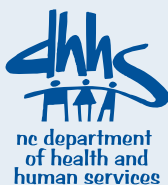


HEALTHY NORTH CAROLINA 2020 TECHNICAL REPORT



May 2011





North Carolina Institute of Medicine

shaping policy for a healthier state

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, health care access, and quality of health care in North Carolina.

The full text of this report is available online at <http://www.nciom.org>

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Suggested citation

North Carolina Institute of Medicine. *Healthy North Carolina 2020 Technical Report*. Morrisville, NC: North Carolina Institute of Medicine; 2011.

North Carolina Institute of Medicine in collaboration with the Governor's Task Force for Healthy Carolinians; Division of Public Health, North Carolina Department of Health and Human Services (NC DHHS); the Office of Healthy Carolinians and Health Education, NC DHHS; and the State Center for Health Statistics, NC DHHS.

Supported by the Kate B. Reynolds Charitable Trust, The Duke Endowment, and the North Carolina Health and Wellness Trust Fund.

Any opinion, finding, conclusion or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view and policies of the Kate B. Reynolds Charitable Trust, The Duke Endowment, or the North Carolina Health and Wellness Trust Fund.

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HEALTHY NORTH CAROLINA 2020 TECHNICAL REPORT

INTRODUCTION

Healthy North Carolina 2020 Technical Report^a

The goal of the Healthy North Carolina (HNC) 2020 project was to develop the state's 2020 health objectives. This work began in late 2009 and culminated with the release of the 2020 objectives in January 2011. The publication released in January, *Healthy North Carolina 2020: A Better State of Health*, highlights the 40 objectives, briefly describes the rationale for their selection, and includes key health disparities, as well as strategies to address the objectives. The purpose of this companion publication, entitled the *Healthy North Carolina 2020 Technical Report*, is to provide additional background information for each of the 13 focus areas and more information about why each of the 40 objectives was selected and how targets were set. To provide an online source for additional information, the evidence-based strategy tables from the first report have been included in this technical report. The *Healthy North Carolina 2020 Technical Report* begins in Chapter 1 with an explanation of the HNC 2020 objective-development process. Chapter 2 covers data considerations, methods, and calculations used to set targets. Chapters 3-15 are organized by the 13 HNC 2020 focus areas. Finally, the appendices include a complete listing of the HNC 2020 objectives, acknowledgments, and member lists of all the HNC 2020 experts who dedicated their time and expertise to this project, including members of the Governor's Task Force for Healthy Carolinians, the HNC 2020 steering committee, and the HNC 2020 subcommittees. Both the technical report and the briefer publication released in January are available at <http://www.nciom.org/publications/?healthy-north-carolina-2020-a-better-state-of-health>.



^a The *Healthy North Carolina 2020 Technical Report* is solely an online publication.

Every 10 years since 1990, North Carolina has set decennial health objectives with the goal of making North Carolina a healthier state. One of the primary aims of this objective-setting process is to mobilize the state to achieve a common set of health objectives. North Carolina had more than 100 objectives for the year 2010. Although these objectives formed a comprehensive list of health indicators, the large number of them made it difficult to focus attention on key objectives that could lead to overall health improvement. Thus, one of the goals of the HNC 2020 project was to develop a limited number of health objectives. There are 40 objectives within 13 specific focus areas for the year 2020. An *objective* is what we aim to accomplish, such as a reduction in the percentage of people with diabetes. Each HNC 2020 objective includes a discrete *target* that provides a quantifiable way to measure our success in reaching each HNC 2020 objective, such as a 10% reduction in the percentage of people with diabetes. Thus, the HNC 2020 objectives provide a common set of health indicators that we, as a state, can work to improve, while the targets assigned to the objectives enable us to monitor our progress, or lack thereof, toward achieving these common health objectives.

The HNC 2020 objectives were developed over a one-year period on behalf of the Governor’s Task Force for Healthy Carolinians. (See Appendix C for the Governor’s Task Force member list.) The Governor’s Task Force was charged by the Governor to develop these health objectives. According to the Executive Order, objectives “must be measurable, include measures to benefit the State’s disparate populations, emphasize individual and community intervention, emphasize the value of health promotion and disease prevention in our society, and be achievable by the year 2020.”^b Due to the North Carolina Institute of Medicine’s (NCIOM) prior work in developing the state’s Prevention Action Plan,^c the Governor’s Task Force asked the NCIOM to facilitate the development of the 2020 objectives. The NCIOM, in collaboration with the Governor’s Task Force for Healthy Carolinians; the Division of Public Health, North Carolina Department of Health and Human Services (NC DHHS); the Office of Healthy Carolinians and Health Education, NC DHHS; and the State Center for Health Statistics, NC DHHS, helped lead the development of the 2020 objectives. This work was generously supported by The Duke Endowment, the Kate B. Reynolds Charitable Trust, and the North Carolina Health and Wellness Trust Fund.

The overall work in developing the 2020 objectives and targets was led by a steering committee that comprised the State Health Director, the Chair of the Governor’s Task Force for Healthy Carolinians, and other public health and prevention experts. (See Appendix D for the steering committee member list.) These experts provided guidance for the development of the objectives and the selection of targets. Building off the prior work of the NCIOM Prevention Task Force in developing the *Prevention Action Plan*, the steering committee identified 13 focus areas for the HNC 2020 objectives. Nine of the 13 HNC 2020 focus areas had been identified in the *Prevention Action Plan* as major preventable risk factors contributing to the state’s leading causes of death and disability. These nine HNC 2020 focus areas are tobacco use, nutrition and physical activity, injury and violence, sexually transmitted disease and unintended pregnancy, substance abuse, mental health, environmental health, infectious disease and foodborne illness, and social determinants of health.^d The steering committee added four additional focus areas (for a total of 13), which include maternal and infant health, oral health, chronic disease, and a cross-cutting focus area. These focus areas were incorporated to capture other significant public health problems as well as additional summary measures for population health.

In addition to establishing the 13 focus areas, the steering committee identified different methods for establishing the targets for the 2020 objectives. The goal was to establish targets that were *aspirational* yet

b North Carolina Executive Order No. 26, Reestablishing the Governor’s Task Force for Healthy Carolinians. October 8, 2009.

c For the full NCIOM Prevention Task Force report, *Prevention for the Health of North Carolina: Prevention Action Plan*, see: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/PreventionReport-July2010.pdf>.

d “Violence” was not part of the NCIOM Prevention Task Force’s injury study area, but was included for Healthy North Carolina 2020.

achievable. The steering committee examined several different target-setting methods for states.¹ Among those reviewed were using an absolute percentage change over time, using a compounded percentage change over time, and using current Healthy People targets.^e The review of these methods helped to inform the specific methods ultimately used in the HNC 2020 target-setting process. These methods are discussed in detail in Chapter 2.

The NCIOM convened 11 different subcommittees to develop objectives and targets within each specific focus area. (See Appendix E for a complete list of all subcommittee members.) Each subcommittee comprised subject matter experts charged with identifying three critical health objectives in a specific focus area. Subcommittees were also asked to identify one of the three objectives as the *key performance indicator* for that focus area. These specific indicators were selected for various reasons; however in many cases, the key performance indicator was selected because it best represents the particular focus area. All selected objectives had to meet the criteria of being *actionable* and *measurable*. Thus, some potential objectives were rejected due to a lack of knowledge about how to intervene to make improvements or because data are not routinely collected to measure the specific health problem, and therefore a baseline value and target could not be set. Subcommittees were also asked to help establish the targets for the objectives by using one of the recommended target-setting methods whenever possible. The steering committee developed the objectives and targets for the chronic disease and cross-cutting focus areas. In addition, the steering committee reviewed the proposed objectives and targets of the 11 subcommittees to ensure that the objectives, collectively, were balanced in form and that the level of aspiration was similar throughout all targets. The full set of objectives was then reviewed and ultimately approved by the Governor’s Task Force for Healthy Carolinians. Members of the subcommittees, steering committee, and the Governor’s Task Force for Healthy Carolinians are collectively referred to in this technical report as the *HNC 2020 experts*.

More than 150 North Carolinians—including public health and health professionals, state and local public health officials, representatives from Healthy Carolinians partnerships and nonprofits, community leaders, academics, and others—contributed their expertise, experience, and time to the development of the HNC 2020 objectives. The consensus-based approach used in the HNC 2020 process was vital to the selection of a limited number of robust objectives and to the establishment of aspirational yet achievable targets. In addition, this process was intended to generate greater ownership of the objectives. Such ownership is essential to inspiring action.

Reaching the 2020 objectives and targets will be a statewide initiative, and success is possible only through concerted and coordinated state, regional, and local efforts. The Division of Public Health, NC DHHS, led by the state health director, will serve as the lead agency in the implementation of activities related to HNC 2020. More information about such activities is available in *Healthy North Carolina 2020: A Better State of Health* at <http://www.nciom.org/publications/?healthy-north-carolina-2020-a-better-state-of-health> and on the Division of Public Health’s website at <http://publichealth.nc.gov/hnc2020/>.

Reference

1. Public Health Foundation. Setting target levels for objectives. http://www.phf.org/pmqi/HPtools/state/DE_setting_targets_for_objectives.pdf. Published November 2000. Accessed November 18, 2010.

^e Healthy People is a federal effort that provides 10-year national health objectives. The Healthy North Carolina 2020 objectives were developed before the Healthy People 2020 national objectives were finalized. Therefore these processes were completed independently.

Data availability was an important consideration in the development of all HNC 2020 objectives. Across the objectives, various data sources were used. In addition, there is variation in the number of years of national-, state-, and county-level data that were available. Targets for all objectives were selected by the HNC 2020 experts using the most recent available data and standardized target-setting methods. A data grid was developed for each focus area and is included within the chapter for that particular focus area. Data grids show baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes. This chapter provides a description of the methods used for developing the data grids, as well as the target-setting methods that were considered across the focus areas.

Data Methods

The following six rules were used in developing the data grids for the HNC 2020 objectives. However, data were not available that fit all these criteria for each objective; limitations are noted below. (Specific limitations are noted in the data grids.)

1) Data are high quality, publicly available, and derived using consistent methods.

All HNC 2020 objectives used data from widely respected, publicly available data sources such as the Centers for Disease Control and Prevention and the North Carolina State Center for Health Statistics. The time range of data used for objectives was, in part, affected by methods used to calculate values since changes in data methods prevent accurate comparisons of data. Thus, data were only used for years where methods were consistent. When possible, HNC 2020 used the same data sources and methods that state departments, such as the North Carolina Department of Health and Human Services, use to track public health indicators.

2) Data for North Carolina are the most recent data available.

For all objectives, the most recent data available for North Carolina was used to set targets. Since the release of data varies by source, the most recent data available are treated as North Carolina's current rate or percentage (and is reported as "current rate or percentage" on the data grid). In most cases, data were not available for 2010, so earlier years of data have been reported. Often the North Carolina State Center for Health Statistics was able to supply more recent state data for objectives than what was nationally available.

3) National state-level data are reported.

Whenever available, the most recent national state-level data were reported for all objectives. Data from the District of Columbia and United States territories were excluded. However, not all states report data in every year. The number of states reporting data is noted on the data grid. When national state-level data were not available, it is indicated as not available (N/A) on the data grids.

4) National state-level data are compared to North Carolina data.

When national state-level data were available, rankings comparing North Carolina to other states are provided. Rankings are based upon the most recent national state-level data available (that include North Carolina). For all rankings, 1st is best, and rankings have been marked as not available (N/A) when national state-level data were unavailable or when national state-level data did not include North Carolina.

5) Data represent a 10-year period of change in North Carolina.

For most objectives, North Carolina data were collected to represent a 10-year period of change. Note that a 10-year period of change contains 11 years of data. This captures a baseline year, which is the earliest data year for a particular objective. This baseline year is followed by 10 years of data, which represent the 10-year period of change. The baseline data year is therefore ideally 10 years *before* the most current year (i.e., if the current data year is 2008, the baseline data year is 1998). Frequently though, data representing a 10-year period of change

were not available. Ten-year periods of change were not available if data had not been collected for a sufficient length of time or if data calculation or collection methods changed, therefore preventing comparison between current data and baseline data. The length of the period of change is reported on each data grid along with the years of available data, as well as the reasons data availability was limited for particular objectives.

6) National state-level period of changes are similar to North Carolina's period of change.

Whenever possible, similar periods of change were obtained for national state-level data in order to compare trends between North Carolina and other states. Ideally, the period of change for other states utilizes the same baseline and current data year as North Carolina's data. However, often this was not possible. In these cases, the same baseline data year used for North Carolina was used for other states (if available). Thus, the data range available for other states does not always represent a 10-year period of change. This occurs, for example, when North Carolina's current year is more recent than what is available for other states. The resulting period of change is then longer for North Carolina than for other states. As noted above, due to data limitations, the period of change is often less than 10 years for North Carolina as well. The length of the period of change (from the baseline data year to the current year) has been indicated on the data grid.

Target-Setting Methods

Four core methods were initially considered in setting targets for all objectives, including: 1) reaching the value of the best state in the nation (i.e., the state with the best current value for a given objective); 2) relying on the best-performing state in the nation to determine achievable gains (i.e., the state with the most improvement for a given objective); 3) maintaining North Carolina's current pace of improvement; and 4) improving upon North Carolina's current value. In general, all data grids show potential targets values derived using these four core methods for each objective. However, due to data limitations, targets could not be calculated for every objective using these methods; whenever these calculations were not possible, the potential target is marked as "–". Other target-setting methods were necessary to consider when there were data limitations or when trends or potential target values were unrealistic or un-replicable. These other methods include reaching the top percentile of counties; improving North Carolina's current pace; relying on national or state standards, recommendations, or goals; using North Carolina's previous best value; reaching the projected national average; and in one case, relying on the informed opinion of the HNC 2020 experts. Each target-setting method is described in more detail below and the formulas used for calculating each target are included in the table at the end of this chapter.

Core Methods

1) Best State

This target-setting method shows what North Carolina's 2020 target would be if North Carolina's target was set equal to the value of the best rate or percentage seen in another state in the most current data year.

2) Best-Performing State's Pace

This target-setting method shows what North Carolina's projected 2020 target would be if North Carolina's target was inferred using the annual percentage change seen by the best-performing state over the given period of time. Using this method entailed applying the best state's annual pace of improvement to North Carolina's current value out to 2020. This target was calculated by first finding the best-performing state. The best-performing state is the state that achieved the largest overall percentage change (the most improvement from the baseline year to the current year). Each state's overall percentage change was calculated and ranked in order to find the state with the most improvement. Next, the annual percentage change of the best-performing state over the period of change was calculated. This annual percentage change is reported on each data grid as the "Best-Performing State's Pace." Finally, this annual percentage change was applied to North Carolina's current rate or percentage out to 2020. This is reported on each data grid as "Best-Performing State's Pace Applied to NC's Current Value Out to 2020."

3) Maintaining North Carolina's Pace of Change Out to 2020

This target-setting method shows what North Carolina's 2020 target would be if North Carolina were to maintain the annual percentage change seen over the previous period of change. This target was found by first calculating the overall percentage change from the baseline year to the current year. The annual percentage change was then calculated. This is reported on each data grid as "NC's Pace." Finally, this annual percentage change was applied to North Carolina's current rate or percentage out to 2020. This is reported as "NC's Pace Applied Out to 2020." Note that when North Carolina's current pace is referred to, no factors other than the values of the baseline and current data years were considered. In other words, factors such as resources and efforts were not considered in projecting where North Carolina would be by 2020 if it maintains its current pace.

4) Making a 10% Improvement in North Carolina's Current Value

This target-setting method shows what North Carolina's rate or percentage would be in 2020 if North Carolina were to make a 10% improvement in its current value (rate or percentage). This is reported on the data grids as "10% Improvement in NC's Current Rate or Percentage."

Other Methods**5) Top Percentile of Counties**

This target-setting method was considered when national state-level were not available and when county-level data were available. This method approximates a best of the best approach (similar to the best state method), where the goal is for the statewide rate or percentage to reach a value that is better than 90% of North Carolina counties. A target based on the 90th percentile yields a value that is above the rate or percentage seen in 90% of reporting counties.^a A target based on the 10th percentile yields a value that is lower than the rate or percentage seen in 90% of counties.

6) Improving Upon North Carolina's Pace

This target-setting method is based upon a 10% improvement in North Carolina's current pace ("NC's Pace Applied out to 2020") determined in the given time period (between the baseline to the current data year). It is reported as "NC's Pace + 10% Improvement."

7) National or State Standard, Recommendation, or Goal

This target-setting method is based upon national- or state-level standards, recommendations, or goals for applicable objectives. When appropriate, targets were extrapolated from the applicable standard, recommendation, or goal.

8) North Carolina's Previous Best

This target-setting method highlights the best rate or percentage North Carolina achieved during the period for which data are available. This target was useful when North Carolina's trend was moving in an undesirable direction or when national state-level comparison data were not available.

9) Projected National Average

This target-setting method is based upon what the projected national average rate or percentage is expected to be in 2020.

10) Expert Opinion

When none of the preceding target-setting methods produced a satisfactory target, a target was selected based on the informed opinion of the HNC 2020 experts.

^a Calculations were done using Microsoft Excel's percentile function, which uses a formula similar to the formula reported in Table 1: Formulas for HNC 2020 Target-Setting Methods.

Table 1: Formulas for HNC 2020 Target-Setting Methods

| Targets | Formula |
|---|---|
| 1) Best State | Highest or lowest national state-level rate or percentage in the current data year. |
| 2) Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | $= ((1 + ('Best-Performing State's Pace' / 100))^{(2020 - 'NC's current data year')}) * ('NC's current rate')$ <p>Best-Performing State's Pace = $((1 + ('Overall percentage change' / 100))^{(1 / ('Current year' - 'Baseline year'))}) - 1 * 100$</p> <p>Overall percentage change = $(('Current rate or percentage' - 'Baseline rate or percentage') / ('Baseline rate or percentage')) * 100$</p> |
| 3) NC's Pace Applied Out to 2020 | $= (((1 + ('NC's Pace' / 100))^{(2020 - 'NC's current data year')}) * ('NC's current rate or percentage'))$ <p>NC's Pace = $((1 + ('Overall percentage change' / 100))^{(1 / ('Current year' - 'Baseline year'))}) - 1 * 100$</p> <p>Overall percentage change = $(('Current rate or percentage' - 'Baseline rate or percentage') / ('Baseline rate or percentage')) * 100$</p> |
| 4) 10% Improvement in NC's Current Rate or Percentage | $= ('NC's current rate or percentage' * 0.9)$ or $(('NC's current rate or percentage' * 1.1))$ |
| 5) 10th or 90th Percentile of NC's Counties | $R_p = R_k + d(R_{k+1} - R_k); \text{ where } 1 < n < N$ <p>$n = (P/100) * (N-1) + 1$; where n is the number of values in the data set that fall below the percentile level, P is the percentile level (i.e., 10th or 90th) and N is the number of values in the data set. It is also necessary to rank the data from smallest to largest. K is the integer component of n and d=the decimal component of n. Rp is the rate for the P percentile, RK is the rate of the Kth largest value in the data and RK+1 is the next largest rate (i.e., R10 is the 10th largest value in the data set).</p> <p>$R_p = R_n$; where n=1</p> <p>$R_p = R_N$; where n=N</p> |
| 6) NC's Pace + 10% Improvement | $= ('NC's Pace Applied Out to 2020' * 0.9)$ or $(('NC's Pace Applied Out to 2020' * 1.1))$ Formula for "NC's Pace Applied Out to 2020" target is above. |
| 7) National or State Standard, Recommendation, or Goal | Target based on reaching standard, recommendation, or goal. In one case, a formulas was used, which is described on the relevant data grid. |
| 8) NC's Previous Best | North Carolina's best rate or percentage from the period for which data is available. |
| 9) Projected National Average | Target basd on projected national average, and no formula required. |
| 10) Expert Opinion | Target based upon expert opinion, and no formula required. |

Background^a

Tobacco use is the leading cause of preventable death in the nation.¹ At least 30% of all cancer deaths and nearly 90% of lung cancer deaths—the leading type of cancer death among men and women—are caused by smoking.² Oral, esophageal, pancreatic, cervical, bladder, stomach, and kidney cancers can also be caused by smoking. Other diseases linked to smoking include chronic obstructive lung disease and coronary heart disease, and those who smoke have increased risks for heart attack and stroke.³ Furthermore, tobacco use causes premature birth, low birthweight, stillbirth, and sudden infant death syndrome (SIDS).⁴

There are no safe tobacco products.⁵ Other tobacco products (OTP), such as cigars, pipes, bidis, kreteks, and smokeless tobacco, are not safe alternatives to cigarettes. Cigars can cause larynx, mouth, esophagus, and lung cancers; bidis increase the risk for coronary heart disease and cancers of the mouth, pharynx, lung, esophagus, stomach, and liver; and smokeless tobacco (often called “spit” or “chewing” tobacco) contains 28 cancer-causing agents and can cause oral, esophageal, and pancreatic cancers, and has been linked to periodontitis and tooth decay.^{4,5} Secondhand smoke is another dangerous facet of tobacco use, to which there is no safe level of exposure. Secondhand smoke contains more than 7,000 chemicals; approximately 70 cause cancer and hundreds are toxic. Exposure to secondhand smoke can trigger heart attacks, cause strokes, and lead to sudden death.^{6,7}

In addition to the health effects of tobacco use, it is also a costly problem in the state. It led to medical expenditures of \$2.4 billion in 2004, including \$769 million to Medicaid.⁸ Secondhand smoke exposure alone led to excess medical costs in 2006 of approximately \$293.3 million (in 2009 dollars).⁹

Healthy North Carolina 2020: Tobacco Use Objectives

The HNC 2020 experts identified the following three measures for objectives in the tobacco use focus area: the percentage of adults who smoke, the percentage of high school students who use any tobacco product, and the percentage of people exposed to secondhand smoke in the workplace. The data grid on page 14 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: DECREASE THE PERCENTAGE OF ADULTS WHO ARE CURRENT SMOKERS TO 13.0% (KEY PERFORMANCE INDICATOR)

Rationale for selection: In 2009, approximately 2 million (20.3%) adults in North Carolina smoked, compared to the national average of 17.9%, ranking North Carolina 36th out of all states.^{10,11} It is reported that more than 70% of smokers want to quit, and more than 40% have tried to quit.^{12,13} In 2009, 59.3% of adult smokers in North Carolina reported they stopped smoking for one or more days in an attempt to quit smoking.¹⁴ Quitting tobacco is difficult and many relapse without assistance.¹² Advice from a medical provider to quit smoking and intensive counseling interventions can increase an individual’s likelihood of quitting. A combination of counseling and cessation medications is the most effective strategy.¹²

While all the tobacco use objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area. Current efforts to reduce smoking among high school students will ultimately be reflected through this objective, and the implementation of more comprehensive secondhand smoke policies will affect this objective as well.

^a More information about tobacco use in North Carolina can be found in Chapter 3 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/PreventionReport-July2010.pdf>.

Rationale for target (refer to data grid): If North Carolina continues its pace from 1999-2009 through to the year 2020, the percentage of adults who smoke will decrease to 16.4%. Given the state's past success in reducing tobacco use, the passage of Session Law 2009-27 (House Bill 2) in 2009, and tobacco prevention and control activities occurring throughout the state, the HNC 2020 experts elected to set a 2020 target that was aggressive and decided the best-performing state method was the most appropriate method. Washington state, the best-performing state from 1999-2009, demonstrated a 33.5% decrease in the percentage of adult smokers during this time period. Applying Washington's annual pace of improvement to North Carolina's current value yields a 2020 target of 13.0%, which HNC 2020 experts decided was both aspirational and achievable. (The best state target-setting method yielded a potential 2020 target of 9.8% (Utah), which HNC 2020 deemed too aspirational and not achievable by 2020.)

OBJECTIVE 2: DECREASE THE PERCENTAGE OF HIGH SCHOOL STUDENTS REPORTING CURRENT USE OF ANY TOBACCO PRODUCT TO 15%

Rationale for selection: Most adult smokers begin smoking before the age of 18, with the average age of initiation between the ages of 12 and 14 years (when youth are in middle school and at the beginning of high school).¹⁵ Moreover, smokers typically become addicted before they reach 20 years of age.¹⁶ Smokeless tobacco is of special concern among youth because youth who use smokeless tobacco are more likely to smoke cigarettes.¹⁷ In contrast to North Carolina having an adult smoking percentage higher than that of the nation, the percentage of high school students who smoke is less than the national average (16.7% versus 17.2%, respectively).^{18,19} However, despite the progress made in reducing cigarette use among high school students—down from 31.6% in 1999 to 16.7% in 2009—a significant amount of work still needs to be done to protect youth from tobacco use because in addition to cigarettes, other forms of tobacco also pose serious health risks. In 2009, 25.8% of high school students in North Carolina reported current use of *any* tobacco product. This includes 8.5% reporting smokeless tobacco use, 13.2% reporting cigar use, 3.7% reporting bidi use, and 4.0% reporting pipe use.^b Nationwide, 23.9% of high school students reported current use of *any* tobacco product.¹⁹

Rationale for target (refer to data grid): National state-level data were not available for this measure; therefore, the target was based upon North Carolina data. The HNC 2020 experts decided the potential target that was the most aspirational and yet achievable was improving upon North Carolina's 1999-2009 pace. If North Carolina continues its pace from 1999-2009 through to the year 2020, the percentage of high school students who report use of any tobacco product will decrease to 16.7%. Applying a 10% improvement to this pace yields a 2020 target of 15.0%.

OBJECTIVE 3: DECREASE THE PERCENTAGE OF PEOPLE EXPOSED TO SECONDHAND SMOKE IN THE WORKPLACE IN THE PAST SEVEN DAYS TO 0%

Rationale for selection: Secondhand smoke is a noxious substance. Exposure can cause disease and premature death among children and adult nonsmokers.²⁰ Approximately 1,700 North Carolinians die every year from secondhand smoke exposure.²¹

For adults, the workplace can be major source of exposure to secondhand smoke. In 2008, 14.6% of North Carolinians reported exposure to secondhand smoke at the workplace in the past seven days.²² North Carolina Session Law 2009-27 (House Bill 2), which went into effect on January 2, 2010, prohibits smoking in restaurants and most bars.^c However, other worksites are not included. The law permits local governments to restrict smoking in certain public places by allowing them to “adopt and enforce ordinances, board of health rules, policies restricting or prohibiting smoking that are more restrictive than State law and apply that in

b Tobacco Prevention and Control Branch, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. May 20, 2010.

c Cigar bars and private clubs are exempted.

local government buildings, on local government grounds, in local vehicles, or in public places.” Thus, local governments can use the parameters of the bill to extend smoke-free policies in their communities.

The HNC 2020 experts decided that secondhand smoke exposure is both a public health issue and a healthy workforce issue. The current partial coverage of the law leads to disparities in exposure. Blue collar workers are more likely to be exposed to secondhand smoke than white collar workers.^{23,24} Until a comprehensive statewide law is passed protecting all workers in the state, local governments can extend protection from secondhand smoke to more workers in their communities. In addition to reducing secondhand smoke exposure, smoke-free policies in the workplace lead to less smoking among covered workers.^{24,25}

Rationale for target (refer to data grid): While only 2008 data were available for this objective, the HNC 2020 experts were able to easily set a target. The 2020 target of 0% was set based upon the US Surgeon General’s pronouncement that no level of secondhand smoke is safe and the *Guide to Community Preventive Services’* recommendation that smoke-free worksites help reduce tobacco use among workers.

Strategies to Prevent and Reduce Tobacco Use

| Level of the Socioecological Model | Strategies |
|------------------------------------|--|
| Individual | Be tobacco free. ²⁶ |
| Family/Home | Maintain a tobacco-free home. ²⁷ |
| Clinical | Offer comprehensive cessation services (counseling and medication) to help smokers and other tobacco users quit ²⁸ ; stay up-to-date on evidence-based clinical preventive screenings, counseling, and treatment guidelines. ²⁹ |
| Schools and Child Care | Enforce tobacco-free school laws ³⁰ ; enforce smoke-free child care facility rules ^e ; implement evidence-based healthful living curricula in schools. ^{31,32} |
| Worksites | Institute a worksite wellness program using interventions accompanied by incentives for cessation ³³ ; implement smoking bans or restrictions in worksites. ³⁴ |
| Insurers | Provide coverage with no cost sharing for tobacco use screening and counseling for adolescents; and for screening, cessation counseling, and appropriate cessation interventions, including cessation medications, for adults; and for screening and pregnancy-tailored counseling for pregnant women ^{f,35} ; provide coverage for drug use assessment for individuals aged 11-21 years. ³⁶ |
| Community | Expand smoking bans or restrictions in community spaces ³⁴ ; encourage mass media campaigns (coupled with local laws directed at tobacco retailers) ^{34,37} ; support school-based and school-linked health services. ³² |
| Public Policies | Expand tobacco-free policies to all workplaces and in community establishments ³⁴ ; increase the tobacco tax ³⁸ ; provide tax incentives to encourage worksite wellness programs ³¹ ; fund and implement a Comprehensive Tobacco Control Program ³¹ ; provide funding to support school-based and school-linked health services and achieve a statewide ratio of 1 school nurse for every 750 middle and high school students. ³² |

d The strategy table above, as well as those throughout this report, show levels of a modified socioecological model of health behavior. The intention of this model is to provide a framework for public health improvement by focusing interventions at various “levels.” More information about ecological models of health behavior can be found in Glanz K, Rimer B, Lewis MF, eds. *Health Behavior and Health Education*, 3rd edition. San Francisco, CA: Jossey-Bass; 2002.

e 10A NCAC § 09.0604(g).

f Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.

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Background^a

The US Surgeon General calls obesity a “major public health challenge” and a “national health threat.”¹ Individuals who are overweight or obese are at increased risk for various serious health conditions including, but not limited to, coronary heart disease, type 2 diabetes, high blood pressure, stroke, respiratory problems, and osteoarthritis. They are also at increased risk for certain cancers including endometrial, breast, and colon.² The percentage of North Carolinians who are overweight or obese has increased over the years. Most notable is the increase in the percentage of adults who are obese. In 1995, 35.4% were overweight and 16.9% were obese, whereas in 2009, 35.3% were overweight and 30.1% were obese.³

Physical activity and nutrition are key factors in helping individuals reach and maintain a healthy body weight. Balancing caloric intake with energy expenditure is part of the overall equation that is essential to healthy weight. As noted by the Centers for Disease Control and Prevention, other factors are also important such as genes, metabolism, behavior, the environment, culture, and socioeconomic factors.⁴ However, physical activity and nutrition are modifiable health risk factors.⁵ Individuals who practice healthy physical activity and nutrition behaviors reduce their risk for being overweight and obese and thereby reduce their risk for the aforementioned associated health conditions and diseases.

Healthy North Carolina 2020: Physical Activity and Nutrition Objectives

The HNC 2020 experts identified the following three measures for objectives in the physical activity and nutrition focus area: the percentage of high school students who are neither overweight nor obese, the percentage of adults getting the recommended amount of physical activity, and the percentage of adults who consume five or more servings of fruits and vegetables per day. The data grid on page 22 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: INCREASE THE PERCENTAGE OF HIGH SCHOOL STUDENTS WHO ARE NEITHER OVERWEIGHT NOR OBESE TO 79.2%^b (KEY PERFORMANCE INDICATOR)

Rationale for selection: Obese youth are more likely to have risk factors for cardiovascular disease including high blood pressure and high cholesterol. With the increase in obesity, type 2 diabetes has also emerged as a health problem among youth. Aside from the physical effects, obesity also takes a toll on mental health. Obese youth are often stigmatized and discriminated against and, as a result, can suffer from low self-esteem, which can lead to impaired functioning in school and in social settings.⁶ In addition, children who are obese are more likely to be obese as adults.⁷

A substantial proportion of youth of all ages in North Carolina are overweight or obese. In 2009, 14.6% of high school students were overweight, while 13.4% were obese.⁸ This means that one in four high school students were not at a healthy weight (i.e., 72.0% were neither overweight nor obese.)⁹ The HNC 2020 experts focused on the weight of high school age youth because while the objective outwardly focuses on high school students, changing the weight status of this population segment means intervening earlier, i.e., implementing strategies during the elementary and middle school years. Thus, this objective best captures strategies that will impact K-12 students. In addition, while all the physical activity and nutrition objectives are important, the

a More information about physical activity, nutrition, and overweight/obesity in North Carolina can be found in Chapter 4 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/PreventionReport-July2010.pdf>.

b The Cross-Cutting Focus Area chapter contains an objective addressing the prevalence of overweight and obesity among adults.

HNC 2020 experts selected this objective as the key performance indicator for this focus area. This objective is the only outcome measure of the three objectives.

Rationale for target (refer to data grid): If North Carolina continues its pace from 2001-2009 through to the year 2020, the percentage of high school students who are *neither* overweight nor obese will actually decline to 70.9%. This means that the trend is moving in an undesirable direction, and that the percentage of students who are obese or overweight will increase by 2020. The HNC 2020 experts determined that target-setting methods based on other states' data were not appropriate because no state demonstrated an improving performance (i.e., all states' percentages decreased or stayed the same from 2001-2009). The HNC 2020 experts decided that a 10% improvement in North Carolina's current value was most appropriate as the 2020 target-setting method because, of all remaining potential methods, this method best fit the criteria of being aspirational and achievable. Increasing the percentage of high school students who are *neither* overweight nor obese to 79.2% by 2020 represents a 10% increase from the 2009 percentage of 72.0%.

OBJECTIVE 2: INCREASE THE PERCENTAGE OF ADULTS GETTING THE RECOMMENDED AMOUNT OF PHYSICAL ACTIVITY TO 60.6%^c

Rationale for selection: Regular physical activity is important for the maintenance of a healthy weight and can lower an individual's risk for cardiovascular disease, high blood pressure, and high cholesterol. The risk for type 2 diabetes and metabolic syndrome is also lowered, as is the risk for some cancers, including breast and colon. Other benefits of regular physical activity include stronger bones and muscles, improved mental health, and reduced risk for falls.¹⁰ Too few North Carolinians are physically active on a regular basis. In fact, fewer than half of all adults (46.4%) meet current physical activity recommendations (defined in the Behavioral Risk Factor Surveillance System survey as at least 30 minutes of moderate physical activity five or more days per week or vigorous physical activity for at least 20 minutes three or more days per week).

Rationale for target (refer to data grid): From 2001-2009, the percentage of adults getting the recommended amount of physical activity increased. If North Carolina continues this pace through to the year 2020, the percentage of adults getting the recommended amount of physical activity will further increase to 52.5% by 2020. The best state target-setting method was chosen to set the 2020 target for this objective because, of all methods, this method resulted in a 2020 target that was deemed most aspirational and achievable. In 2009, Alaska was the best state with 60.6% of adults getting the recommended amount of physical activity. Thus, North Carolina's 2020 target is 60.6%.

OBJECTIVE 3: INCREASE THE PERCENTAGE OF ADULTS CONSUMING FIVE OR MORE SERVINGS OF FRUITS AND VEGETABLES PER DAY TO 29.3%^d

Rationale for selection: Fruits and vegetables are important components of a healthy diet. The protective benefits of a diet high in fruits and vegetables have been documented by numerous studies that show these foods protect against numerous chronic diseases such as cardiovascular disease (including heart attack and stroke) and certain cancers.¹¹ Only one in five (20.6%) North Carolinians consumes five or more servings of fruits and vegetables every day.¹²

It is difficult to obtain accurate dietary intake information about individuals through self-reported questionnaires.¹³ In addition, the availability of population-based dietary data is limited. However, the HNC 2020 experts decided that inclusion of a dietary objective was important as it emphasizes the importance of good nutrition in the prevention of overweight and obesity and the prevention of chronic disease. Further, inclusion of such an objective will encourage the implementation of strategies at both the state and local levels to improve nutrition.

^c The physical activity questions asked through the Behavioral Risk Factor Surveillance System survey changed beginning with the 2011 survey. The State Center for Health Statistics will determine how to best address this change in the annual assessments of progress towards reaching the 2020 objectives.

Rationale for target (refer to data grid): From 2000-2009, the percentage of North Carolina adults eating five or more servings of fruits and vegetables per day decreased from 22.1% to 20.6%. If North Carolina continues its 2000-2009 pace through to the year 2020, the percentage of adults consuming five or more servings of fruits and vegetables per day will actually decrease to 18.9%. The HNC 2020 experts felt that a target for population health should be aspirational and should also represent an improvement over the state's current value. Similar to the physical activity objective, the best state target-setting method was chosen to set the 2020 target for this objective. In 2009, Vermont had the highest percentage of adults consuming five or more servings of fruits and vegetables a day (29.3%). Thus, the HNC 2020 experts set the target to reach Vermont's current value by 2020. Based upon this method, North Carolina's 2020 target is 29.3%.

CHAPTER 4

Physical Activity and Nutrition Focus Area

Physical Activity and Nutrition Data Grid

| | North Carolina | | | | Best States | | Potential Targets | | | Selected Targets | | |
|--|----------------------------|---|--|---|--|---|--|------------|--|---|--|--------------------------|
| | Baseline | Current Rate or Percentage Most recent NC data | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | Selection Method |
| 2020 Objectives | | | | | | | | | | | | |
| Increase the percentage of high school students who are neither overweight nor obese. (Key Performance Indicator) | 72.8% 2001 ¹ | 72.0% 2009 ² | 18th 2001 ¹ 21 states reporting | 27th 2009 ² 42 states reporting | -0.1% (-1.1% overall decrease over 8 years) | 83.1% Utah, 2009 ³ | 0.03% New Jersey, 2001-2009 ^{4,5} (-0.3% overall increase over 8 years) | 83.1% | 72.3% (-0.03% annual increase for 11 years) | 70.9% (-0.1% annual decrease for 11 years) | 79.2% 79.2% | 79.2% 10% Improvement |
| Increase the percentage of adults getting the recommended amount of physical activity** | 42.4% 2001 ¹ | 46.4% 2009 ² | 41st 2001 ¹ 50 states reporting | 41st 2009 ² 50 states reporting | 1.1% (-9.4% overall increase over 8 years) | 60.6% Alaska, 2009 ³ | 5.9% Kentucky, 2001-2009 ^{4,5} (-57.8% overall increase over 8 years) | 60.6% | 86.9% (-5.9% annual increase for 11 years) | 52.5% (-1.1% annual increase for 11 years) | 51.0% 51.0% | 60.6% Best State |
| Increase the percentage of adults who consume five or more servings of fruits and vegetables per day*** | 22.1% 2000 ¹ | 20.6% 2009 ² | 34th 2000 ¹ 50 states reporting | Tied for 38th 2009 ² 50 states reporting | -0.8% (-6.8% overall decrease over 9 years) | 29.3% Vermont, 2009 ³ | 1.7% Idaho, 2000-2009 ^{4,5} (-16.6% overall increase over 9 years) | 29.3% | 230.5% (-1.7% annual increase for 11 years) | 18.9% (-0.7% annual decrease for 11 years) | 22.7% 22.7% | 29.3% Best State |

Notes:

For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.

* The percentage of students who are neither overweight nor obese is 100% minus the total percentage of students who are overweight or obese. Overweight students have a body mass index (BMI) between the 85th and 95th percentile and obese students have a BMI greater than the 95th percentile, based on reference data. 2001 was chosen as the baseline year for all states because NC did not report 1999 data. The overall percentage change from 2001-2009 could be calculated only for the 21 states that reported data in both 2001 and 2009.

** Adults (18 and older) living in households getting the recommended physical activity of 30+ minutes of moderate physical activity five or more days per week, or vigorous physical activity 20+ minutes three or more days per week. 2001 was used as the base year because data were not collected in 1999 and in 2000 the recommended level of physical activity was different.

*** Adults (18 and older) living in households. 2000 was chosen as the baseline year because data was not collected in 1999.

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Strategies to Prevent and Reduce Obesity by Promoting Healthy Eating and Physical Activity

| Level of the Socioecological Model | Strategies |
|------------------------------------|---|
| Individual | Eat more fruits and vegetables; increase physical activity level. ¹⁴ |
| Family/Home | Serve fruits and vegetables with meals ¹⁵ ; reduce screen time at home. ¹⁵ |
| Clinical | Offer obesity screening for children aged more than 6 years and for adults, and offer counseling and behavioral interventions for those identified as obese ¹⁶ ; expand childhood obesity prevention initiatives for children ¹⁴ ; stay up-to-date on evidence-based clinical preventive screening, counseling, and treatment guidelines. |
| Schools and Child Care | Offer high-quality physical education and healthy foods and beverages ^{14,17,18} ; implement evidence-based healthful living curricula in schools ^{17,19} ; expand physical activity and healthy eating in afterschool and child care programs ^{17,18} ; support joint use of recreational facilities. ¹⁷ |
| Worksites | Institute worksite wellness programs and promote healthy foods and physical activity ²⁰ ; assess health risks and offer feedback and intervention support to employees. ²¹ |
| Insurers | Offer coverage at no cost sharing for obesity screening for children aged more than 6 years and adults and for counseling and behavioral interventions for those identified as obese. ^{e,16} |
| Community | Implement <i>Eat Smart, Move More</i> community-wide obesity prevention strategies ¹⁷ ; promote menu labeling in restaurants ¹⁸ ; build active living communities ¹⁴ ; support joint use of recreational facilities ¹⁷ ; support school-based and school-linked health services. ¹⁹ |
| Public Policies | Require schools to offer high-quality physical education and healthy foods and beverages ^{14,17,18} ; require schools to implement evidence-based healthful living curricula in schools ^{17,19} ; fund <i>Eat Smart, Move More</i> community-wide obesity prevention plans ¹⁷ ; provide community grants to promote physical activity and healthy eating ^{14,17} ; support community efforts to build active living communities ¹⁴ ; provide tax incentives to encourage comprehensive worksite wellness programs ¹⁷ ; and provide funding to support school-based and school-linked health services and achieve a statewide ratio of 1 school nurse for every 750 middle and high school students. ¹⁹ |

e Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.

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Background^a

Injury and violence are significant problems in North Carolina, resulting in death and disability for tens of thousands every year. The two main categories of injury are intentional injury (violence) and unintentional injury. These are distinguished by whether harm to another individual or to one's self was intended (intentional injury or violence) or not intended (unintentional injury). There are many different areas of injury prevention that need to be addressed in North Carolina, including unintentional injuries such as falls, poisonings, and motor vehicle crashes; and intentional injuries, such as homicide, suicide, child neglect, and family violence.

Unintentional injury accounts for two-thirds of injury-related deaths in the state, and is the fourth leading cause of death for North Carolinians of all ages. Injury—unintentional and intentional—is the leading cause of death for individuals aged 1 to 49 years. Homicide and suicide (intentional violence) are the first and second leading causes of death for individuals aged 15 to 25 years. In 2007, injuries and violence caused over 6,000 deaths, 154,000 hospitalizations, and 812,000 emergency department visits in North Carolina. In addition, injury and violence impose a significant economic burden on the state resulting in more than \$27 billion each year in medical costs, lost work time costs, and quality of life costs. For instance, more than \$1 billion was spent on medical care for North Carolinians aged 45-64 years in 2005 as a result of unintentional falls.¹ And in 2007, \$51 million was spent on hospital charges for unintentional poisonings.² Injuries and violence are often incorrectly viewed as unavoidable or as accidents, but they have known risk factors and interventions, which make them preventable events.¹

Healthy North Carolina 2020: Injury and Violence Objectives

The HNC 2020 experts identified the following three measures for objectives in the injury and violence focus area: the unintentional poisoning mortality rate, the unintentional falls mortality rate, and the homicide rate. The data grid on page 30 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: REDUCE THE UNINTENTIONAL POISONING MORTALITY RATE TO 9.9 (PER 100,000 POPULATION) (KEY PERFORMANCE INDICATOR)

Rationale for selection: Unintentional poisoning is a significant and growing issue in North Carolina. It is the second leading cause of unintentional injury deaths in North Carolina after motor vehicle fatalities.² However, unlike motor vehicle fatalities, the rate of unintentional poisonings has dramatically increased over the past 10 years.² Unintentional poisonings result from unintentional overdoses of prescription or recreational drugs, as well as exposure to other poisons such as exhaust fumes, pesticides, and solvents.² The vast majority of unintentional poisonings result from the misuse of prescription and over-the-counter drugs: 56% of all unintentional poisonings result from misuse of prescription narcotic painkillers, which include methadone, oxycodone, and hydrocodone.² While deaths resulting from unintentional poisonings are a significant issue, nonfatal injury is a far more common result. North Carolinians are four times more likely to be hospitalized and 10 times more likely to receive treatment in an emergency department for unintentional poisonings than to die from unintentional poisonings.² In addition, while children are unlikely to die from

^a More general information about injury and specific information about unintentional poisonings and unintentional falls in North Carolina can be found in Chapter 8 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/PreventionReport-July2010.pdf>.

unintentional poisonings, they do constitute the majority of nonfatal cases.² In 2008, there were 11.0 deaths per 100,000 population due to unintentional poisoning in North Carolina.^b

While all the injury objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area due to the steep increase seen in the unintentional poisoning mortality rate in the last decade.

Rationale for target (refer to data grid): North Carolina has experienced a drastic increase in its unintentional poisoning mortality rate over the past decade. Between 1999 and 2008, the mortality rate increased 3.5 fold, from 3.1 to 11.0. The HNC 2020 experts determined that target-setting methods based on other states' data were not appropriate because no state demonstrated an improving performance (i.e., all states' rates increased), and because the best state had a very low rate of 1.0 death per 100,000 population, which was deemed unachievable by 2020. Therefore, the HNC experts decided that a target based upon a 10% improvement in North Carolina's current rate was most appropriate. This target is aspirational because it requires reversing the trend, but also achievable because North Carolina had—until very recently—a mortality rate below this target. Thus, based upon this method, North Carolina's 2020 target is 9.9 deaths per 100,000 population.

OBJECTIVE 2: REDUCE THE UNINTENTIONAL FALLS MORTALITY RATE TO 5.3 (PER 100,000 POPULATION)

Rationale for selection: Unintentional falls are the third leading cause of death from unintentional injury for North Carolina residents of all ages. Unintentional falls include falls on stairs, from ladders, out of buildings, on playgrounds, and certain sport-related injuries. Unintentional falls are a significant issue among the elderly, as they are the leading cause of death from injury for adults aged 65 years or older.³ Over 75% of all unintentional fall injury deaths occur among the elderly. As the state population ages, the number of fall-related deaths is expected to rise.¹ The burden of unintentional falls also includes the thousands of individuals injured every year. In 2007 there were 25,000 hospitalizations and 170,000 emergency department visits related to falls. As with the unintentional falls mortality rate, the hospitalization rate for falls is highest among individuals aged 65 years or greater.³ In 2008, there were 8.1 deaths per 100,000 population due to unintentional falls in North Carolina.^c

Rationale for target (refer to data grid): The unintentional falls mortality rate increased in North Carolina from 4.2 to 8.1 per 100,000 population between 1999 and 2008. In contrast, Delaware—the best-performing state—had a rate that decreased by 20% during this period. If North Carolina were to continue its current pace, the mortality rate would be 19.5 deaths per 100,000 population by 2020. The HNC 2020 experts sought a target that represented an improvement over the state's current rate. The HNC 2020 experts decided that basing North Carolina's target on the pace of improvement seen by Delaware was both achievable and aspirational— aspirational because it will require reversing the recent trend and achievable because this rate is close to rates recently experienced by North Carolina. Thus, the 2020 target is 5.3 deaths per 100,000 population.

OBJECTIVE 3: REDUCE THE HOMICIDE RATE TO 6.7 (PER 100,000 POPULATION)

Rationale for selection: Homicide is an entirely preventable cause of death. It is the second leading cause of violent death in the state, after suicide. In 2008, there were 7.5 homicides per 100,000 population.^d Nationally, North Carolina is in the bottom third of states reporting homicide data (tied for 32nd in 2006).⁴ There are significant differences in homicide rates by age, gender, and race/ethnicity. The homicide rate is highest

b Injury Prevention and Control Branch, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. September 3, 2010.

c Injury Prevention and Control Branch, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. September 3, 2010.

d Injury Prevention and Control Branch, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. September 3, 2010.

among young adults, peaking among individuals aged 20 to 24 years.⁵ Men are three times more likely to die from homicide than women, and the rate of homicide is highest among African Americans and American Indians relative to whites.⁵ The most common contributing factors to homicide are arguments, abuse, or conflict; intimate partner violence; drug involvement; and other crimes such as robbery or burglary. Over two-thirds of homicides involve firearms.⁵

Rationale for target (refer to data grid): The HNC 2020 experts decided against a 2020 target based upon the best-performing state's pace because this potential target was viewed as unachievable (3.8 homicides per 100,000). Yielding a potential target of 1.5 homicides per 100,000 population, the best state method was also not used for the same reason. Therefore, the HNC 2020 experts selected a target based upon a 10% improvement in North Carolina's current rate. This target was viewed as achievable and aspirational. Thus, the 2020 target is 6.7 per 100,000 population.

Injury and Violence Data Grid

| | North Carolina | | | | Best States | | Potential Targets | | | | Selected Targets | | |
|--|--------------------------|---|---|--|--|---|--|------------|--|---|--|-----------------------------|-------------------------------------|
| | Baseline | Current Rate or Percentage Most recent NC data | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | NC's Pace + 10% Improvement | Selection Method |
| 2020 Objectives | | | | | | | | | | | | | |
| Reduce the unintentional poisoning mortality rate (per 100,000 population)* (Key Performance Indicator) | 3.1 1999 ¹ | 11.0 2008 ² | 23rd 1999 ¹ 45 states with reliable data | 31st 2006 ³ 49 states with reliable data | 15.3% (-259.9% overall increase over 9 years) | 1.0 Maryland, 2006 ⁴ | 2.0% California, 1999-2006 ⁵ (-14.7% overall increase over 7 years) | 1.0 | 13.9 (-2% annual increase for 12 years) | 60.7 (-15.3% annual increase for 12 years) | 9.9 | 54.7 | 9.9 10% Improvement |
| Reduce the unintentional falls mortality rate (per 100,000 population)** | 4.2 1999 ¹ | 8.1 2008 ² | 26th 1999 ¹ 49 states with reliable data | Tied for 21st 2006 ³ 50 states with reliable data | 7.6% (-93.8% overall increase over 9 years) | 3.7 Alabama, 2006 ⁴ | -3.5% Delaware, 1999-2006 ⁵ (-21.9% overall decrease over 7 years) | 3.7 | 5.3 (-3.5% annual decrease for 12 years) | 19.5 (-7.6% annual increase for 12 years) | 7.3 | 17.5 | 5.3 Best-Performing State's Pace |
| Reduce the homicide rate (per 100,000 population)*** | 7.2 1999 ¹ | 7.5 2008 ² | 38th 1999 ¹ 47 states with reliable data | Tied for 32nd 2006 ³ 47 states with reliable data | 0.4% (-3.3% overall increase over 9 years) | 1.5 Maine & New Hampshire, 2006 ⁴ | -5.4% Hawaii, 1999-2006 ⁵ (-32.3% overall decrease over 7 years) | 1.5 | 3.8 (-5.4% annual decrease for 12 years) | 7.8 (-0.4% annual increase for 12 years) | 6.7 | 7.0 | 6.7 10% Improvement |

Notes:

For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.

* Unintentional poisoning mortality International Classification of Diseases (ICD)-10 codes: X40-X49. State and national data are age-adjusted to the 2000 U.S. standard million population. Mortality coding changed in 1999 from ICD-9 to ICD-10. Because of this change current rates are not comparable to rates from years before 1999. Overall state improvement, and pace, could not be calculated for five states without reliable data in both years. These states include North Dakota, Rhode Island, South Dakota, Vermont, and Wyoming.

** Unintentional falls mortality International Classification of Diseases (ICD)-10 codes: W00-W19. State and national data age adjusted to 2000 U.S. standard million. Mortality coding changed in 1999 from ICD-9 to ICD-10. Because of this change current rates are not comparable to rates from years before 1999. Overall state improvement could not be calculated for one state, Alaska, without reliable data in both years.

*** Homicide mortality International Classification of Diseases (ICD)-10 codes: X85-Y09.Y87.1. State and national data age adjusted to the 2000 U.S. standard million population. Mortality coding changed in 1999 from ICD-9 to ICD-10. Because of this change current rates are not comparable to rates from years before 1999. Overall state improvement could not be calculated for the three states, North Dakota, Vermont, and Wyoming, without reliable data in both years.

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Strategies to Prevent and Reduce Injury and Violence

| Level of the Socioecological Model | Strategies |
|------------------------------------|---|
| Individual | Practice common sense safety; older adults should exercise regularly and reduce tripping hazards ⁶ ; follow directions on medication/chemical labels ⁷ ; be safe at work; take breaks to stretch your muscles; get enough sleep. ⁸ |
| Family/Home | Reduce potential hazards in the home; supervise children at home and on the playground ⁹ ; store medicines and chemicals in locked cabinets. ¹⁰ |
| Clinical | Offer counseling to prevent injuries ¹¹ ; learn about evidence-based strategies to prevent and to reduce injuries; collect and report injury data; cross-train home-visit staff to assist the elderly, individuals with disabilities and their caregivers, and low-income families with fall prevention measures. ¹¹ |
| Schools and Child Care | Establish a social environment that promotes safety and prevents unintentional injuries, violence, and suicide ^{12,13} ; maintain safe playgrounds, school grounds, and school buses; provide health, counseling, psychological, and social services to meet the needs of students ¹³ ; implement evidence-based healthful living curricula in schools. ^{14,15} |
| Worksites | Meet Occupational Safety and Health Act requirements to provide a workplace that is “free from recognized hazards that are causing or are likely to cause death or serious physical harm.” |
| Insurers | Provide coverage for screening and anticipatory guidance for children and adolescents to reduce injury and violence. ¹⁶ |
| Community | Support adoption of healthy, safe, accessible, affordable, and environmentally friendly homes ¹¹ ; inform older adults, people with disabilities, and housing and health care professionals about eligibility and coverage in existing home modification services and products (e.g., Medicare and Medicaid) ¹¹ ; promote a community of violence prevention ¹⁷ ; support school-based and school-linked health services. ¹⁵ |
| Public Policies | Enforce housing code requirements to prevent injury ¹¹ ; fund injury surveillance and intervention ¹⁴ ; create a statewide task force to prevent injury and violence ¹⁴ ; fund injury prevention training for health professionals ¹⁴ ; enforce housing and sanitary code requirements ¹¹ ; promote policies that ensure gender and social equity to prevent violence ¹⁷ ; provide funding to support school-based and school-linked health services and achieve a statewide ratio of 1 school nurse for every 750 middle and high school students. ¹⁵ |

e 29 U.S.C. §654.

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Background

Maternal health is an important predictor of newborn health and well-being. Good maternal health is critical to the reduction of poor birth outcomes, such as low birth weight, pre-term birth, and infant mortality.¹ Both the health of women before they become pregnant (preconception health), as well as the health of women during pregnancy, are important for women and their babies. Since many pregnancies are unintended, it is especially important to focus on preconception care to ensure women are as healthy as possible before pregnancy occurs.² In addition to health status prior to pregnancy, age, poverty, and access to appropriate preconception and interconception care affect pregnancy and childbirth.² Furthermore, maternal behaviors such as smoking, substance abuse, and poor nutrition are behavioral risk factors that increase the risk for poor birth outcomes such as infant death.³

The health challenges faced by mothers and infants can help forecast the public health challenges that families, the health care system, and communities will face in the future.² Maternal and infant health measures, such as the infant mortality rate and mortality rate disparities, are also good measures of general population health because they are associated with maternal health, quality of and access to medical care, socioeconomic conditions, and public health practices.^{2,4}

Healthy North Carolina 2020: Maternal and Infant Health Objectives

The HNC 2020 experts identified the following three measures for objectives in the maternal and infant health focus area: the infant mortality racial disparity between whites and African Americans, the infant mortality rate, and the percentage of women who smoke during pregnancy. The data grid on page 36 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: REDUCE THE INFANT MORTALITY RACIAL DISPARITY BETWEEN WHITES AND AFRICAN AMERICANS TO 1.92

(KEY PERFORMANCE INDICATOR)

Rationale for selection: A number of factors may contribute to infant mortality disparities including maternal sociodemographic and behavioral risk factors, maternal preconception health, infection, stress, racism, and social and cultural differences.⁴ The largest infant mortality racial disparity in North Carolina is the gap between the infant death rate for white and African American infants. In 2008, this disparity was 2.45, which means that more than twice as many African American infants die before their first birthday than white infants in North Carolina.^a In 2007, North Carolina ranked 21st out of 36 states reporting the infant mortality disparity between whites and African Americans.⁵

African American mothers are much more likely to begin prenatal care in the third trimester or not at all and to give birth to pre-term and/or low birth weight infants.⁶ The leading causes of African American infant deaths are pre-term birth/low birth weight, congenital malformations, and Sudden Infant Death Syndrome (SIDS).⁶

While all the maternal and infant health objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area. It was selected because this infant mortality disparity is the most significant issue affecting the state's infant mortality rate and because there are specific interventions that can be implemented to address this disparity. Reducing this disparity will help drive down the state's overall infant mortality rate.

a State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. May 13, 2010.

Rationale for target (refer to data grid): North Carolina made progress in reducing this infant mortality racial disparity between 1998 and 2008 moving it from 2.75 to 2.45. If North Carolina continues this pace through to the year 2020, the infant mortality racial disparity between whites and African Americans will further decrease to 2.13. The HNC 2020 experts reviewed the potential target-setting methods for this objective and determined that targets based on the best state and on the best-performing state were too aspirational and not achievable for North Carolina by 2020. These potential targets were 1.78 and 1.40, respectively. Given the state's proven success in reducing the infant mortality disparity rate, the HNC 2020 experts set the 2020 target based upon making a 10% improvement in North Carolina's 1999-2008 pace of improvement, which yields a 2020 target of 1.92.

OBJECTIVE 2: REDUCE THE INFANT MORTALITY RATE TO 6.3 (PER 1,000 LIVE BIRTHS)

Rationale for selection: The infant mortality rate measures the rate of deaths among babies less than one year of age. The leading causes of infant death include congenital abnormalities, pre-term birth and/or low birth weight, SIDS, pregnancy complications, and respiratory distress syndrome.³ Infant mortality rates are higher among infants born to mothers who are adolescents, unmarried, have lower educational levels, had a fourth or higher order birth, or did not obtain adequate prenatal care. Maternal health factors that affect infant mortality include smoking, substance abuse, poor nutrition, lack of prenatal care, medical problems, and chronic illness. In addition, women who begin prenatal care late or have no prenatal care are less likely to receive counseling and other care to help them manage health factors that may affect birth outcomes. Pre-term births—or births before 37 completed weeks of gestation—and low birth weight infants have substantially higher infant mortality rates.⁴ Approximately one-third of infant deaths in the United States are due to causes related to pre-term births.⁷

Although North Carolina's infant mortality rate has declined in the past 10 years, from 9.3 deaths per 1,000 live births in 1998^b to 8.2 in 2008^c, the state's infant mortality rate remains one of the highest in the nation. In 2007, North Carolina ranked 45th out of all states in infant mortality.⁵ Given the magnitude of infant mortality racial disparities in North Carolina, reducing them is critical to reducing the overall infant mortality rate.

Rationale for target (refer to data grid): North Carolina made progress in reducing the infant mortality rate from 1998-2008 from 9.3 deaths per 1,000 live births to 8.2 deaths per 1,000 live births. If North Carolina continues this pace through to the year 2020, the infant mortality rate will further decrease to 7.1. The HNC 2020 experts reviewed the potential target-setting methods for this objective and determined that targets based on the best state and on the best-performing state were too aspirational and not achievable for North Carolina by 2020. These potential targets were 4.8 and 5.2, respectively. Given the state's proven success in reducing the infant mortality rate, the HNC 2020 experts set the 2020 target based upon making a 10% improvement in North Carolina's 1999-2008 pace of improvement, which yields a 2020 target of 6.3 per 1,000 live births.

OBJECTIVE 3: REDUCE THE PERCENTAGE OF WOMEN WHO SMOKE DURING PREGNANCY TO 6.8%^d

Rationale for selection: Smoking before and during pregnancy is the most preventable cause of illness and death among women and infants.⁸ Women who smoke are almost twice as likely to experience premature rupture of membranes, placental abruption, and placenta previa during pregnancy. Babies born to women who smoke

b State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. July 9, 2010.

c State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. May 13, 2010.

d North Carolina implemented the 2003 U.S. Standard Birth Certificate beginning in August 2010. As a result of the mid-year implementation, prenatal tobacco use estimates will not be available for 2010. Additionally, prenatal tobacco use information collected from the 2003 standard certificate will not be comparable to tobacco use information collected in the previous version of the birth certificates. The State Center for Health Statistics will determine how best to address this in the annual assessments of progress towards reaching the 2020 objectives.

while pregnant are approximately 30% more likely to be born pre-term, are more likely to be born with low birth weight, and are significantly more likely to die of SIDS.^{9,10} Pregnant women who receive brief smoking cessation counseling, such as what can be offered during a prenatal visit, are more likely to quit smoking than those who do not receive counseling.⁸

One in 10 women (10.4%) who gave birth in North Carolina in 2008 reported using tobacco during their pregnancy.¹¹ In 2006, North Carolina ranked 17th out of 31 states reporting the percentage of women who smoke during pregnancy.¹²

Rationale for target (refer to data grid): North Carolina reduced the percentage of pregnant women smoking between 1998 and 2008 by 30%, from 14.9% to 10.4%. If North Carolina continues this pace of improvement, the percentage of women who smoke during pregnancy will further decline to 6.8% by 2020. The HNC 2020 experts decided that maintaining North Carolina's current pace is both aspirational and achievable given the state's proven success in reducing this percentage. Thus, the 2020 target is 6.8%.

Maternal and Infant Health Data Grid

| 2020 Objectives | North Carolina | | | Best States | | Potential Targets | | | Selected Targets | | | | |
|---|----------------------------|---|---|---|--|---|---|------------|--|--|--|-----------------------------|-------------------------------------|
| | Baseline | Current Rate or Percentage Most recent NC data | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | NC's Pace + 10% Improvement | Selection Method |
| Reduce the infant mortality racial disparity between whites and African Americans* (Key Performance Indicator) | 2.75 1998 ¹ | 2.45 2008 ² | 26th 1998 ³ 35 states with reliable data | 21st 2007 ⁴ 36 states with reliable data | -1.1% (-10.9% overall decrease over 10 years) | 1.8 New York, 2007 ⁵ | -4.5% Connecticut, 1998-2007 ⁶ (-34.2% overall decrease over 9 years) | 1.78 | 1.40 (-4.5% annual decrease for 12 years) | 2.13 (-1.1% annual decrease for 12 years) | 2.21 | 1.92 | 1.92 NC's Pace + 10% Improvement |
| Reduce the infant mortality rate (per 1,000 live births)** | 9.3 1998 ¹ | 8.2 2008 ² | 46th 1998 ³ 50 states reporting | 45th 2007 ⁴ 50 states reporting | -1.3% (-11.8% overall decrease over 10 years) | 4.8 Washington, 2007 ⁵ | -3.8% South Dakota, 1998-2007 ⁶ (-28.2% overall decrease over 9 years) | 4.8 | 5.2 (-3.8% annual decrease for 12 years) | 7.1 (-1.3% annual decrease for 12 years) | 7.4 | 6.35 | 6.3 NC's Pace + 10% Improvement |
| Reduce the percentage of women who smoke during pregnancy*** | 14.9% 1998 ¹ | 10.4% 2008 ² | 27th 1998 ³ 47 states reporting | 17th 2008 ⁴ 31 states reporting | -3.5% (-30.2% overall decrease over 10 years) | 5.1% Arizona, 2006 ⁵ | -7.1% Nevada, 1998-2006 ⁶ (-44.7% overall decrease over 8 years) | 5.1% | 4.3% (-7.1% annual decrease for 12 years) | 6.8% (-3.5% annual decrease for 12 years) | 9.4% | 6.1% | 6.8% NC's Pace |

Notes:

For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.
 * The infant mortality racial disparity is defined as the gap between the infant death rate for whites and African Americans (the largest disparity between two racial/ethnic groups in North Carolina) expressed as a ratio. This ratio expresses the number of times greater the African American infant mortality rate is in proportion to the white infant mortality rate. For example, in 2008, the infant mortality rate for African Americans was 14.7 per 1,000 births and the infant mortality rate for whites was 6 per 1,000. The disparity ratio is calculated as (the rate for African Americans)/(rate for whites) (i.e. 14.7/6=2.45). In 2007, there were only 36 states with a large enough number of African American infant deaths to allow for the calculation of the infant mortality disparity rate. There were only 35 states in which infant mortality disparity rates could be calculated in both 1998 and 2007 and therefore only 35 states for which pace calculations were possible for 1998-2007.

** The infant mortality rate is the number of infant deaths per 1,000 live births. Infant death is defined as the death of an infant before his or her first birthday. Infant deaths are based on race of decedent; live births are based on race of mother.

*** In 2006, only 31 states reported this data and pace calculations were only possible for 30 out of 50 states for 1998-2006. 2007 national data are available through North Carolina data on smoking during pregnancy is not available. Therefore, 2006 is used as the most recent data year for the national state-level data.

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Strategies to Improve Maternal and Infant Health

| Level of the Socioecological Model | Strategies |
|------------------------------------|--|
| Individual | Plan your pregnancy ¹³ ; enter into pregnancy healthy ¹⁴ ; be tobacco free during pregnancy ¹⁵ ; access pre- and postnatal care ^{16,17} ; breastfeed your baby ¹⁸ ; space apart pregnancies by 2 to 3 years. ¹⁹ |
| Family/Home | Maintain a tobacco-free home ²⁰ ; put children on their backs to sleep ¹⁵ ; do not use soft bedding. ¹⁵ |
| Clinical | Promote reproductive life planning ¹⁴ ; screen all pregnant women for tobacco use and provide counseling ²¹ ; screen for postpartum depression ²¹ ; encourage women in good health to breastfeed. ¹⁸ |
| Schools and Child Care | Put children on their backs to sleep ¹⁵ ; do not use soft bedding. ¹⁵ |
| Worksites | Encourage employers to provide time and space for their employees to breastfeed. ^{e,18} |
| Insurers | Provide coverage with no copays for breastfeeding and smoking cessation counseling for pregnant women. ^{f,g,18,21} |
| Community | Expand availability of family planning services and community-based pregnancy prevention programs for low-income families, such as the Nurse Family Partnership ^{22,23} ; support the Back to Sleep campaign ¹⁵ ; offer age-appropriate education to student and parent groups. ¹⁸ |
| Public Policies | Create policies that encourage formal training on breastfeeding and lactation in medical schools and residency programs ¹⁸ ; fund expansion of family planning services and community-based pregnancy prevention programs for low-income families, such as the Nurse Family Partnership. ^{22,23} |

e Patient Protection and Affordable Care Act, Pub L No. 111-148, §4207.

f Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.

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Background^a

Risky sexual behaviors can lead to sexually transmitted diseases (STDs), including human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) and unintended pregnancy. Sexually transmitted diseases and unintended pregnancy are preventable conditions that have enormous social and economic costs. In 2008, 1,964 new cases of HIV were reported in North Carolina, and an estimated 35,000 individuals were living with either HIV or AIDS.¹ In addition, almost 58,000 cases of STDs (non-HIV) were reported in North Carolina.¹ The three most commonly reported STDs were chlamydia, gonorrhea, and syphilis. These preventable conditions—STDs and HIV—can lead to reduced quality of life, as well as premature death and disability and result in millions of dollars of preventable health expenditures annually. Though unintended pregnancy does not typically result in death or disability, it can lead to adverse health, social, and economic outcomes.² The burden of STDs, including HIV, and unintended pregnancies falls disproportionately on young people, minorities, and disadvantaged populations.³⁻⁵

There are many promising approaches to reducing STDs, HIV, and unintended pregnancy in North Carolina. Evidence-based educational programs have been shown to decrease risky sexual behavior and increase the use of contraception (including condoms) which decreases the chances of both infection and unintended pregnancy.² Although there are numerous effective interventions, unintended pregnancies and the spread of sexually transmitted diseases (including HIV) are affected by social, economic, and behavioral factors that can be difficult to counteract.⁶

Healthy North Carolina 2020: Sexually Transmitted Disease and Unintended Pregnancy Objectives

The HNC 2020 experts identified the following three measures for objectives in the sexually transmitted disease and unintended pregnancy focus area: the percentage of pregnancies that are unintended, the percentage of positive results among individuals aged 15-24 years tested for chlamydia, and the rate of new HIV infection diagnoses (per 100,000 population). The data grid on page 44 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: DECREASE THE PERCENTAGE OF PREGNANCIES THAT ARE UNINTENDED TO 30.9%

(KEY PERFORMANCE INDICATOR)

Rationale for selection: Unintended pregnancies are those that are reported to have been either unwanted or mistimed at the time of conception.^b Unintended pregnancies are related to negative health and economic outcomes. For women, the negative outcomes associated with an unintended pregnancy include delays in prenatal care, poor mental health, increased risk of physical violence during pregnancy, and lower quality mother-child relationship. For children, the negative outcomes associated with an unintended pregnancy include poor mental and physical health and poor educational and behavioral outcomes.⁷

Nearly 40% of women who gave birth in North Carolina in 2007 reported their pregnancy was unintended.⁸ While the majority of unintended pregnancies occur among older women, most teen pregnancies are unintended and the risk of unintended pregnancy is higher among younger women.^{9,10} According to the North

a More information about sexually transmitted disease and unintended pregnancy in North Carolina and its effects can be found in Chapter 5 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/PreventionReport-July2010.pdf>.

b Intendedness of pregnancy is only measured for those pregnancies resulting in a live birth. Pregnancies that are aborted are not included in this measure.

Carolina Pregnancy Risk Assessment Monitoring System (PRAMS) survey, between 2006 and 2008, almost 70% of pregnancies among women under the age of 20 were unintended. However, approximately four in five unintended pregnancies are among women over the age of 20.¹¹ Therefore, prevention efforts to reduce unintended pregnancy need to focus on both teens and adults.

While all the sexually transmitted disease and unintended pregnancy objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area because it is both a sexual and reproductive health issue.

Rationale for target (refer to data grid): If North Carolina continues its pace from 2000–2007 through to the year 2020, the percentage of unintended pregnancies in the state will decrease to 31.3%. In 2007, Massachusetts and Utah had the lowest percentages of unintended pregnancies in the country, with both states at 30.9%. Given that North Carolina's current pace applied out to 2020 is similar to these two best states' current percentages, the HNC 2020 experts decided that the best state target-setting method yielded a target that was both aspirational and achievable. Therefore, North Carolina's 2020 target is to reduce unintended pregnancies to 30.9% by 2020.

OBJECTIVE 2: REDUCE THE PERCENTAGE OF POSITIVE RESULTS AMONG INDIVIDUALS AGED 15-24 YEARS TESTED FOR CHLAMYDIA TO 8.7%

Rationale for selection: Chlamydia is the most common STD in the United States and the most prevalent reportable STD in North Carolina.^{12,13} In 2009, 9.7% of individuals aged 15–24 years in North Carolina tested for chlamydia had a positive result.^c

Individuals with chlamydia often experience no symptoms or only mild symptoms, and therefore under-reporting is substantial. While the symptoms of chlamydia are often mild, untreated chlamydia can lead to serious reproductive and other health problems, particularly among women. In women, untreated chlamydia can lead to pelvic inflammatory disease, chronic pelvic pain, infertility, and complications during pregnancy.¹⁴ Early treatment of chlamydia with antibiotics is extremely successful and can prevent long-term consequences.¹³

Currently, the Centers for Disease Control and Prevention recommends chlamydia screening for women age 25 years or younger, older women with risk factors for chlamydial infections (those who have a new sex partner or multiple sex partners), and all pregnant women.¹⁴ The HNC 2020 experts included women and men in this objective to highlight the importance of screening among men in order to reduce transmission. While men typically do not experience serious long-term health problems due to chlamydia, increasing awareness of the importance of men being screened and treated is critical to reducing the prevalence of chlamydia in the entire population.

Rationale for target (refer to data grid): The percentage of positive results among individuals aged 15–24 years tested for chlamydia increased between 2005 and 2009 from 9.3% to 9.7%. While the goal is to reduce the percentage of positive results, it is important to note that increased positive results could be the result of an increase in prevalence or due to an increase in testing. The HNC 2020 experts acknowledged that balancing the goals of increasing testing and reducing positive results can be difficult to achieve because they may drive results in different directions. National state-level data are not comparable because different segments of the population are tested in each state through the Infertility Prevention Project (the source of data for this objective); therefore, other states' data were not available for use in potential target-setting methods. Thus, the HNC 2020 experts decided to base the 2020 target upon North Carolina data. These data were limited due to the fact that the chlamydia testing method changed in 2004. Therefore, 2005 is the earliest comparable data

^c Communicable Disease Branch, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. July 19, 2010.

year available.^d Based on data availability, the HNC 2020 experts concluded that a 10% improvement in the current value was the most logical target-setting method for this measure. Therefore, the 2020 target is 8.7%, which is a 10% reduction from the 2009 percentage of 9.7%.

OBJECTIVE 3: REDUCE THE RATE OF NEW HIV INFECTION DIAGNOSES TO 22.2 (PER 100,000 POPULATION)

Rationale for selection: Human immunodeficiency virus (HIV) is a blood-borne virus that damages an individual's immune system and can lead to acquired immune deficiency syndrome (AIDS). Individuals with AIDS have difficulty fighting diseases, including some cancers. There is no cure for HIV/AIDS; however treatment is available to slow the progression of the disease. HIV/AIDS is a sexually transmitted disease that can also be spread through contact with infected blood, or from mother to child during pregnancy, birth, or breastfeeding.¹⁵

In 2008, 24.7 new HIV diagnoses were reported per 100,000 population, ranking North Carolina 33rd of 37 states reporting.¹⁶ In 2008, among adult and adolescent males, 74% of new HIV cases were among men having sex with men (MSM) and MSM who were also injection drug users. Among adult and adolescent females in 2008, heterosexual contact accounted for 90% of new cases, and injection drug use accounted for 10% of new cases. The impact of HIV falls disproportionately on non-Hispanic African Americans in North Carolina, with 64% of all new HIV diagnoses being in this population.¹ HIV/AIDS is a preventable disease, and there are numerous highly effective prevention interventions. Individuals who are HIV positive can reduce their ability to transmit the virus, while non-HIV positive individuals can take preventive steps such as limiting their number of sexual partners and properly using condoms. Furthermore, behavior modification and medication can help individuals with HIV to live longer, healthier lives.¹⁵

Rationale for target (refer to data grid): While the goal is to reduce new HIV diagnoses, it is important to note that increased positive results could be the result of an increase in prevalence or due to an increase in testing. It is currently estimated that 21% of individuals with HIV may be unaware of their status.¹⁷ The HNC 2020 experts acknowledged that balancing the goals of increasing testing and reducing new HIV diagnoses can be difficult to achieve because they may drive results in different directions. In addition, 2008 was the first year the Centers for Disease Control and Prevention calculated the HIV rate for children, adolescents, and adults. Previously, the HIV rate was calculated only for adolescents and adults. Therefore, target-setting methods were limited. Based on this, the HNC 2020 experts concluded that a 10% improvement in the current value was the most logical target-setting method for this measure. Thus, the 2020 target is 22.2 new diagnoses per 100,000 population, or a 10% reduction from the 2008 rate.

^d Communicable Disease Branch, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. July 19, 2010.

Sexually Transmitted Diseases and Unintended Pregnancy Data Grid

| 2020 Objectives | North Carolina | | | | Best States | | Potential Targets | | | Selected Targets | | |
|---|---------------------------|---|--|---|---|--|--|------------|--|---|--|-------------------------|
| | Baseline | Current Rate or Percentage Most recent NC data | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | |
| Decrease the percentage of pregnancies that are unintended* (Key Performance Indicator) | 45.3% 2001 | 39.8% 2007 ² | 12th 2001 ¹ 18 states reporting | Tied for 13th 2007 ² 27 states reporting | -1.8% (-12.1% overall decrease over 7 years) | 30.9% Massachusetts & Utah, 2007 ² | -1.8% North Carolina, 2000-2007 ² | 30.9% | 31.3% (-1.8% annual decrease for 13 years) | 31.3% (-1.8% annual decrease for 13 years) | 35.8% | 30.9% Best State |
| Reduce the percentage of positive results among individuals aged 15-24 years tested for chlamydia** | 9.3% 2005 ³ | 9.7% 2009 ⁴ | N/A | N/A | 1.1% (-4.3% overall increase over 4 years) | N/A | — | — | 10.9% (-1.1% annual increase for 11 years) | 10.9% (-1.1% annual increase for 11 years) | 8.7% | 8.7% 10% Improvement |
| Reduce the rate of new HIV infection diagnoses (per 100,000 population)*** | N/A | 24.7 2008 ⁴ | N/A | 33rd 2008 ⁴ 37 states reporting | N/A | 2.5 North Dakota, 2008 ⁴ | — | 2.5 | — | — | 22.2 | 22.2 10% Improvement |

Notes:
 For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.
 N/A indicates that data were not available.
 — indicates calculations that were not possible given data limitations, or potential targets that do not apply to or were not considered for a given objective.
 * Based on the Centers for Disease Control and Prevention (CDC) Pregnancy Risk Assessment Monitoring System (PRAMS) indicator for whether a mother wanted to become pregnant at time of pregnancy—that is, the percentage indicating that the pregnancy was unintended. Data were not reported before 2000 and only 14 states reported data in both 2000 and 2007.
 Therefore, pace calculations were only available for those 14 states.
 ** Data are from reports of the percentage of individuals testing positive for chlamydia submitted to the State Laboratory of Public Health (SLPH). Reports are from 95 counties: Durham, Forsyth, Guilford, Mecklenburg, and Wake Counties use other laboratories and their screening data are not included. The SLPH changed testing technology midyear in 2004—therefore, 2005 is the earliest year for which the testing data is comparable. Currently the population screened for chlamydia is over 99% female.
 *** Data are reported only for states with confidential reporting laws. 2008 data are not comparable to previous years, because the rate now includes children, adolescents, and adults, whereas only adults and adolescents were included in 2007 and previous years.
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 4 Centers for Disease Control and Prevention, US Department of Health and Human Services. HIV Surveillance Report, Table 19. Diagnoses of HIV Infection, by area of residence, 2006—United States and 5 U.S. dependent areas. <http://www.cdc.gov/hiv/surveillance/resources/reports/2008report/table19.htm>. Updated June 14, 2010. Accessed November 4, 2010.

Strategies to Prevent and Reduce Sexually Transmitted Disease and Unintended Pregnancy

| Level of the Socioecological Model | Strategies |
|------------------------------------|---|
| Individual | Use protection to prevent STDs and unintended pregnancy; get screened for human immunodeficiency virus (HIV) if at increased risk for HIV infection (or if pregnant) ¹⁸ ; get the HPV vaccine if you are a female aged 11-26 years. ¹⁹ |
| Family/Home | Talk to your children about the consequences of risky sexual behavior; encourage females aged 11-26 years to get the HPV vaccine. ¹⁹ |
| Clinical | Provide screening, counseling, and treatment of STDs/HIV infection as recommended by the US Preventive Services Task Force ¹⁸ ; screen women younger than 25 years and others at risk for chlamydia ²⁰ ; use provider-referral partner notification to identify people with HIV ²¹ ; counsel injecting drug users (IDUs) who are at increased risk for HIV ²² ; offer HPV vaccine to females aged 11-26 years ¹⁹ and to males aged 9-26 years ²³ ; provide interventions for men who have sex with men. ²⁴ |
| Schools and Child Care | Ensure that all students receive comprehensive sexuality education ^{2,25} ; implement evidence-based healthful living curricula in schools ^{2,26} ; deliver group-based comprehensive risk reduction (CRR) to adolescents to promote behaviors that prevent or reduce the risk of pregnancy, HIV, and other STDs. ²⁷ |
| Insurers | Provide coverage for STD/HIV screening and counseling for sexually active adolescents and high-risk adults; provide screening for chlamydia among women younger than 25 years and for others at increased risk, with no cost sharing. ^{e,28} |
| Community | Expand availability of family planning services and community-based pregnancy prevention programs, such as the Nurse Family Partnership ^{2,29} ; educate youth about the importance of sexual health ²⁵ ; support school-based and school-linked health services ²⁶ ; provide youth development-focused behavioral interventions coordinated with community service components ³⁰ ; create sterile needle exchange programs for IDUs ²² ; provide group and community-level interventions for men who have sex with men. ²⁴ |
| Public Policies | Pass policies that ensure comprehensive sexuality education for all students ^{2,25} ; provide funding to support school-based and school-linked health services and achieve a statewide ratio of 1 school nurse for every 750 middle and high school students ²⁶ ; fund community education campaigns to increase awareness of sexual health ²⁵ ; fund expansion of family planning services and community-based pregnancy prevention programs for low-income families, such as the Nurse Family Partnership. ^{2,29} |

e Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.

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Background^a

Alcohol and drug abuse are major contributors to premature death and disability in North Carolina. Substance abuse disorders have huge adverse consequences for individuals, their families, and for society at large. Alcohol and drug misuse contribute to family breakups, fatal motor vehicle crashes, and problems with the juvenile justice or criminal justice system. National data suggest that parental misuse of drugs and alcohol contributes to more than 75% of the cases where children are removed from the home and placed into foster care.¹ Alcohol contributed to almost one in three (30.0%) fatal motor vehicle crashes in the state in 2008.² Additionally, of the approximate 90% of incarcerated prisoners in North Carolina screened for substance abuse problems when they first enter the prison system, 63% were in need of intermediate or long-term substance abuse services in 2008-2009.³

While there is a genetic factor that makes some people more susceptible to addiction disorders, substance abuse and the adverse consequences from substance abuse disorders can be prevented. Focusing on preventing or reducing youth use of alcohol or other drugs is particularly important, as the use of these substances can have particularly adverse impacts on the developing brain.⁴ In addition, studies have shown that people who begin drinking in childhood are more likely than those who began drinking later in life to become dependent on or abuse alcohol once they are an adult.⁵ Similarly, delaying use of other substances can reduce the likelihood of abuse and later addiction.⁶ Thus, prevention strategies aimed at reducing underage drinking or use of drugs can be effective in reducing the likelihood of developing an addiction disorder. Further, early intervention in the primary care and/or outpatient setting has also been shown to be effective in reducing the misuse of alcohol and other drugs.⁷ For those who have an addiction disorder, treatment, medication management, and ongoing recovery supports can be effective in managing this chronic illness.

Healthy North Carolina 2020: Substance Abuse

The HNC 2020 experts identified the following three measures for objectives in the substance abuse focus area: the percentage of high school students who had alcohol on one or more of the past 30 days, the percentage of traffic crashes that are alcohol-related, and the percentage of individuals aged 12 years and older reporting any illicit drug use in the past 30 days. The data grid on page 52 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: REDUCE THE PERCENTAGE OF HIGH SCHOOL STUDENTS WHO HAD ALCOHOL ON ONE OR MORE OF THE PAST 30 DAYS TO 26.4%

(KEY PERFORMANCE INDICATOR)

Rationale for selection: Research suggests that the brain's prefrontal cortex—that portion of the brain involved in executive decision-making—does not fully develop until a person reaches his or her mid-20s. Therefore, teens do not possess the same abilities as adults when it comes to impulse control and making sound judgments.⁸ Because of this, substance use and abuse is a particularly important issue for youth. Furthermore, as noted previously, delaying the use of substances among youth can reduce the likelihood an individual will abuse substances and suffer from addiction later in life.⁶

^a More information about substance abuse can be found in Chapter 6 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/Prevention-Chptr6.pdf>. More detailed information on the impact of substance use on health and potential evidence-based prevention, treatment, and recovery supports is available in *Building a Recovery-Oriented System of Care: A Report of the NCIOM Task Force on Substance Abuse Services*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: http://www.nciom.org/wp-content/uploads/NCIOM/projects/substance_abuse/chapters/FullReport.pdf.

Alcohol is the most commonly used substance among young people.⁹ In 2009, 35% of North Carolina high school students reported that they had at least one drink of alcohol on one or more of the past 30 days.¹⁰ The HNC 2020 experts considered focusing this objective on middle school children due to the importance of preventing early use. While 30% of middle school students report ever having a drink of alcohol other than a few sips; a much smaller percentage (6.6%) report recent use (within the past 30 days).¹¹ Because the prevalence of youth who report recent alcohol use is so much higher among high school students than among middle school students, the HNC 2020 experts chose to focus on reducing alcohol use among high school students. However, it should be noted that in order to be effective in reducing the prevalence of alcohol use among high school students, it is also necessary to intervene to reduce alcohol use among younger students. In addition, while all the substance abuse objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area.

Rationale for target (refer to data grid): From 2001-2009, North Carolina experienced a reduction in the youth drinking percentage from 38.2% to 35.0%. If North Carolina were to continue this pace through to 2020, the percentage of high school students who had alcohol in the past 30 days would decrease to 31.0%. In their review of the potential target-setting methods, the HNC 2020 experts decided that the best state's value (Utah at 18% in 2009) was too aspirational to be North Carolina's 2020 target. South Dakota, the best-performing state from 1999-2009, was able to reduce its youth drinking percentage by 32.3%; however, the HNC 2020 experts believed this percentage reduction was also too aspirational and not achievable for North Carolina by 2020. They also felt maintaining North Carolina's pace or improving upon North Carolina's pace did not produce targets that were aspirational enough. Thus, the HNC 2020 experts sought an alternative method and looked at the performance of a state more similar to North Carolina for guidance. Another southeastern state—South Carolina—was able to reduce its youth drinking rate from 1999-2009 by 22.5%. The HNC 2020 experts agreed that a similar reduction could be achieved in North Carolina by the year 2020. Applying South Carolina's annual pace of improvement to North Carolina's current percentage yields a 2020 target of 26.4%.

OBJECTIVE 2: REDUCE THE PERCENTAGE OF TRAFFIC CRASHES THAT ARE ALCOHOL-RELATED TO 4.7%

Rationale for selection: Motor vehicle injury is the leading cause of injury death in North Carolina.¹² Between 2002 and 2008, the total number of motor vehicle crashes declined by 6.0% (from 222,164 in 2002 to 209,318 in 2008). However, the number of motor vehicle crashes that were alcohol-related only declined by 3.0% during the same time period (from 12,299 in 2002 to 11,920 in 2008). Further, the percentage of total crashes that were alcohol-related rose slightly from 5.5% in 2002 to 5.7% in 2008.²

Rationale for target (refer to data grid): In 2008, 5.7% of all traffic crashes in North Carolina were alcohol-related. National state-level data were not available for this objective since each state has its own method of defining, measuring, and reporting alcohol involvement in crashes, as well as unique reporting forms. Therefore, other states' data could not be used to help establish the 2020 target. From 2002-2008, North Carolina experienced an increase in the percentage of alcohol-related crashes from 5.5% to 5.7%. If North Carolina continues this pace through to 2020, the percentage of alcohol-related crashes will be 6.1%. The HNC 2020 experts felt that a target for population health should be aspirational and should also represent an improvement over the state's current value. They also felt that improving upon North Carolina's pace was not aspirational enough. Thus, the HNC 2020 experts examined North Carolina data from the years for which comparable data were available (2002-2008) to find the year with the lowest percentage of alcohol-related traffic crashes, which was 4.7% in 2003. The HNC 2020 experts used this percentage to set the 2020 target at 4.7%. (Note that this target can also be calculated by determining the best 10th percentile of all North Carolina counties.) The HNC 2020 experts decided this goal was achievable given that this percentage was achieved in the recent past.

OBJECTIVE 3: REDUCE THE PERCENTAGE OF INDIVIDUALS AGED 12 YEARS AND OLDER REPORTING ANY ILLICIT DRUG USE IN THE PAST 30 DAYS TO 6.6%

Rationale for selection: According to the most recent two-year national survey on drug use and health (2007-2008), 7.8% of North Carolinians aged 12 years and older (approximately 576,000 people) reported using illicit drugs in the past 30 days.¹³ Illicit drugs include marijuana, hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used for non-medical purposes.¹⁴

Unlike the first objective to reduce alcohol use among high school students, this time the HNC 2020 experts chose to focus on illicit drug use among the entire North Carolina population (ages 12 years and older). Illicit drug use is actually highest among the 18-25 year old population compared to other age groups. Almost one-fifth (19.5%) of adults age 18-25 reported using illicit drugs in the past month (2007-2008), compared to 9.8% of youth aged 12-17 years, and 5.6% of adults aged 26 years and older.

Rationale for target (refer to data grid): Between 2002-2003 and 2007-2008, there was very little reduction in the overall use of illicit drugs in North Carolina. In 2002-2003, 7.9% of people ages 12 years and older reported using illicit drugs in the past 30 days, compared to 7.8% in 2007-2008. Iowa, the best state in 2007-2008 at 4.1%, was also the best-performing state from 2002-2003 to 2007-2008. During this time period, Iowa reported an 8.8% annual decrease in illicit drug use; however, the HNC 2020 experts believed this annual decrease resulted in a 2020 target that was too aspirational for North Carolina. Thus, for an aspirational yet achievable target, the HNC 2020 experts chose to set the 2020 target using the method that calculates a 10% improvement over North Carolina's projected pace. If North Carolina continues its current pace through to 2020, the percentage will be 7.4%. Applying a 10% improvement to this pace yields a 2020 target of 6.6%.

Substance Abuse Data Grid

| | North Carolina | | | | Best States | | | | Potential Targets | | | | Selected Targets | |
|--|--------------------------------|--|---|---|--|--|--|------------|--|---|-----------------------------|--|---|--|
| | Baseline | Current Rate or Percentage (Most recent NC data) | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | NC's Pace + 10% Improvement | 10% Improvement in NC's Current Rate or Percentage | NC's Previous Best Rate or Percentage | Best 10th Percentile of NC Counties |
| Reduce the percentage of high school students who had alcohol on one or more of the past 30 days* (Key Performance Indicator)* | 38.2% 2001 ¹ | 35.0% 2009 ² | 2nd 2001 ¹ 22 states reporting | 8th 2009 ² 42 states reporting | -1.1% (-6.4% overall decrease over 8 years) | Utah, 2009 ² (-22.5% overall decrease over 10 years) | South Carolina ¹ 1999-2009 ³ (-22.5% overall decrease over 10 years) | 18.0% | 26.4% (-2.5% annual decrease for 11 years) | 31.0% (-1.1% annual decrease for 11 years) | 27.9% | 31.5% | — | 26.4% Best-Performing State's Pace |
| Reduce the percentage of traffic crashes that are alcohol-related** | 5.5% 2002 ⁴ | 5.7% 2008 ⁴ | N/A | N/A | 0.6% (-3.6% overall increase over 6 years) | N/A | — | — | — | 6.1% (-0.6% annual increase for 12 years) | 5.5% | 4.7% 2003 ¹ | 4.7% (10th Percentile) 2008 ⁴ | 4.7% NC's Previous Best & Best 10th Percentile of NC Counties |
| Reduce the percentage of individuals aged 12 years and older reporting any illicit drug use in the past 30 days*** | 7.9% 2002-2003 ⁵ | 7.8% 2007-2008 ⁶ | 24th 2002-2003 ⁵ 50 states reporting | 22nd 2007-2008 ⁶ 50 states reporting | -0.4% (-2.1% overall decrease over 5 years) | 4.1% Iowa, 2002-2003 to 2007-2008 ⁶ (-8.8% overall decrease over 5 years) | Iowa, 2002-2003 to 2007-2008 ⁶ (-36.9% overall decrease over 5 years) | 4.1% | 2.6% (-8.8% annual decrease for 12 years) | 7.4% (-0.4% annual decrease for 12 years) | 6.6% | 7.0% | — | 6.6% NC's Pace + 10% Improvement |

Notes: For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting. N/A indicates that data were not available. * Indicates calculations that were not possible given data limitations, or potential targets that do not apply to or were not considered for a given objective. † South Carolina is of the most improved states from this time period. The HNC 2002 experts decided that the best state pace was too aspirational for North Carolina's 2020 target. For the period 1999-2009, the most improved state was South Dakota with a overall percent change of -32.3%. HNC 2020 experts decided that using South Carolina's pace was appropriate because of regional similarities. However, the periods of change for North and South Carolina are not the same because South Carolina did not report data in 2001. ** A crash report form was introduced in 2002; therefore, it was not possible to compare data from years prior to 2002. *** Illicit drugs include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used nonmedically. These estimates are based on data from original questions, excluding those on the use of over-the-counter drugs or new methamphetamine items that were added in 2005 and 2006. Due to changes in data collection methodology it is not possible to use data from before 2002.

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Strategies to Prevent and Reduce Substance Abuses

| Level of the Socioecological Model | Strategies |
|------------------------------------|---|
| Individual | Be free from substance abuse, and seek help for substance abuse problems ^{15,16} ; use prescription medication as prescribed and be aware of prescription drug misuse. ¹⁷ |
| Family/Home | Talk to your children about the dangers of substance use and help family members with substance use problems get into treatment ^{18,19} ; parents should serve as positive role models for children by neither drinking excessively nor using drugs. ¹⁸⁻²⁰ |
| Clinical | Offer screening and behavioral counseling interventions to reduce alcohol misuse by adults and pregnant women ²¹ ; offer drug and alcohol use assessments for adolescents aged 11-21 years. ²² |
| Schools and Child Care | Implement evidence-based substance abuse prevention programs ^{18,23} ; implement evidence-based healthful living curricula in schools ^{20,24} ; establish, review, and enforce rules about underage drinking with sufficient consequences. ¹⁸ |
| Worksites | Offer employee assistance programs that include screening and referrals for substance use ²⁵ ; combat stigma against seeking help for substance abuse ²⁵ ; offer facts on the harmful health effects of excessive use of alcohol. ²⁵ |
| Insurers | Offer coverage for substance abuse services in parity with other services ²⁶ ; cover screening and behavioral counseling interventions to reduce alcohol and drug misuse by adolescents with no cost sharing ^{22,27} ; cover screening and behavioral counseling interventions to reduce alcohol misuse by adults and pregnant women with no cost sharing. ^{b,21,28} |
| Community | Invest in alcohol-free youth programs and volunteer opportunities ¹⁸ ; widely publicize alcohol laws ¹⁸ ; develop and implement a comprehensive substance abuse prevention plan ²⁰ ; support school-based and school-linked health services. ²⁴ |
| Public Policies | Increase the tax on beer and wine ^{20,29} ; enforce legal liability of places where alcohol is sold for actions/harms caused by customers ³⁰ ; expand funding to support regular, well-publicized sobriety checkpoints ²⁰ ; enforce blood alcohol content and “zero tolerance” laws for drunk driving ³¹ ; require appropriate therapeutic interventions for parents with substance use disorders who are before courts because children are at heightened risk for underage drinking and drug use ¹⁸ ; develop comprehensive systems of care that include prevention, treatment, and recovery supports ²⁶ ; provide funding to support school-based and school-linked health services and achieve a statewide ratio of 1 school nurse for every 750 middle and high school students. ²⁴ |

b Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.ice Act, 42 USC §300gg.

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31. Centers for Disease Control and Prevention. Impaired driving. US Department of Health and Human Services website. http://www.cdc.gov/MotorVehicleSafety/Impaired_Driving/3d.html. Accessed December 13, 2010.

Background^a

Mental health is an essential part of individual health throughout the lifespan. Poor mental health can significantly affect individuals in many ways, including their sense of well-being, interpersonal relationships, and productivity in the workplace or in school.¹ In addition, depression, along with other mental health disorders, is a leading risk factor for suicide, a serious but preventable public health issue.² Mental health conditions are also associated with increased health care costs and service utilization. For example, depression has been associated with longer lengths of stay and increased costs for treating other chronic conditions.¹

Serious psychological distress is a generic indicator of a mental health condition or illness in the past year.³ In North Carolina, approximately 11% of all adults aged 18 years and older, 17% of individuals aged 18-25 years, and 10% of individuals aged 26 years and older reported serious psychological distress in the past year (2006-2007 data).³ Additionally, 7.7% of all adults in North Carolina reported having at least one major depressive episode in the past year.³ Despite the prevalence of mental health conditions and the severity of their effects, individuals face many barriers to accessing the care and services they need. Identified gaps in necessary services in the state include a lack of public awareness regarding service availability, a need for increased services in rural areas, lack of culturally competent services, and a dearth of mental health service providers.⁴

Healthy North Carolina 2020: Mental Health Objectives

The HNC 2020 experts identified the following three measures for objectives in the mental health focus area: the suicide rate, the average number of poor mental health days among adults, and the rate of mental health-related emergency department (ED) visits. The data grid on page 60 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: REDUCE THE SUICIDE RATE TO 8.3 (PER 100,000 POPULATION)

(KEY PERFORMANCE INDICATOR)

Rationale for selection: Suicide is a significant public health issue. In 2007, suicide was the 10th leading cause of death in the country.² In 2008, the suicide rate in North Carolina was 12.4 deaths per 100,000 population.^b North Carolina's state ranking for suicide declined from tied for 19th in 1999 to 27th in 2006 out of all 50 states.⁵

Suicide behavior is complex and influenced by a variety of risk factors, though suicide is strongly associated to depression and mental health disorders.^{2,6,7} Suicide is most commonly associated with mood disorders, including major depressive disorder.⁸ Depression is associated with approximately 60% of all suicides.⁹ Among adults with major depressive episodes in the past year, over half had thoughts related to suicide, and over 10% of those individuals made a suicide attempt.^{c,7} Given the strong association between mental illness and suicide—particularly depression—but the relatively small percentage of individuals with depression who attempt suicide, suicide rates can be seen as the tip of the iceberg of a much larger issue—the prevalence of mental illness. Suicide is an extreme outcome of mental health disorders, but it is preventable. The HNC 2020

a More information about mental health can be found in Chapter 6 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/Prevention-Chptr6.pdf>.

b State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. July 9, 2010.

c Major depressive episodes are defined as having a period of at least two weeks when the person experienced depressed mood or loss of interest or pleasure in daily activities and experienced specified depression symptoms as defined in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV). Office of Applied Statistics, Substance Abuse and Mental Health Service Administration: <http://www.oas.samhsa.gov/2k6/suicide/suicide.htm>.

experts selected this objective due its preventability and because communities can play an important role in raising awareness about mental health problems and the link to suicide. In addition, while all the mental health objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area.

Rationale for target (refer to data grid): Between 1999 and 2008, North Carolina's suicide rate increased by 12.7% from 11.0 to 12.4 deaths per 100,000 population. Between 1999 and 2006, some states were able decrease their rates. Hawaii, the best-performing state during this time, experienced an 18% decrease in its suicide rate. In 2006, the state with the lowest suicide rate was New Jersey, at 6.5 suicides per 100,000 population. The HNC 2020 experts decided that a 2020 target based upon the best state (New Jersey) was not achievable and that a 10% reduction in North Carolina's current rate was not aspirational enough. Thus, the HNC 2020 experts decided to set the 2020 target using the best-performing state's pace applied to North Carolina's current rate, which results in a 2020 target of 8.3 suicide deaths per 100,000 population.

OBJECTIVE 2: DECREASE THE AVERAGE NUMBER OF POOR MENTAL HEALTH DAYS AMONG ADULTS IN THE PAST 30 DAYS TO 2.8

Rationale for selection: The Centers for Disease Control and Prevention's Healthy Days Measures are frequently used measures for tracking population trends and identifying disparities in overall mental health status. They are part of the Health Related Quality of Life component of the Behavioral Risk Factor Surveillance System survey.^{10,11} One of the Healthy Days Measures indicates the number of days individuals report having poor mental health, which includes stress, depression, and other emotional problems.¹¹ Additionally, this measure has been validated as a reliable indicator of population mental health status.¹⁰

In 2008, adults in North Carolina reported an average of 3.4 mentally unhealthy days out of the past 30 days.¹² North Carolina was tied for the 9th best value out of all 50 states in 1998. However, by 2008 North Carolina's ranking had fallen dramatically to a tied ranking of 28th out of 50 states.¹²

Rationale for target (refer to data grid): From 1998-2008, the average number of poor mental health days in the past 30 days reported by North Carolinian adults increased from 2.7 to 3.4 days. The HNC 2020 experts decided that the best state's value (North Dakota at 2.2 days) was unachievable and that a 10% improvement in North Carolina's current value was not aspirational enough. During this time period, Utah, the best-performing state, experienced a 16.2% overall decrease in the number of reported poor mental health days. The HNC 2020 experts felt that a 2020 target based upon Utah's performance was both aspirational and achievable. Applying Utah's pace to North Carolina's current value results in a 2020 target of 2.8 days.

OBJECTIVE 3: REDUCE THE RATE OF MENTAL HEALTH-RELATED VISITS TO EMERGENCY DEPARTMENTS TO 82.8 (PER 10,000 POPULATION)

Rationale for selection: Access to mental health treatment is a key component to improving outcomes and reducing long-term disability.¹³ However, many people with mental health disorders do not receive treatment or care. Over half of adults with severe psychological distress are not receiving treatment.¹⁴ Individuals who do not receive regular, ongoing care for mental health conditions may seek treatment in emergency departments (ED). Thus, inadequate community-level support for those with mental health disorders is reflected in ED utilization for mental health conditions.^{15,16} Evidence also shows that rates of mental health-related ED utilization have been increasing across the country.¹⁷ This indicates a situation in which many individuals do not have access to adequate outpatient treatment for mental health conditions and are increasingly seeking care in EDs.¹⁶ It is important to note that EDs do serve a vital purpose in providing care during crisis situations. Thus, mental health-related visits will never be eliminated entirely. In 2008, the rate of mental health-related

ED visits in North Carolina was 92.0 per 10,000 population.^d This rate covers both child and adult visits to the emergency department in which a mental health diagnosis was the primary diagnosis.

The HNC 2020 experts felt strongly about including an indicator related to access to mental health services as an objective. The number of mental health providers per population was considered, but ultimately decided against because the ED objective is an outcome measure and thus a better measure of access.

Rationale for target (refer to data grid): Data for this objective were limited; however, from 2007-2008, North Carolina experienced a 14.3% overall increase in the rate of mental health-related visits to emergency departments from 80.5 to 92.0 per 10,000 population.^e Given the lack of national state-level data available for this indicator, the 2020 target could not be based on the best state or the best-performing state. In addition, a target could not be set using historical North Carolina data because data prior to 2007 were not available. Therefore, the HNC 2020 experts set the target using the 10% improvement method, resulting in a 2020 target of 82.8 visits per 10,000 population.

d The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). Written (email) communication. December 23, 2010. The NC Public Health Data Group and NC DETECT do not take responsibility for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.

e The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). Written (email) communication. December 23, 2010. The NC Public Health Data Group and NC DETECT do not take responsibility for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.

Mental Health Data Grid

| 2020 Objectives | North Carolina | | | Best States | | Potential Targets | | | Selected Targets | | | |
|---|-------------------------------|---|---|---|---|--|--|------------|--|--|--|---|
| | Baseline | Current Rate or Percentage Most recent NC data | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | Selection Method |
| Reduce the suicide rate (per 100,000 population)* (Key Performance Indicator) | 11.0 1999 ¹ | 12.4 2008 ² | Tied for 19th 1999 ² 50 states reporting | 27th 2006 ² 50 states reporting | 1.3% (-12.7% overall increase over 9 years) | 6.5 New Jersey, 2006 ² | -2.8% Hawaii, 1999-2006 ² (-18% overall decrease over 7 years) | 6.5 | 8.3 (-2.8% annual decrease for 14 years) | 14.5 (-1.3% annual increase for 12 years) | 11.2 | 8.3 Best-Performing State's Pace |
| Decrease the average number of poor mental health days among adults in the past 30 days** | 2.7 1988 ³ | 3.4 2008 ² | Tied for 9th 1988 ³ 50 states reporting | Tied for 28th 2008 ² 50 states reporting | 2.3% (-25.9% overall increase over 10 years) | 2.2 North Dakota, 2008 ² | -1.8% Utah, 1998-2008 ² (-16.2% overall decrease over 10 years) | 2.2 | 2.8 (-1.8% annual decrease for 12 years) | 4.5 (-2.3% annual increase for 12 years) | 3.1 | 2.8 Best-Performing State's Pace |
| Reduce the rate of mental health-related visits to emergency departments (per 10,000 population)*** | 80.5 2007 ⁴ | 92.0 2008 ² | N/A | N/A | 14.3% (-14.3% overall increase over 1 year) | N/A | — | — | — | 456.8 (-14.3% annual increase for 12 years) | 82.8 | 82.8 10% Improvement |

Notes:

- 1 State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication, July 9, 2010.
 - 2 Centers for Disease Control and Prevention, US Department of Health and Human Services. Compressed Mortality File 1998-2006. CDC WONDER On-line Database. <http://wonder.cdc.gov/mort1998-2006.html>. Accessed November 8, 2010.
 - 3 Centers for Disease Control and Prevention, US Department of Health and Human Services. Health-Related Quality of Life, 1995-2006. Behavioral Risk Factor Surveillance System. <http://apps.nccd.cdc.gov/HRQOL/>. Accessed November 8, 2010.
 - 4 The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). Written (email) communication, December 23, 2010.
- For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting. N/A indicates that data were not available.
- Indicates calculations that were not possible given data limitations, or potential targets that do not apply to or were not considered for a given objective.
 - * Suicide International Classification of Diseases (ICD)-10 codes: X60-X64, Y87.0. State and national data are age-adjusted to the 2000 U.S. Standard million population. Mortality coding changed in 1989 from ICD-9 to ICD-10. Because of this change current rates are not comparable to rates from years before 1989.
 - ** The average number of mean poor mental health days was based on the adult population (18 years of age or older) living in households answering the question: "How thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"
 - *** Mental health-related visits to the emergency department (ED) defined as a visit to the ED with any of the following primary diagnoses (ICD-9 codes) in a child or adult (ages 0-17, 290.00-290.99 Dementia/Delusional psychosis; 293.00-293.99 Organic delirium/delusions; 294.00-294.99 Dementia/Organic brain syndrome; 295.00-295.99 Schizophrenia; 296.00-296.99 Major depression/bipolar disorder; 297.00-297.99 Paranoid/delusional disorders; 298.00-298.99 Unspecified psychosis; 300.00-300.99 Anxiety disorders; 301.00-301.99 Personality disorders; 302.00-302.99 Psychosocial disorders; 306.00-306.99 Physiological malfunction from mental disorders; 307.00-307.99 Sleeping disorders/insomnia disorder; 308.00-308.99 Acute reactions to stress; 309.00-309.99 Adjustment disorders; 310.00-310.99 Specific non-psychotic mental disorders; 311.00-311.99 Depressive disorders, not otherwise specified; 312.00-312.99 Conduct disorders; 313.00-314.99 Emotional disturbances specific to childhood or adolescence; 317.00-317.99 Other NH (unknown/unspecified); V79.0 Screening for depression; V62.04 Suicidal ideation/homicidal ideation; E950.0-E950.9 Suicide and intentional self-inflicted injury. Note: This definition of mental health related diagnosis comes from the North Carolina Department of Mental Health, Developmental Disabilities and Substance Abuse Services and will be used in its quarterly emergency department admissions reports. These reports also use NC DETECT data. Disclaimer: The NC Public Health Data Group and NC DETECT do not take responsibility for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.

Sources:

- 1 State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication, July 9, 2010.
- 2 Centers for Disease Control and Prevention, US Department of Health and Human Services. Compressed Mortality File 1998-2006. CDC WONDER On-line Database. <http://wonder.cdc.gov/mort1998-2006.html>. Accessed November 8, 2010.
- 3 Centers for Disease Control and Prevention, US Department of Health and Human Services. Health-Related Quality of Life, 1995-2006. Behavioral Risk Factor Surveillance System. <http://apps.nccd.cdc.gov/HRQOL/>. Accessed November 8, 2010.
- 4 The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). Written (email) communication, December 23, 2010.

Strategies to Improve Mental Health

| Level of the Socioecological Model | Strategies |
|------------------------------------|---|
| Individual | Seek help for mental health problems ¹³ ; adults aged 60 years and older should have depression care management at home. ¹⁸ |
| Family/Home | Respond sensitively to family members with mental health conditions; know what community resources exist; help family members make contact with appropriate services ¹⁹ ; safely store firearms. ^{20,21} |
| Clinical | Offer screening for depression in adults and adolescents (aged 12-18 years) when treatment and follow-up services are available ^{22,23} ; offer developmental screening of young children ²⁴ ; use collaborative care for the management of depressive disorders ²⁵ ; deliver culturally competent care ¹⁹ ; develop crisis plans for persons with mental illness ²⁶ ; stay up-to-date on evidence-based clinical preventive screening, counseling, and treatment guidelines. |
| Schools and Child Care | Implement evidence-based mental health programs; staff members should be trained to identify stress in children that leads to mental health problems, as well as signs of mental illness ^{27,28} ; implement evidence-based healthful living curricula in schools ^{29,30} ; staff should know which community resources exist, offer appropriate referrals, and act sensitively ¹⁹ ; mental health professionals working at schools should have specific training in child and adolescent mental health. ²⁸ |
| Worksites | Employers should conduct assessments of office stress, health, and job satisfaction and use interventions to target office stressors. ³¹ |
| Insurers | Provide coverage for developmental screenings and psychosocial behavioral assessments for children and adolescents with no cost sharing ²⁴ ; provide coverage for depression screening and intervention services offered in primary care settings for adolescents and adults with no cost sharing ^{f,32} ; provide coverage of mental health services in parity with other services. ⁵ |
| Community | Services should take into account age, gender, race, and culture ¹⁹ ; facilitate “portals to entry” to services and treatment in the community ¹⁹ ; publicize ways to access mental health crisis services outside of emergency departments and create partnerships among emergency personnel, school, community hospitals, law enforcement, and behavioral health crisis service providers to improve coordination and communication ²⁶ ; support school-based and school-linked health services. ³⁰ |
| Public Policies | Expand the availability of mental health services in outpatient and community settings ¹⁹ ; provide funding to support school-based and school-linked health services and achieve a statewide ratio of 1 school nurse for every 750 middle and high school students ³⁰ ; develop comprehensive systems of care that include prevention, treatment, and recovery supports ^{13,19} ; provide tax incentives to encourage comprehensive worksite wellness programs ²⁹ ; implement a surveillance system to promote developmental screenings ³³ ; provide funding for research on support and prevention strategies. ¹⁹ |

f Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.
g North Carolina Session Law 2007-268.

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Background

Oral health is an important component of overall health. While poor oral health is not a leading cause of death in North Carolina, it is associated with disability and reduced quality of life. Tooth decay (cavities) and periodontal (gum) disease are two oral diseases that cause considerable pain and disability. Periodontal disease undermines gum tissue and can destroy both gums and bones. This condition can cause discomfort when chewing and can ultimately lead to tooth loss. In addition, periodontal disease has recently been linked to chronic diseases such as diabetes, heart disease, and stroke, as well as to premature and low birth weight births. Smoking increases an individual's chance of developing periodontal disease. While tooth decay commonly affects both children and adults, it is the most common childhood chronic disease. It can lead to a host of problems if left untreated, including pain and tooth loss. School attendance and the ability to concentrate are also impacted by untreated tooth decay. Routine activities of daily life are also impacted by poor oral health, such as the ability to communicate and eat.¹

There are evidence-based strategies that can be implemented to prevent oral diseases and help maintain good oral health. Regular dental care is one.² However, in 2008, nearly one out of every three adults in North Carolina did not visit a dentist, dental hygienist, or dental clinic within the past year.³ Water fluoridation is another proven prevention strategy.¹ The majority (88%) of the state's population receiving water through community water systems has fluoridated water.⁴ The application of sealants is another evidence-based strategy that effectively prevents tooth decay.¹ But fewer than half (44%) of all North Carolina 5th graders had sealants in 2009. However, it is important to note that this percentage represents a substantial increase in the percentage of 5th graders with sealants since 1996. In 1996, only 28% of 5th graders had sealants.^a

Healthy North Carolina 2020: Oral Health Objectives

The HNC 2020 experts identified the following three measures for objectives in the oral health focus area: the percentage of children aged 1-5 years enrolled in Medicaid who received any dental service during the previous 12 months; the average number of decayed, missing, or filled teeth among kindergartners; and the percentage of adults with tooth loss due to tooth decay or gum disease. The data grid on page 68 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: INCREASE THE PERCENTAGE OF CHILDREN AGED 1-5 YEARS ENROLLED IN MEDICAID WHO RECEIVED ANY DENTAL SERVICE DURING THE PREVIOUS 12 MONTHS TO 56.4%

(KEY PERFORMANCE INDICATOR)

Rationale for selection: Regular dental care is of the utmost importance in the prevention of oral disease and the maintenance of good oral health. Children from low-income families are at increased risk for oral health problems and also have lower access to care than the general population. Health insurance coverage is a factor contributing to access to care.² However, there are other barriers to accessing care. There are disparities in dental health and access to dental care even among children with coverage. Children with public insurance coverage, such as Medicaid and the State Children's Health Insurance Program (SCHIP) (known as NC Health Choice), are more likely to have dental caries than children not enrolled in these programs.⁵ Children from low-income families are not only more likely to have tooth decay, but they are also less likely to have sealants, a proven dental caries prevention strategy.⁶

a Oral Health Section, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. April 6, 2011.

There are multiple barriers to access to dental services for children enrolled in Medicaid. In North Carolina, there is a shortage of dentists, including pediatric dentists, who accept Medicaid, which contributes to the low percentage of children on Medicaid who receive dental services.⁷ The lack of dentists in some regions of the state is also a contributing factor. Access to dental care is more challenging for Medicaid recipients in the northeastern and far western parts of the state due to the lack of dentists and enrolled Medicaid providers.^b Three out of four North Carolina counties are currently designated as either a partial or full dental Health Professional Shortage Area.⁸

In 2008, North Carolina ranked 3rd of 47 states reporting the percentage of children aged 1-5 years enrolled in Medicaid receiving any dental service during the previous 12 months. While the state's national ranking is good, slightly less than one in two (46.9%) Medicaid-enrolled children in North Carolina received any dental service during the previous 12 months.⁹ Increasing the percentage of children on Medicaid who receive dental services will lead to oral health improvement among this population, which has been demonstrated by the Into the Mouth of Babes program. This program trains medical practitioners to provide preventive dental services to children up to age 3.5 years who are covered by Medicaid. The program has led to reductions in tooth decay among those enrolled in the program.^{4,10,11}

While all the oral health objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area.

Rationale for target (refer to data grid): While fewer than half (46.9%) of Medicaid-enrolled children received dental care during the previous 12 months according to 2008 data, this is a dramatic improvement from 2000 when only 15.1% received such care. The improvement seen between 2000 and 2008 can be largely attributed to the Into the Mouths of Babes program, which was rolled out statewide in 2001. According to the HNC 2020 experts, repeating an improvement of this size is not likely. Given North Carolina's good national ranking for this measure in 2008, the HNC 2020 experts chose not to use the best state method for setting the 2020 target, which would have been 48.4% and is close to North Carolina's current value of 46.9%. The best-performing state method yielded a percentage greater than 100%, as did maintaining North Carolina's current pace. A 10% improvement in the 2008 percentage yielded a potential target of 51.6%, which was viewed as not aspirational enough. Thus, the HNC 2020 experts looked toward county-level data to set this target. Basing the target on the 90th percentile of counties provides a target that the HNC 2020 experts deemed aspirational and achievable. This method results in a 2020 target of 56.4%.

OBJECTIVE 2: DECREASE THE AVERAGE NUMBER OF DECAYED, MISSING, OR FILLED TEETH AMONG KINDERGARTNERS TO 1.1

Rationale for selection: Tooth decay among adults is on the decline, but it is increasing among the preschool population. Approximately 40% of all children in North Carolina entering kindergarten already have tooth decay.⁴ Therefore, there is an urgent need for intervention to prevent and reduce dental caries in this population. Tooth decay in primary teeth can cause serious pain and can also lead to other problems ranging from tooth abscesses and embarrassment, to an inability to chew food.² Primary teeth are often underappreciated due to the fact they will be replaced by the permanent teeth. However, the health of primary teeth is important to the health of permanent teeth because primary teeth act as space savers for permanent ones.¹² Healthy primary teeth also reduce the risk for caries in permanent teeth.²

Oral health begins in infancy—before teeth have even erupted.² Measuring tooth decay among kindergartners provides information about a child's oral health history from birth. In 2008-2009, the average number of

b Division of Medical Assistance, North Carolina Department of Health and Human Services. Written (email) communication. December 10, 2010.

decayed, missing, or filled teeth (dmft) among kindergartners in North Carolina was 1.5.^c Preventing and reducing tooth decay in this population provides an opportunity to make changes to improve oral health at a young age, which can lead to many positive results including reduced pain, a more productive school experience, and a greater likelihood of having healthy, disease-free permanent teeth.

Rationale for target (refer to data grid): National state-level comparison data were not available for this objective, but county-level dmft data were available. Therefore, the HNC 2020 experts elected to base North Carolina's 2020 target on the 10th percentile of North Carolina counties. Using this method yields a 2020 target of 1.1.

OBJECTIVE 3: DECREASE THE PERCENTAGE OF ADULTS WHO HAVE HAD PERMANENT TEETH REMOVED DUE TO TOOTH DECAY OR GUM DISEASE TO 38.4%

Rationale for selection: While tooth loss, or edentulism, is decreasing in the United States, it is still a health issue of concern for particular segments of the population. According to North Carolina data, of all racial and ethnic groups, African Americans and American Indians are most likely to have had permanent teeth extracted due to gum disease or dental caries, as are individuals with less education and those with lower household incomes. In addition, older adults, smokers, and individuals who are disabled are also at greater risk for tooth loss.^{13,14}

The decrease in edentulism is likely due to the more widespread adoption of community water fluoridation, dental sealants, and use of fluoride toothpaste and mouth rinse. Among the problems associated with tooth loss include dysfunctional chewing, problems with communication, avoidance of social interactions, and embarrassment and dissatisfaction in appearance. In addition, fruit and vegetable and dietary fiber intake have been found to be negatively affected by loss of teeth. Furthermore, substantial tooth loss has been associated with greater likelihood of obesity.¹⁴ In 2008, 47.8% of adults in North Carolina reported having had permanent teeth removed due to tooth decay or gum disease.¹⁵

Rationale for target (refer to data grid): North Carolina, along with the rest of the nation, has made substantial progress in reducing the percentage of people who have had teeth removed due to gum disease or tooth decay. From 2004-2008, the state saw an approximate 12% decrease from 54.3% to 47.8%. However, the potential targets calculated using the best state method (33.1%) and the best-performing state method (22.5%) were deemed too aspirational for North Carolina to achieve by 2020. The HNC 2020 experts decided that, of the remaining target-setting methods, the most appropriate method was maintaining North Carolina's 2004-2008 pace. Thus the 2020 target is 38.4%, and is based upon the state's 2004-2008 pace of improvement.

^c Oral Health Section, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. April 28, 2010.

Oral Health Data Grid

| | North Carolina | | | | Best States | | | | Potential Targets | | | | Selected Targets |
|--|-------------------------------|--|--|--|--|---|---|------------|--|---|--|---|------------------|
| | Baseline | Current Rate or Percentage Most recent NC data | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | Best 90th or 10th Percentile of NC Counties | Selection Method |
| 2020 Objectives | | | | | | | | | | | | | |
| Increase the percentage of children aged 1-5 years enrolled in Medicaid who received any dental service during the previous 12 months* (Key Performance Indicator) | 15.1% 2000 ¹ | 46.9% 2008 ² | 35th 2000 ¹ 47 states reporting | 3rd 2008 ² 47 states reporting | 15.2% (-210.6% overall increase over 8 years) | 48.4% Texas, 2008 ³ | 17.3% Maryland, 2000-2008 ⁴ (-259.6% overall increase over 8 years) | 48.4% | 319.8% (-17.3% annual increase for 12 years) | 256.7% (-15.2% annual increase for 12 years) | 51.6% 90th percentile SFY 2009 ^{2†} | 56.4% 90th Percentile of NC Counties | |
| Decrease the average number of decayed, missing, or filled teeth among kindergartners** | 1.5 1989-2009 ³ | 1.5 2008-2009 ³ | N/A | N/A | 0.3% (-2.7% overall increase over 9 years) | N/A | — | — | — | 1.6 (-0.3% annual increase for 11 years) | 1.4 10th percentile 2008-2009 | 1.1 10th Percentile of NC Counties | |
| Decrease the percentage of adults who have had permanent teeth removed due to tooth decay or gum disease*** | 54.3% 2004 ⁴ | 47.8% 2008 ⁵ | N/A ¹ | 36th 2008 ⁶ 50 states reporting | -1.8% (-12% overall decrease over 7 years) | 33.1% Utah, 2008 ⁷ | -6.1% Minnesota, 1999-2008 ^{4†} (-43.1% overall decrease over 9 years) | 33.1% | 22.5% (-6.1% annual decrease for 12 years) | 38.4% (-1.8% annual decrease for 12 years) | 43.0% — | 38.4% NC's Pace | |

Notes:
 For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.
 N/A Indicates that data were not available.
 — Indicates calculations that were not possible given data limitations, or potential targets that do not apply to or were not considered for a given objective.
 * Calculated by dividing the number of individuals aged 1-5 who receive any dental services in each year, and in each state, by the number of individuals who are eligible for Early & Periodic Screening & Diagnostic Treatment through Medicaid.
 † Includes data from all 100 counties.
 ** Adults (ages 18 and older) answering the following survey question with a non-zero response: "How many of your permanent teeth have been removed because of tooth decay or gum disease?" Include teeth lost to infection, but do not include teeth lost for other reasons, such as injury or orthodontics.
 *** County-level comparison unavailable (NA) because only 23 counties reported data.
Sources:
 1 Centers for Medicaid and Medicare Services. US Department of Health and Human Services. Annual Early & Periodic Screening & Diagnostic Treatment Report. Form CMS-416. <http://www.cms.gov/medicare/earlyPeriodicScreening/StateAgencyResponsibilities.asp>. Accessed October 29, 2010.
 2 Oral Health Section, Division of Public Health, North Carolina Department of Health and Human Services. Written (email) communication. May 2010.
 3 State Center for Health Statistics, North Carolina Department of Health and Human Services. Behavioral Risk Factor Surveillance System, 2008. <http://www.schs.state.nc.us/SCHS/Hrfs/2008/index.html>. Published 2009. Accessed November 1, 2010.
 4 State Center for Health Statistics, North Carolina Department of Health and Human Services. Behavioral Risk Factor Surveillance System, 2004. <http://www.schs.state.nc.us/SCHS/Hrfs/2004/index.html>. Published 2005. Accessed November 1, 2010.
 5 Centers for Disease Control and Prevention, US Department of Health and Human Services. Behavioral Risk Factor Surveillance System, 2008. <http://apps.nccd.cdc.gov/brfssl/atl.asp?cat=OH&y=2008&key=6607&state=AL>. Accessed October 29, 2010.
 6 Centers for Disease Control and Prevention, US Department of Health and Human Services. Behavioral Risk Factor Surveillance System, 1999. <http://apps.nccd.cdc.gov/brfssl/atl.asp?cat=OH&y=1999&key=6607&state=AL>. Accessed October 29, 2010.
 7 Ranking unavailable because North Carolina's 1999 data were unreliable due to small sample size and national data were not reported in 2001.

Strategies to Improve Oral Health

| Level of the Socioecological Model | Strategies |
|------------------------------------|--|
| Individual | Brush using fluoridated toothpaste and floss your teeth appropriately; visit the dentist regularly ¹⁶ ; avoid tobacco use. ¹⁷ |
| Family/Home | Promote good quality oral health ¹⁷ ; help children to avoid frequent snacking between meals ¹⁸ ; ensure that children receive regular dental care from a pediatrician or dentist. ¹⁹ |
| Clinical | Apply dental sealants ¹⁷ ; primary care clinicians should prescribe oral fluoride supplementation at currently recommended doses to preschool children older than 6 months whose primary water source is deficient in fluoride ²⁰ ; offer education to families or caregivers on prevention methods for dental caries ¹⁹ ; pediatricians should offer oral health risk assessments for patients beginning at 6 months if the child does not have a regular dentist. ²¹ |
| Schools and Child Care | Establish school-based and school-linked dental sealant delivery programs ²² ; offer referrals to providers ¹⁷ ; offer fluoride supplements in schools ¹⁷ ; implement evidence-based healthful living curricula in schools. ^{23,24} |
| Insurers | Cover preventive and restorative care, including fluoride treatment, sealants, and oral surgery, if necessary, for children ^{d,19} ; cover fluoride treatment for children with a fluoride-deficient water source ^{e,25} ; cover oral health assessments starting at 6 months if the child does not have a dental home. ²⁶ |
| Community | Increase access to dental care for those most at risk for oral health problems ¹⁷ ; support community water fluoridation ^{27,28} |
| Public Policies | Increase dental provider participation in the North Carolina Medicaid program ²⁹ ; increase the supply of dentists in underserved areas and across North Carolina ^{29,30} ; create policies that require community water fluoridation ^{27,28} ; encourage greater diversity in dental schools ¹⁷ ; provide funding to achieve a statewide ratio of 1 public health dental hygienist for every 7,000 elementary school students. ³¹ |

d The Patient Protection and Affordable Care Act requires the Secretary of the US Department of Health and Human Services to develop an essential health benefits package which shall include oral health services for children. Patient Protection and Affordable Care Act, Pub L No. 111-148, §1302(b)(J).
 e Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.

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Background^a

Environmental risks contribute to death and disability every year in North Carolina. While it is difficult to quantify the number of deaths and the prevalence of diseases and conditions in the state directly caused by environmental risks, scientific research clearly shows that environmental risks lead to poor health outcomes.¹⁻³

There are many aspects of the environment that are important to the public's health. For example, clean air is necessary for good health. Under the Clean Air Act,^b the United States Environmental Protection Agency (EPA) is required to set national ambient air quality standards for six criteria pollutants. These six pollutants are ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxides, and lead. All are harmful to health.⁴ Exposure to air pollution is associated with increased risk of heart attack and stroke, as well as respiratory symptoms.^{5,6} Long-term exposure can cause damage to the immune, respiratory, reproductive, and neurological systems, and can even cause premature death.⁶

In addition to clean air, access to safe drinking water is also important to human health. Water pollution can occur in groundwater or in surface waters. The protection of these water sources from contaminants is important because they are both sources of drinking water.⁷ Public water systems (as opposed to private household wells) are regulated by the EPA.⁸ The Safe Drinking Water Act was signed into law to ensure safe drinking water to protect the public's health.^c The law contains health-based standards and requirements for reporting and monitoring that all public water systems must meet. Microorganisms, disinfectants, disinfection byproducts, inorganic chemicals, organic chemicals, and radionuclides are categories of contaminants that are monitored in the public water supply. Generally speaking, each of the dozens of monitored contaminants is associated with health effects ranging from gastrointestinal illness, to kidney problems, to an increased risk of cancer.⁹

The worksite is another aspect of the environment that affects human health. Many individuals spend a significant amount of time at work, and thus safe worksite environments are paramount to ensuring the health of the public. Unlike the impact of some environmental risks, the impact of worksite risks—in particular, on mortality—can be easily quantified.

Healthy North Carolina 2020: Environmental Health Objectives

The HNC 2020 experts identified the following three measures for objectives in the environmental health focus area: the percentage of air monitor sites meeting the current ozone standard of 0.075 ppm, the percentage of the population being served by community water systems (CWS) with no maximum contaminant level violations, and the mortality rate from work-related injuries. The data grid on page 77 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

a More information about environmental health can be found in Chapter 7 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/PreventionReport-July2010.pdf>.

b 42 U.S.C. § 7401 et seq. (1970).

c 42 U.S.C. § 300f et seq. (1974).

OBJECTIVE 1: INCREASE THE PERCENTAGE OF AIR MONITOR SITES MEETING THE CURRENT OZONE STANDARD OF 0.075 PPM TO 100%**(KEY PERFORMANCE INDICATOR)**

Rationale for selection: As mentioned previously, the six criteria pollutants that the EPA sets national ambient air quality standards for are ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxides, and lead. Ground-level ozone and particulate matter are the most pervasive health threats of the six.⁴ Of these two criteria pollutants, the HNC 2020 experts agreed that ground-level ozone should be the HNC 2020 air quality objective due to the fact that North Carolina is not meeting the current 0.075 ppm standard and also because the EPA is expected to promulgate a lower ozone standard in 2011.¹⁰ In North Carolina there are approximately 40 sites that monitor air quality across the state. In 2007-2009, only 62.5% of air monitoring sites recorded ozone levels below the current EPA standard.^d

Ozone can be found in the upper level of the atmosphere and at ground level. At upper levels, it protects the Earth from harmful ultraviolet rays. Ozone found closer to the earth, called “ground-level ozone,” is the ozone that causes health problems. Ground-level ozone is largely a byproduct of industrial and commercial processes, electric utilities, motor vehicles, and gasoline vapors.¹¹ It can reduce lung function, cause damage to the lining of the lungs, and increase susceptibility to infection. Ground-level ozone exacerbates asthma and other lung diseases and can cause permanent lung damage and scarring. Ozone exposure creates health problems for many individuals, but children, people with lung diseases, older people, and people who are active outdoors are particularly sensitive to the effects of ozone.^{11,12}

While all the environmental health objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area.

Rationale for target (refer to data grid): When possible, the HNC 2020 experts relied on existing state or national standards, recommendations, or goals to set targets for objectives. The current ozone standard of 0.075 ppm was promulgated in 2008 by the EPA. The HNC 2020 experts incorporated the current EPA standard for ozone into this objective since air quality standards are levels that air pollutant values should not exceed and then set the 2020 target at 100%. This means that all air monitoring sites in the state should record ozone levels below the current EPA standard by 2020.^e

OBJECTIVE 2: INCREASE THE PERCENTAGE OF THE POPULATION BEING SERVED BY COMMUNITY WATER SYSTEMS (CWS) WITH NO MAXIMUM CONTAMINANT LEVEL VIOLATIONS (AMONG PERSONS ON CWS) TO 95.0%

Rationale for selection: Access to clean drinking water is a key public health issue. Individuals receive drinking water through a public water system or through private drinking wells. A *public water system* provides consumable water through pipes and other structures, and has at least 15 service connections or serves an average of at least 25 people for 60 or more days annually.⁸ A *community water system* (CWS) is a type of public water system that supplies water to the same group of people throughout the year.¹³ Three out of four North Carolinians live in areas serviced by community water systems.¹⁴ Approximately 30% of North Carolinians (2.7 million) rely on private wells for their drinking water, thus the safety of well water is also critically important to public health.^{f,15}

Under the Safe Drinking Water Act, the EPA set maximum contaminant levels (MCLs) for certain contaminants in public water systems.¹⁶ An MCL is defined as the “maximum level of a contaminant in water delivered to

d Division of Air Quality, North Carolina Department of Environment and Natural Resources. Written (email) communication. June 21, 2010.

e The HNC 2020 experts recognize that this objective may need to be amended if the EPA ozone standard is changed.

f North Carolina General Statute 87-97.

users of a public water system.”¹⁷ The limits are reflective of the limit needed to protect human health and the limit achievable given the best available technology. The Safe Drinking Water Act allows states to set more aggressive standards than those put forth by the EPA.¹⁶ The public water supply in North Carolina is regulated by the Safe Drinking Water Act and the North Carolina Drinking Water Act.¹⁸

There was interest among the HNC 2020 experts in creating an objective to increase the percentage of North Carolinians with access to safe drinking water, regardless of source (CWS or private well). However, data do not exist to support such an objective. The HNC 2020 experts also recognized the importance of addressing the safety of private drinking water wells; however, data were not available to support this objective.^g They also expressed interest in an objective that focused on protecting surface waters and groundwater. However, this was also not possible due to data limitations. The HNC 2020 experts agreed that the best measure of access to safe drinking water—given the available data—was one addressing CWS. The intention of this objective is to improve the quality of water from CWS (i.e., reduce maximum contaminant violations), not to increase the percentage of people on CWS. As of 2009, 92.2% of North Carolinians who are served by a CWS are served by a CWS with no MCL violations.^h

Rationale for target (refer to data grid): If North Carolina continues its pace from 1999-2009 through to the year 2020, the percentage of the population being served by CWS with no maximum contaminant level violations will decline to 86.7%. This means the trend is moving in an undesirable direction. There were no national state-level data or county-level data to use in setting the target. North Carolina data were available to set the 2020 target; however, there were specific challenges to using this data, such as changes in water quality standards, and to using the typical target-setting methods. First, a 10% improvement in the state’s current value yields a 2020 target of over 100%. The HNC 2020 experts decided that a target of 100% was too aspirational and not achievable by the year 2020. The experts then studied the state’s previous values for this measure and felt similarly about achieving North Carolina’s best value seen during the time period from 1999-2009, which was 98.6% in 2001. The HNC 2020 experts noted that improvement for this particular objective may become more challenging as the value approaches 100%. Thus, expert opinion was used to set the 2020 target for this objective, and the HNC 2020 experts concluded that a 2020 target of 95.0% was both aspirational and achievable.

OBJECTIVE 3: REDUCE THE MORTALITY RATE FROM WORK-RELATED INJURIES TO 3.5 (PER 100,000 EQUIVALENT FULL-TIME WORKERS)

Rationale for selection: As noted earlier, the worksite is an environment in which many individuals spend a significant amount of time. Jobs provide the means by which people live; therefore, safe work conditions are important to ensuring individuals are able to earn a living in an environment that is as hazard-free as possible. Worksite deaths are preventable, and safety is a concern of both employers and employees. The Occupational and Health Safety Act of 1970 was passed to protect workers from harm, including death and serious injury, at the worksite.¹⁹

Certain industries are more hazardous and therefore have increased rates of occupational fatality compared with rates in other industries. Compared with the overall 2008 state work-related mortality rate of 3.9 deaths per 100,000 equivalent full-time workers, the mortality rate was 41.7 for agriculture, forestry, fishing, and hunting; 10.2 for transportation and utilities; and 9.7 for construction.ⁱ In addition, national data show that certain groups are more at risk for fatal occupational injuries, including men, individuals 65 years and older, and Hispanic workers.^{20,21}

g According to North Carolina General Statute § 87-97 (15A NCAC-18A.3800), counties are required to have programs to test new private drinking water wells, but there is no state-level requirement for routine testing and monitoring.

h Public Water Supply Section, North Carolina Department of Environment and Natural Resources. Written (email) communication. May 18, 2010.

i Bureau of Labor Statistics, US Department of Labor. Written (email) communication. September 16, 2010.

Rationale for target (refer to data grid): Applying the best state and the best-performing state target-setting methods to this objective yielded potential 2020 targets of 1.1 deaths per 100,000 equivalent full-time workers and 0.002 deaths per 100,000 equivalent full-time workers, respectively. Both were deemed by HNC 2020 experts to be too aspirational and not achievable by 2020. In addition, a target could not be set using historical North Carolina data because the US Bureau of Labor Statistics changed its method for calculating the mortality rate for work-related injuries in 2007. Therefore, data were only available for 2007 and 2008. The HNC 2020 experts determined that the 10% improvement method was the most appropriate target-setting method for this objective. Thus, the 2020 target is 3.5 deaths per 100,000 equivalent full-time workers, which is a 10% improvement over the current rate of 3.9 deaths per 100,000 equivalent full-time workers.

Environmental Health Data Grid

| 2020 Objectives | North Carolina | | | Best States | | | Potential Targets | | | | Selected Targets | | |
|---|--------------------------------|--|------------------------|---------------------------|--|---|---|------------|--|--|--|---|---|
| | Baseline | Current Rate or Percentage (Most recent NC data) | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | NC's Previous Best Rate or Percentage | National or State Standard, Recommendation, or Goal |
| Increase percentage of air monitor sites meeting the current ozone standard of 0.075 ppm* <i>(Key Performance Indicator)</i> | 3.1% 1987-1999 ¹ | 62.5% 2007-2009 ² | N/A | N/A | 34.9% (-1903.2% overall increase over 10 years) | N/A | — | — | 1689.6% (-34.9% annual increase for 11 years) | 68.8% | 42.1% 2004-2006 ³ | 100% (Based on reaching current EPA standard of 0.075 ppm) | 100% National Standard |
| Increase the percentage of the population being served by community water systems (CWS) with no maximum contaminant level violations (among persons on CWS)** | 97.5% 1999 ² | 92.2% 2009 ² | N/A | N/A | -0.6% (-5.4% overall decrease over 10 years) | N/A | — | — | 86.7% (-0.6% annual decrease for 11 years) | 101.4% | 98.6% 2001 ² | — | 95% Expert opinion ¹ |
| Reduce the mortality rate from work-related injuries (per 100,000 equivalent full-time workers)*** | 3.9 2007 ² | 3.9 2008 ³ | 23rd | Tied for 23rd | 0.0% (0% overall change over one year) | 1.1 New Hampshire, 2008 ³ | -47.6% New Hampshire, 2007-2008 ³ | 1.1 | 0.002 (-47.5% annual change for 12 years) | 3.9 (0% annual change for 12 years) | 3.9 | — | 3.5 10% Improvement |

Notes:

- 1 For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.
- 2 — indicates that data were not available.
- 3 * Indicates calculations that were not possible given data limitations, or potential targets that do not apply to or were not considered for a given objective.
- 4 In North Carolina there are currently approximately 40 air quality monitoring sites throughout the state. The ozone standard of 0.075 parts per million (ppm) is a component of the US Environmental Protection Agency's National Ambient Air Quality Standards. Standards can be found at: US Environmental Protection Agency, National Ambient Air Quality Standards. <http://www.epa.gov/air/criteria.html>. Updated June 3, 2010. Accessed October 29, 2010.
- 5 ** Community water systems are a type of public water system that supplies water to the same population year-round. Source: US Environmental Protection Agency. <http://water.epa.gov/dw/infrastructure/criteria/criteria.cfm>. Accessed December 2, 2010. In 2009 79.3% of NC's population was served by a community water system and in 1999 86.8% of NC's population was served by a community water system.
- 6 † The HNC 2020 experts agreed that a target of 95% is both aspirational and achievable. It was not possible to set a target based on the typical approaches due to the limited nature of the data, including the lack of other state data for comparison, and the difficulty in comparing multiple years of data because of changes in water quality standards. Water quality standards were changed in 2002, 2004, and 2005.
- 7 *** Rates estimated by the US Bureau of Labor Statistics using an hours-based methodology. The rate represents the number of fatalities per 100,000 equivalent full-time workers. Workers under the age of 18 years, volunteer workers, and members of the resident military are not included in rate calculations. In 2007, the methodology to calculate the rate changed. The change in methodology prevents comparison with fatality rates from earlier years.

Sources:

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- 2 Public Water Supply Section, North Carolina Department of Environment and Natural Resources. Written (email) communication. May 18, 2010.
- 3 Bureau of Labor Statistics, US Department of Labor. Written (email) communication. September 16, 2010. Note: state-level work-related fatality data is available on request from the Bureau of Labor Statistics website <http://www.bls.gov/iif/>.

Strategies to Improve Environmental Health

| Level of the Socioecological Model | Strategies |
|------------------------------------|--|
| Individual | Carpool, use public transportation, combine errands, conserve electricity, set your air conditioner to a higher temperature ²² ; properly use and dispose of hazardous materials like motor oil and pesticides and use pesticides and fertilizers in moderation. ²³ |
| Clinical | Work with community coalitions for strong state air pollution control measures ²⁴ ; advocate for energy-saving and pollution-minimizing practices. ²⁴ |
| Schools and Child Care | Encourage students to take part in the Youth at Work: Talking Safety occupational safety training program ²⁵ ; enforce a “no idling” policy to improve air quality. ²⁶ |
| Worksites | Reduce environmental risks in the workplace ²⁷ ; inform all employees of applicable safety and health standards and protect all employees who work with hazardous materials ²⁸ ; meet Occupational Safety and Health Act requirements to provide a workplace that is “free from recognized hazards that are causing or are likely to cause death or serious physical harm.” ⁱ |
| Community | Establish carpools, public transportation, or bike-friendly community transportation systems ²² ; implement low-impact development requirements by zoning boards ²⁹ ; follow best available technology for specific contaminants in community water systems, and refer to Environmental Protection Agency (EPA) guidance for simultaneous compliance when making treatment changes ³⁰ ; perform regular monitoring of the water supply as required by the Safe Drinking Water Act and the North Carolina Drinking Water Act. ^{k,l} |
| Public Policies | Encourage implementation of fuel alternatives ²⁴ ; support policies that promote stronger emission standards for vehicles ^{31,32} ; support policies that promote reduction of power plant emissions ³³ ; develop water rates that support future community water system infrastructure needs. ³⁴ |

j 29 USC §654.
 k 42 USC §300g.
 l NCGS §130A-311.

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Background^a

Infectious diseases can be caused by viruses, bacteria, fungi, and parasites.¹ These pathogens can be present in water or food, which are common vectors for spreading infectious disease. Pathogens can also be spread from person to person, from animal to person, and via contaminated surfaces.² Protecting individuals from exposure to pathogens is the key to preventing infectious diseases. Fortunately, many infectious diseases that once caused significant mortality, such as pertussis (whooping cough), measles, and mumps, can now be prevented through immunizations.³ Vaccines, which have been described as one of the greatest 10 achievements of public health, have reduced the number of reported cases of certain infectious diseases by as much as 100%.^{4,5} For example, before vaccines were developed in the 20th century, annually there were approximately 16,000 cases of polio, over 500,000 cases of measles, and 48,000 cases of smallpox. Comparing these numbers to 2008 case numbers shows how significantly these diseases have been reduced. In 2008, there were zero cases of polio, 55 cases of measles, and zero cases of smallpox.⁵

Each year, foodborne illnesses cause approximately 47.8 million illnesses, 127,839 hospitalizations, and 3,037 deaths.⁶ As with many diseases, there are particular groups that are more susceptible to the effects of foodborne illness, including very young children, very old adults, and individuals with compromised immune systems. There are over 250 different known foodborne illnesses caused by pathogens such as bacteria, viruses, and parasites, which can contaminate foods and beverages.⁷ Foodborne illnesses are the most common of infectious diseases and, while they cannot be controlled and prevented by vaccinations, there are prevention strategies that can be implemented to avoid them.⁸ There are numerous ways in which microbes may enter into the foods and beverages we consume, including being present in the food source (e.g., animal) and being introduced during the multi-step process of moving food from the farm to the table. Thus, the way in which food is processed and handled is important in the prevention of foodborne illness.⁷ For this reason, food safety in restaurants and other food service establishments is critical to protecting the public's health from foodborne infectious disease.

Healthy North Carolina 2020: Infectious Disease and Foodborne Illness Objectives

The HNC 2020 experts identified the following three measures for objectives in the infectious disease and foodborne illness focus area: the percentage of children aged 19-35 months who receive the recommended vaccines, the pneumonia and influenza mortality rate, and the average numbers of critical violations per restaurant/food stand. The data grid on page 84 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: INCREASE THE PERCENTAGE OF CHILDREN AGED 19-35 MONTHS WHO RECEIVE THE RECOMMENDED VACCINES TO 91.3%

(KEY PERFORMANCE INDICATOR)

Rationale for selection: Maintaining preventive measures, such as vaccinations, is important in the control of pathogens to avoid outbreaks or re-emergences of controlled infectious diseases.⁹ Immunizations protect both immunized and non-immunized individuals from contracting vaccine-preventable diseases. When a critical number of individuals within a community are immunized, the entire group is ultimately protected through what is called community immunity.⁵

^a More information about infectious diseases and foodborne illness in North Carolina can be found in Chapter 9 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/Prevention-Chptr9.pdf>

Vaccines not only prevent disease, but they also lead to cost savings. The childhood vaccination program in the United States has been found to save \$5 for every \$1 spent.¹⁰ The North Carolina Immunization Program provides vaccines at no cost for children up to age 18 years who are eligible for the federal Vaccines for Children (VFC) Program. These vaccines include those recommended by the CDC Advisory Committee for Immunization Practices and the VFC Program.¹¹ In 2007, 77.3% of children aged 19-35 months in North Carolina received the recommended series of vaccines.¹² While all the infectious disease and foodborne illness objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area due to the strong evidence underlying the effectiveness of vaccines.

Rationale for target (refer to grid): If North Carolina continues its pace from 1997-2007 through to the year 2020, the percentage of children aged 19-35 months receiving the recommended vaccines will increase to 78.4%. Given that North Carolina has a good immunization system in place, the HNC 2020 experts decided that a very aggressive 2020 target was warranted and higher vaccinations percentages should be possible given the present infrastructure. The HNC 2020 experts decided to choose the best state method to set the 2020 target, which was Maryland at 91.3%. Thus, the 2020 target for this objective is 91.3%.

OBJECTIVE 2: REDUCE THE PNEUMONIA AND INFLUENZA MORTALITY RATE TO 13.5 (PER 100,000 POPULATION)

Rationale for selection: The pneumonia and influenza mortality objective measures influenza-related deaths, as well as mortality due to various forms of pneumonia, including but not limited to those caused by *Streptococcus pneumoniae*, *Pseudomonas*, staphylococcus, other bacteria, viruses, and unspecified causes.¹³ Influenza-related deaths make up only a small portion of pneumonia and influenza mortality—an estimated 8.5% according to the Centers for Disease Control and Prevention.¹⁴ Fortunately, pneumonia can often be prevented through vaccinations for pneumococcus (the most common cause of pneumonia), *Haemophilus influenzae* type b (Hib), pertussis (whooping cough), varicella (chickenpox), measles, and influenza.¹⁵

Pneumonia and influenza is one of the leading causes of death nationwide.¹⁶ In general, as age increases, so does the pneumonia mortality rate. The mortality rate spikes for individuals aged 65 years and older with the rate for individuals aged 78-84 years about four times higher, and the rate for individuals aged 85 years or older about 16 times higher, than the rate for individuals aged 65-74 years.¹⁶ In addition, as with many health conditions, certain individuals are more likely to develop pneumonia than others are. This includes individuals aged 65 years or older and those aged 5 years or younger. Smoking, as well as certain medical conditions, such as diabetes or asthma, also increase the likelihood an individual will get pneumonia.¹⁵ In 2008, the pneumonia and influenza mortality rate was 19.5 per 100,000 population in North Carolina.^b

Rationale for target (refer to grid): If North Carolina continues its pace from 1999-2008 through to the year 2020, the pneumonia and influenza mortality rate will decrease from the current rate of 19.5 to 13.5 deaths per 100,000 population. The potential targets developed using the best state method (9.7) and the best-performing state method (5.9) were deemed too aspirational and perhaps not achievable by 2020. The HNC 2020 experts decided that maintaining North Carolina's pace for this objective was the most appropriate target-setting method, yielding a 2020 target of 13.5 deaths per 100,000 population.

^b State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. May 13, 2010.

OBJECTIVE 3: DECREASE THE AVERAGE NUMBER OF CRITICAL VIOLATIONS PER RESTAURANT/FOOD STAND TO 5.5

Rationale for selection: Preventing foodborne illnesses requires taking proper precautions when preparing foods at home such as cooking food to proper temperatures, refrigerating food promptly, washing produce, and avoiding cross-contamination of raw meat and poultry with other foods.¹⁷ Restaurants and other places where people eat need to take similar precautions in order to prevent foodborne illness. Improper holding temperatures, poor personal hygiene, unsafe food sources, inadequate cooking, and contaminated equipment are the top five foodborne illness risk factors identified by the Centers for Disease Control and Prevention.¹⁸ These are the risk factors most often associated with foodborne illness. Since foodborne illnesses are drastically underreported, these risk factors have been identified as performance indicators for retail food programs.¹⁸ The retail food program is one of three cooperative programs between the federal government and states to protect consumers from foodborne illness (the other two programs are milk and shellfish). State and local government have the lead responsibility and authority over regulation; however, the US Food and Drug Administration provides assistance.¹⁹

According to the US Food and Drug Administration, the main goal of food establishment inspections is to prevent foodborne illnesses.²⁰ The 65,000 food establishments in North Carolina are inspected at least once annually; however the actual number of inspections is dependent upon the risk level of the establishment. Some establishments are inspected up to four times a year if they are deemed to be high-risk, and risk is determined by type of establishment and population served. All inspections are overseen by the North Carolina Department of Environment and Natural Resources. Identifying critical violations is a major part of the state's food service establishment inspection process. In 2008, critical violations were aligned with the five CDC risk factor areas. There are a total of 18 critical violations. If a food service establishment is found to have a critical violation, it must be corrected within 10 days.^c In 2009, restaurants and food stands in North Carolina, on average, received 6.1 critical violations.^d This objective refers to violations in restaurants and food stands only, which make up about 25,000 of the 65,000 food service establishments in the state.^e Examples of other food service establishments include mobile food units, pushcarts, elderly nutrition sites, school lunchrooms (public and private), educational food service, limited food service, commissaries (for push carts/mobile food units), meat markets, and institutional food service. Other types of establishments, such as child care centers and summer camps, are also regulated by the state. Restaurants and food stands were chosen for this objective because they are the two largest categories of food service establishments in the state.^f

Rationale for target (refer to data grid): Given changes in rules applying to food service establishment inspections, there were no historical comparable data available for this measure. In addition, national state-level data were not available to assist in target setting. Thus, the HNC 2020 experts decided that a 10% improvement in North Carolina's current percentage was the appropriate method to use for setting the 2020 target. A 10% improvement yields a 2020 target of 5.5 critical violations per restaurant/food stand.

c North Carolina Department of Environment and Natural Resources. Personal and written communication. November 3, 2010.

d Food Protection Branch, North Carolina Department of Environment and Natural Resources. Written (email) communication. September 29, 2010.

e As defined in 15A NCAC §18A.2601, a "restaurant" is a food service establishment which prepares or serves food and which provides seating. A "food stand" is a food service establishment which prepares or serves foods and which does not provide seating facilities for customers to use while eating or drinking.

f Food Protection Branch, North Carolina Department of Environment and Natural Resources. Written (email) communication. March 18, 2011.

Infectious Disease & Foodborne Illness Data Grid

| 2020 Objectives | North Carolina | | | | Best States | | | Potential Targets | | | Selected Targets | |
|---|----------------------------|---|---|--|--|---|--|-------------------|--|--|--|------------------------|
| | Baseline | Current Rate or Percentage Most recent NC data | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | Selection Method |
| Increase the percentage of children aged 19-35 months who receive the recommended vaccines* <i>(Key Performance Indicator)</i> | 76.5% 1997 ¹ | 77.3% 2007 ² | Tied for 5th 1997 ¹ 50 states reporting | 22nd 2007 ² 50 states reporting | 0.1% (-1% overall increase over 10 years) | 91.3% Maryland, 2007 ² | 3.2% Utah, 1997-2007 ^{1,2} (-37.1% overall increase over 10 years) | 91.3% | 116% (-3.2% annual increase for 13 years) | 78.4% (-0.1% annual increase for 13 years) | 85.0% | 91.3% Best State |
| Reduce the pneumonia and influenza mortality rate (per 100,000 population)** | 25.7 1999 ³ | 19.5 2008 ⁴ | Tied for 35th 1999 ³ 50 states reporting | 34th 2006 ⁵ 50 states reporting | -3.0% (-24.1% overall decrease over 9 years) | 9.7 Florida, 2006 ⁵ | -9.5% Vermont, 1999-2006 ⁴ (-50.2% overall decrease over 7 years) | 9.7 | 5.9 (-9.5% annual decrease for 12 years) | 13.5 (-3% annual decrease for 12 years) | 17.6 | 13.5 NC's Pace |
| Decrease the average number of critical violations per restaurant/food stand*** | 4.7 2008 ⁶ | 6.1 2009 ⁶ | N/A | N/A | 30.9% (-24.1% overall decrease over 1 year) | N/A | — | — | — | 118.5 (-30.9% annual decrease for 11 years) | 5.5 | 5.5 10% Improvement |

Notes:
 For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.
 N/A indicates that data were not available.
 * Indicates calculations that were not possible given data limitations, or potential targets that do not apply to or were not considered for a given objective.
 † From 1997 to 2005, the recommended vaccines were as follows: four or more doses of DTP, three or more doses of Hib, and three or more doses of HepB (4:3:1:3:3). In 2006, the recommended vaccines became 4:3:1:3:3, plus 1 or more doses of the varicella vaccine (4:3:1:3:3:1). 2008 and 2009 data were not used for target setting because there is a national shortage of the Hib vaccine.
 ** Pneumonia and influenza influenza Classification of Disease (ICD-10 codes: J10-J18. State and national data are age-adjusted to the 2000 U.S. standard million population. Mortality coding changed in 1999 from ICD-9 to ICD-10. Because of this change current rates are not comparable to rates from years before 1999.
 *** According to North Carolina Administrative Code, Section 2600 The Sanitation of Food Service Establishments, 15A NCAAC 18A.2601 a "restaurant" is defined as a food service establishment which prepares or serves food and provides seating. A "food stand" is a food service establishment which prepares or serves foods, but does not provide seating for customers to use while eating or drinking. Critical violations are defined in the North Carolina Administrative Code at <http://ncrules.state.nc.us/rule/15a%202600.htm> and <http://ncrules.state.nc.us/rule/15a%202601.htm>. Accessed December 1, 2010.
Sources:
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 2 Centers for Disease Control and Prevention, US Department of Health and Human Services, National Immunization Survey (NIS), January-December 2007. http://www.cdc.gov/vaccines/nis/survey/nis_data/tables_2007.htm. Updated September 4, 2008. Accessed November 5, 2010.
 3 State Center for Health Statistics, North Carolina Department of Health and Human Services, Written (email) communication, May 13, 2010.
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 5 Food Protection Branch, North Carolina Department of Environment and Natural Resources, Written (email) communication, September 29, 2010.

Strategies to Reduce and Prevent Infectious Disease and Foodborne Illness

| Level of the Socioecological Model | Strategies |
|------------------------------------|---|
| Individual | Get the recommended immunizations ²¹ ; wash your hands often. ^{22,23} |
| Family/Home | Make sure your children are immunized. ²¹ |
| Clinical | Offer patients age-appropriate immunizations and counsel them to receive age-appropriate immunizations ^{21,22,24} ; offer home visits for vaccination delivery; vaccinate health care workers against influenza. ²⁵ |
| Schools and Child Care | Offer vaccination programs in schools or organized child care centers that include education and promotion, assessment and tracking of vaccination status, referral of school or child care attendees to vaccination providers when needed, and provision of vaccines. ²⁶ |
| Worksites | Offer worksite immunizations for influenza ²⁷ ; restaurants should reduce risk factors for foodborne illness identified by the CDC and as outlined in North Carolina Administrative Code. ^{g,28} |
| Insurers | Provide coverage with no cost sharing for all vaccinations recommended by the Advisory Committee on Immunization Practices. ^{h,21} |
| Community | Provide community interventions in combination to increase vaccine use among targeted populations ²⁹ ; create programs to improve access to influenza vaccines for children aged 6 months to 18 years, individuals more than 50 years old, and those at high risk because of medical conditions. ³⁰ |
| Public Policies | Fund outreach efforts to increase immunization rates for all recommended vaccines ³¹ ; strengthen laws and procedures to prevent foodborne illnesses, particularly in food service and retail establishments. ³² |

g 15A NCAC §18A.2601.

h Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.

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Background^a

Socioeconomic factors such as income, educational achievement, community environment, and housing conditions, are some of the best predictors of health status. A person's income and wealth are strongly correlated with health outcomes, particularly for those with the lowest incomes.¹⁻³ Similarly, educational achievement is strongly correlated with health status throughout a person's life. People who have fewer years of education have more chronic health conditions and generally have lower life expectancies.⁴ College graduates, for example, are likely to live five years longer than those who do not complete high school.⁵ Likewise, there are links between neighborhoods and housing conditions and health outcomes.^{6,7} Many of these socioeconomic factors are interrelated. For example, people in poverty are more likely to live in substandard housing and generally obtain fewer years of education than those with higher incomes. However, research suggests that while these socioeconomic factors are interrelated, they are also independent determinants of health.⁸

Healthy North Carolina 2020: Social Determinants of Health

The HNC 2020 experts identified the following three measures for objectives in the social determinants of health focus area: the percentage of individuals living in poverty, the four-year high school graduation rate, and the percentage of people spending more than 30% of their income on rental housing. The data grid on page 92 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: DECREASE THE PERCENTAGE OF INDIVIDUALS LIVING IN POVERTY TO 12.5%

(KEY PERFORMANCE INDICATOR)

Rationale for selection: There is a strong relationship between income and health status, particularly for those with lower incomes.¹ Almost every health indicator is associated with income, including adult and infant mortality, morbidity, disability, health behaviors, and access to health care.⁹ Individuals with higher incomes are generally more likely to live in safe communities and have better access to good quality schools, grocery stores, and places to play and exercise. Conversely, people with lower incomes are more likely to live in unhealthy communities or substandard housing and have poorer access to grocery stores and recreational facilities. Poor individuals are also less likely to be insured.^{9,10} Those with lower incomes are more likely to die prematurely, report poor health status, have chronic illness, engage in risky health behaviors, and have worse reported access to health care than those with higher incomes.⁹ While income levels are also associated with many of the intermediary factors that impact health, such as education level and health behaviors, income has an independent effect on health status, even after controlling for age, sex, race, urbanicity, education, health status, and health behaviors.¹¹

Data from North Carolina also show the strong link between income and health. Poor adults, those with annual incomes less than 100% of the federal poverty guidelines (FPG) (\$21,834 for a family of four in 2008), were three times more likely to report fair/poor health status than those with annual incomes greater than 300% FPG (\$65,502 for a family of four in 2008) in 2008.^b In 2009, people with the lowest reported annual incomes (less than \$15,000) were more likely than those with the highest annual incomes (greater

a More information about these social determinants of health can be found in Chapter 11 of *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/Prevention-Chpt11.pdf>.

b North Carolina Institute of Medicine. Analysis of the US Census Bureau's Current Population Survey, Annual Social and Economic Supplement. 2007 and 2008. Prepared for the NCIOM Prevention Task Force. Chapter 11 (Figure 11.2). *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/Prevention-Chpt11.pdf>.

than \$75,000) to report having poor health, being a current smoker, or having diabetes, and they were also less likely to report eating five or more servings of fruits and vegetables a day or engaging in physical activity.¹² In addition, people who live in North Carolina counties with the highest poverty rates also have the shortest life expectancies.^c In 2009, 16.9% of North Carolina's population was living below the FPG.¹³

While all the social determinant of health objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area. Both educational achievement and income have strong links to overall health status; however, the HNC 2020 experts ultimately selected the poverty objective because it is linked to both educational achievement and poor housing and broadly underlies health outcomes.

Rationale for target (refer to data grid): From 2000–2009, the percentage of the state's population living in poverty increased from 12.5% to 16.9%. Most states have been hit by the recent downturn in the economy; however the percentage of people living in poverty between 2000 and 2009 has grown faster in North Carolina than nationally (35.2% versus 26.5%, respectively).^{14,15} Since poverty status is highly correlated with adverse health outcomes, the HNC 2020 experts recognized the importance of setting an ambitious target to reduce poverty. Examining the typical target-setting methods did not produce a target that the HNC 2020 experts deemed as both aspirational and achievable. The best state target was too aspirational, while the best-performing state method and the 10% improvement method yielded targets that were not aspirational enough, at 7.8%, 13.5%, and 15.2%, respectively. Thus, the HNC 2020 experts reviewed data from 2000 to 2009 to find North Carolina's previous best percentage. This best percentage, 12.5%, occurred in 2000 and was considered aspirational and achievable—particularly once the economy improves—since North Carolina at one point had this percentage.

OBJECTIVE 2: INCREASE THE FOUR-YEAR HIGH SCHOOL GRADUATION RATE TO 94.6%

Rationale for selection: Level of academic achievement (i.e., the number of years of education) is highly correlated with health outcomes across every racial and ethnic group. Studies have shown that people with less education are more likely to have chronic illnesses, engage in unhealthy behaviors, and have shorter life expectancies. Differences in health outcomes persist even after adjusting for socioeconomic factors and differences in health behavior.⁴ An individual's level of educational achievement is also correlated with the health of that individual's children.^{1,16}

Clearly a person's educational achievement is linked to their earning potential. The average salary in North Carolina increases for each additional level of educational achievement.¹⁷ For example, in 2008–2009, the average salary for someone with some high school education, but no diploma was \$23,852. In contrast, the average earnings for a person with a high school diploma or equivalent was \$29,858; some college (\$35,274); bachelors degree (\$50,029); and graduate degree (\$65,354).^d As noted earlier, educational achievement is linked to income, and income is also linked to health outcomes. However, research also suggests that education is an independent factor affecting health status.¹⁸

The HNC 2020 experts debated whether to include the four-year high school graduation rate, or an objective that reflected a higher educational level. However, given that only 71.8% of youth who entered high school in 2005–2006 graduated in four years, the experts decided to focus first on increasing the four-year high

c North Carolina Institute of Medicine. Analysis of North Carolina Vital Statistics and US Census Bureau Small Area Income Poverty Estimates (SAIPE). Life expectancy computed from North Carolina Vital Statistics. Poverty estimates from SAIPE, 2007. Chapter 11 (Figure 11.1). *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/Prevention-Chpt11.pdf>.

d North Carolina Institute of Medicine. Analysis of Annual Social and Economic Supplement of the Current Population Survey. Converted to annual equivalent based on average wage. Analysis done as part of the *NCIOM Task Force on Adolescent Health and presented in Healthy Foundations for Healthy Youth: A Report of the NCIOM Task Force on Adolescent Health*. Morrisville, NC: North Carolina Institute of Medicine; 2009. Available at: http://www.nciom.org/wp-content/uploads/2009/12/AdolescentHealth_FinalReport.pdf.

school graduation rate.¹⁹ Completing high school is a necessary precursor to any further effort to increase the educational achievement of North Carolinians.

Rationale for target (refer to data grid): In 2010, the North Carolina General Assembly enacted a law directing the North Carolina State Board of Education to improve the four-year high school graduation rate to 90% by 2018, with an ultimate, long-term goal of ensuring that every children graduates within four years.^e Reaching this legislative target would require that the state achieve an approximate 2.5% annual increase between the 2008-2009 and 2017-2018 school year. The 2020 target for this objective is an extrapolation of the 2018 target. Specifically, the HNC 2020 experts extended the approximate 2.5% annual increase through to the year 2020. Using this approach, the 2020 target is for 94.6% of entering high school students to graduate within four years. (Note that the number of data years is limited because North Carolina did not calculate the four-year high school graduation rate prior to 2005-2006.)

OBJECTIVE 3: DECREASE THE PERCENTAGE OF PEOPLE SPENDING MORE THAN 30% OF THEIR INCOME ON RENTAL HOUSING TO 36.1%

Rationale for selection: There is a strong link between community and housing conditions and health outcomes. The best housing measure would be one that focuses on housing conditions because we know that substandard housing is correlated with infection, disease, and other illnesses.⁷ However, we do not have good estimates on the number of people in North Carolina who live in substandard housing. Therefore, the HNC 2020 panel selected housing affordability, which also affects health, as the HNC 2020 housing objective.

Families that are forced to spend inordinate amounts of their income on housing have less income to spend on nutritious foods, utilities (including heat and cooling), medical needs, transportation, or other basic necessities. Individuals who spend a large proportion of their income on housing are also more likely to report greater barriers accessing health care and are more likely to be hospitalized or use the hospital emergency department.²⁰ In general, spending more than 30% of family income on housing is considered to be unaffordable.²¹ Overall, renters are more cost burdened than home owners, especially at lower income levels.²² Furthermore, unlike data on substandard housing, data on housing affordability are readily available. In 2008, 41.8% of North Carolina renters were spending more than 30% of their income on rental housing.²³

Rationale for target (refer to data grid): From 2005-2008, North Carolina experienced an approximate 1.2% overall decrease in the percentage of people spending more than 30% of their income on rental housing. (Note that the number of data years is limited because the American Community Survey was not fully implemented until 2005, and data prior to that year are unreliable for this indicator.) If North Carolina continues its pace from 2005-2008 through to the year 2020, the percentage of renters spending 30% or more of their income on housing will actually decrease to 39.9%. The HNC 2020 experts selected the best-performing state from 2005-2008, New Mexico, for setting the 2020 target. New Mexico was able to decrease the percentage of people spending more than 30% of their income on rental housing by 3.6% during this time period. Applying New Mexico's annual percentage improvement (approximately 1.2%) to North Carolina's current percentage results in a 2020 target of 36.1%, which the HNC 2020 experts decided was aspirational and achievable.

e North Carolina Session Law 2010-2011 (Senate Bill 1246).

Social Determinants of Health Data Grid

| | North Carolina | | | | Potential Targets | | | | Selected Targets | | | | | |
|--|--|--|---|---|--|--|---|------------|---|--|-------------------------------|--|---|---|
| | Baseline | Current Rate or Percentage (Most recent NC data) | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | | Best-Performing State's Pace Applied to NC's Current Value | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | NC's Previous Best | National or State Standard, Recommendation, or Goal |
| 2020 Objectives | | | | | | | | | | | | | | |
| Decrease the percentage of individuals living in poverty* (Key Performance Indicator) | 12.5% 2000 ¹ | 16.9% 2009 ¹ | Tied for 36th 50 states reporting | 43rd 2009 ¹ 50 states reporting | 3.4% (-35.2% overall increase over 9 years) | 7.8% New Hampshire, 2009 ² | -2.0% Louisiana, 2000-2009 ³ (-16.9% overall decrease over 9 years) | 7.8% | 13.5% (-2.0% annual decrease for 11 years) | 24.4% (-3.4% annual increase for 11 years) | 15.2% | 12.5% NC's 2000 rate | — | 12.5% NC's Previous Best |
| Increase the four-year high school graduation rate** | 66.3% 2005-2006 school year ³ (for 9th graders entering in 2002-2003) | 71.8% 2008-2009 school year ³ (for 9th graders entering in 2005-2006) | 40th 2001-2002 school year ³ 50 states reporting | 42nd 2006-2007 school year ⁴ 50 states reporting | 1.7% (-5.1% overall increase over 3 years) | 88.6% Vermont, 2006-2007 school year ⁴ | 4.0% Tennessee, 2001-2002 to 2006-2007 school years ^{4,5} (-21.6% overall increase over 5 years) | 88.6% | 110.8% (-4% annual increase for 11 years) | 86.2% (-1.7% annual increase for 11 years) | 79% | — | 94.6% NC's Long-term Performance Goal ⁶ | 94.6% |
| Decrease the percentage of people spending more than 30% of their income on rental housing*** | 42.3% 2005 ⁵ | 41.8% 2008 ⁵ | 22nd 2005 ⁵ 50 states reporting | 17th 2008 ⁵ 50 states reporting | -0.4% (-1.2% overall decrease over 3 years) | 32.5% Wyoming, 2008 ⁶ | -1.2% New Mexico, 2005-2008 ^{6,8} (-3.6% overall decrease over 3 years) | 32.5% | 36.1% (-1.2% annual decrease for 12 years) | 39.9% (-0.4% annual decrease for 12 years) | 37.6% | 41.8% NC's 2008 rate | — | 36.1% Best-Performing State's Pace |

Notes:
 1 For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.
 2 * Indicates calculations that were not possible given data limitations, potential targets that do not apply to or were not considered for a given objective.
 3 * This measure refers to individuals living in households with a total income below the Federal Poverty Threshold. For example, the official federal poverty guideline for one person is \$10,830 and for a family of four is \$22,050 in 2010. US Department of Health and Human Services. <http://aspe.hhs.gov/poverty/10poverty.shtml>. Accessed January 4, 2010. 2000 was chosen as the base year rather than 1999 because the Current Population Survey was expanded in 2000.
 4 ** North Carolina did not calculate the four-year high school graduation rate prior to 2005-06.
 5 † The 2020 high school graduation target was set to correspond with targets set forth in Session Law 2010-111 (Senate Bill 1246). The law directs the State Board of Education to establish a model to improve the four-year high school graduation rate to 90% by 2018. The 2020 target is an extrapolation of the 2018 target. The formula used to extrapolate this target was: $(1 + ((90\% / 100) - \text{current percentage}) / \text{current percentage})^x \times (11.9\%)$ (current percentage).
 6 *** 2005 was chosen as the baseline year because the American Community Survey was not fully implemented until 2005 and data prior to 2005 are not reliable. The survey universe is renter-occupied housing units, excluding homeowners without a mortgage.
Sources:
 1 US Census Bureau. Current Population Survey Annual Social and Economic Supplements. Historical Tables: Table 21. Number of Poor and Poverty Rate, by State. <http://www.census.gov/hhes/www/poverty/data/historical/people.html>. Updated September 16, 2010. Accessed October 29, 2010.
 2 North Carolina Department of Public Instruction. 4-Year cohort graduation rate report, North Carolina graduation results. <http://acprp.ncpublicschools.org/app/2009/grad>. Accessed October 29, 2010.
 3 Seastrom M, Hoffman L, Chapman C, Stillwell R. The Averaged Freshman Graduation Rate for Public High Schools From the Common Core of Data: School Years 2001-02 and 2002-03. NCES 2006-601. US Department of Education, National Center for Education Statistics. <http://nces.ed.gov/pub/pubs/2006/2006601.pdf>. Published October 29, 2010.
 4 Stillwell R. Public School Graduates and Dropouts From the Common Core of Data: School Year 2006-07. NCES 2010-313. US Department of Education, National Center for Education Statistics. <http://nces.ed.gov/pub/pubs/2010/2010313.pdf>. Published October 2009. Accessed November 5, 2010.
 5 US Census Bureau. American Community Survey, 2005. Table R215. http://factfinder.census.gov/servlet/RTTable?_lang=en&_format=US-308-CONTEXT=dt. Accessed November 1, 2010.
 6 US Census Bureau. American Community Survey, 2008. Table R215. http://factfinder.census.gov/servlet/RTTable?_lang=en&_format=US-308-CONTEXT=dt. Accessed November 1, 2010.

Strategies to Address Social Determinants of Health

| Level of the Socioecological Model | Strategies |
|------------------------------------|--|
| Individual | <i>Education, poverty:</i> Finish high school and pursue higher education. ¹ |
| Family/Home | <i>Education, poverty:</i> Encourage everyone in the family to get his or her high school diploma or GED and to pursue higher education. ¹ |
| Clinical | <i>Education, poverty:</i> Counsel parents and children about the importance of school and youth about taking responsibility for school work. ²⁴ |
| Schools and Child Care | <i>Education:</i> Expand the North Carolina Positive Behavior Support Initiative to include all schools in order to reduce the number of short- and long-term suspensions and expulsions ²⁵ ; develop <i>Learn and Earn</i> partnerships between community colleges and high schools ²⁶ ; support publicly funded, center-based, comprehensive early childhood development programs for low-income children aged 3 to 5 years (e.g., <i>More at Four and Smart Start</i>) ²⁷ ; help low-wealth or underachieving districts meet state proficiency standards ²⁸ ; expand alternative learning programs for students who have been suspended from school that support continuous learning, behavior modifications, appropriate youth development, and school success. ²⁸ |
| Worksites | <i>Poverty, housing:</i> Provide outreach to employees regarding applying for the Earned Income Tax Credit ²⁹ ; provide health insurance coverage. ^f |
| Community | <i>Poverty:</i> Conduct outreach to help people enroll in Supplemental Nutrition Assistance Programs (SNAP). ⁹ <i>Education:</i> Use proven school-community collaboration models to keep students in school. ³⁰ <i>Housing:</i> Create tenant-based rental assistance programs that offer vouchers or direct cash assistance for low-income renters. ³¹ |
| Public Policies | <i>Poverty:</i> Increase the state Earned Income Tax Credit ^{32,33} ; make the state's child and dependent tax credit refundable. ³⁴ <i>Education:</i> Raise the compulsory school attendance age ³⁵ ; pass policies and provide funding to support the strategies listed in the schools and child care section above. <i>Housing:</i> Increase funding to support affordable housing, such as the North Carolina Housing Trust Fund. ⁹ <i>Poverty, housing:</i> Support public policies that create new jobs ³⁶ and provide worker education and training and work supports (e.g., child care) ³⁷ ; coordinate housing and transportation policies to reduce transportation burdens to worksites and target job development in low- and moderate-income neighborhoods. ³⁸ |

^f Patient Protection and Affordable Care Act, Pub L No. 111-148, §1513.

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Background

Death and disability are serious consequences of chronic diseases such as heart disease, cancer, and diabetes. Nationwide, 70% of all deaths every year are due to chronic diseases. In addition, chronic diseases are costly. Fortunately, much of the chronic disease burden is preventable.¹ The World Health Organization estimates that eliminating major risk factors for chronic disease would prevent at least 80% of all heart disease, stroke, and type 2 diabetes and more than 40% of cancer cases.²

Physical inactivity, tobacco use, poor nutrition, and alcohol use are four modifiable health risk behaviors that contribute significantly to the burden of chronic diseases.¹ Far too many North Carolinians practice these unhealthy behaviors. Of adults in North Carolina in 2009, 20.3% were smokers, and only one in five (20.6%) consumed five or more servings of fruits and vegetables per day.³⁻⁵ In addition, less than half of adults (46.4%) in North Carolina reported they get the recommended amount of physical activity.⁶ In a 2007-2008 survey, approximately 7% of North Carolinians reported alcohol dependence or abuse, and a much higher percentage (21.4%) reported binge alcohol use in the past month.^{a,7}

Healthy North Carolina 2020: Chronic Disease Objectives

The HNC 2020 experts identified the following three measures for objectives in the chronic disease focus area: the cardiovascular disease mortality rate, the percentage of adults with diabetes, and the colorectal cancer mortality rate. The data grid on page 100 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: REDUCE THE CARDIOVASCULAR DISEASE MORTALITY RATE TO 161.5 (PER 100,000 POPULATION)

(KEY PERFORMANCE INDICATOR)

Rationale for selection: Cardiovascular disease (CVD), often referred to as heart disease, can lead to outcomes such as heart attacks, chest pain, and stroke, which result from narrowed or blocked blood vessels.⁸ Heart disease and stroke were the second and third leading causes of death in North Carolina in 2009.⁹ In 2008, the cardiovascular disease mortality rate was 256.6 per 100,000 population.^b

North Carolina is part of the Stroke Belt—a region in the country with historically higher stroke mortality rates compared to the rest of the nation. The eastern counties of the state are part of the Buckle of the Stroke Belt, an area where stroke mortality rates have been the highest in the nation for the past 30 years or more. Mortality rates due to stroke are markedly higher among individuals aged 35-54 years and aged 55-74 years in this area when compared to their counterparts nationwide. North Carolina's stroke mortality rate has declined over recent years; however, it remains higher than the US rate.¹⁰

The leading behavioral risk factors for heart disease and stroke are poor nutrition, physical inactivity, tobacco use, obesity, and excessive alcohol use. The effects of these risk factors can lead to other risk factors such as high blood pressure, high triglyceride levels, and elevated LDL (bad) cholesterol levels. Individuals with diabetes, a condition also associated with and impacted by these behavioral risk factors, are at increased risk for developing cardiovascular disease.¹¹

a Binge alcohol use is defined as drinking five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least one day in the past 30 days. Alcohol dependence or abuse is based on definitions found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*.

b State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. July 9, 2010.

While all the chronic disease objectives are important, the HNC 2020 experts selected this objective as the key performance indicator for this focus area because it is a leading cause of mortality in the state.^{c,12}

Rationale for target (refer to data grid): North Carolina made substantial progress in reducing the CVD mortality rate from 1999-2008, decreasing it from 363.1 to 256.6 deaths per 100,000 population. If North Carolina continues its pace from 1999-2008 through to the year 2020, the cardiovascular disease mortality rate will decline to 161.5 deaths per 100,000 population. Using the best state's value (Minnesota at 190.1 deaths per 100,000 population) was deemed not aspirational enough for North Carolina's 2020 target given the reduction seen from 1999-2008. Minnesota was also the best-performing state during this time, but its percentage improvement was determined to be too aspirational for North Carolina, yielding a 2020 target of 135.6 deaths per 100,000 population. Therefore, the HNC 2020 experts elected to set the 2020 target for this objective by applying North Carolina's pace from 1999-2008 out to 2020. This resulted in a 2020 target of 161.5 deaths per 100,000 population. The HNC 2020 experts felt that maintaining this pace will be a challenge, and therefore aspirational, but achievable given the state's proven past success in reducing the CVD mortality rate.

OBJECTIVE 2: REDUCE THE PERCENTAGE OF ADULTS WITH DIABETES TO 8.6%

Rationale for selection: Diabetes is caused by the body's inability to use or recognize insulin, a hormone needed to metabolize blood glucose. This inability causes an elevation in blood glucose levels.¹³ Diabetes can lead to complications such as heart disease, stroke, high blood pressure, blindness, kidney disease, neuropathy (nerve damage), gum disease, and depression. Heart disease or stroke is the cause of death for 65% of people with diabetes. Seventy percent of people with diabetes have high blood pressure.¹⁴ In 2008, more than one million people in North Carolina had pre-diabetes, undiagnosed diabetes, or diagnosed diabetes.¹⁵ Diabetes was the 7th leading cause of death in North Carolina in 2009.⁹ In 2009, 9.6% of adults reported they had diabetes.¹⁶

Roughly 5% of all diabetes cases are type 1, formerly called insulin-dependent diabetes or juvenile onset diabetes. However, the vast majority of people (90-95%) with diagnosed diabetes have type 2 diabetes, formerly called adult onset diabetes.^d Type 1 diabetes cannot be prevented, but secondary and tertiary prevention are important.¹⁷ On the other hand, type 2 diabetes can be prevented. Among the modifiable risk factors for type 2 diabetes are being overweight or obese and being physically inactive.¹³ Moderate weight loss and exercise have been shown to prevent or delay type 2 diabetes among adults at high risk of diabetes. A federally funded study of high-risk individuals showed that the onset of type 2 diabetes can be delayed or even possibly prevented by making changes to diet, losing and maintaining a 5% to 7% reduction of total body weight, and exercising 150 minutes weekly. These changes reduced the risk of getting diabetes by 58%.¹⁸ Thus, the focus of this objective is to reduce the prevalence of type 2 diabetes, which can be prevented by addressing modifiable risk factors through lifestyle changes such as getting adequate physical activity, eating a healthy diet, and achieving and maintaining a healthy weight.

Rationale for target (refer to data grid): From 1999-2009, North Carolina demonstrated an increase in the percentage of adults with diabetes from 6.1% to 9.6%.^e Implementing strategies to reduce obesity may contribute to reductions in the diabetes rate, but even with supporting prevention strategies, reversing this overall trend and reducing the diabetes rate will be challenging. However, maintaining North Carolina's current pace, which would lead to an increase in the percentage of people with diabetes, is not an ideal public health goal. For a similar reason, using the best-performing state, which also had an increase in the percent

c At the time the key performance indicator was selected, heart disease was the leading cause of death in the state. It recently became the second leading cause of death, being surpassed by cancer.

d Gestational diabetes is another type of diabetes. It occurs during pregnancy.

e The data used for this objective do not include gestational diabetes.

of people with diabetes (albeit a smaller increase than North Carolina) to set the 2020 target was also not ideal. It, too, translated into a target value that indicated an *increase* in the percentage of adults with diabetes by 2020. The HNC 2020 experts felt that a target for population health should represent an improvement over the state's current value. Thus a 10% improvement on the state's current percentage was selected as the 2020 target-setting method. Of all the remaining target-setting methods, the HNC 2020 experts decided this method best fit the criteria of being both aspirational and achievable. Reducing the percentage of adults with diagnosed diabetes to 8.6% by 2020 represents a 10% improvement from the 2009 percentage of 9.6%.

OBJECTIVE 3: REDUCE THE COLORECTAL CANCER MORTALITY RATE TO 10.1 (PER 100,000 POPULATION)

Rationale for selection: Cancer was the leading cause of death in North Carolina in 2009.⁹ Colorectal cancer mortality was chosen as the HNC 2020 cancer objective instead of other cancers for various reasons. First, colorectal cancer is one of the leading causes of cancer death among *both* men and women. Other leading causes of cancer death include female breast cancer, which only affects women, and prostate cancer, which only affects men.¹⁹ In 2008, the colorectal cancer mortality rate was 15.7 deaths per 100,000 population.^f Second, colorectal cancer was the third leading cause of cancer mortality in the state in 2008.¹⁹ Lung cancer is the leading cause of cancer death.¹⁹ However, since three HNC 2020 objectives address smoking and secondhand smoke—major risk factors for lung cancer—lung cancer mortality was not chosen as the 2020 cancer objective. Finally, colorectal cancer is highly preventable. The 5-year survival rate is 90% with early detection and treatment.¹⁸ It is estimated that if all men and women were screened regularly, approximately 60% of all colorectal cancer deaths could be prevented. Being physically active, eating fruits and vegetables, and avoiding tobacco use and excessive alcohol consumption are behaviors that may also reduce an individual's risk for developing colorectal cancer.²⁰

Rationale for target (refer to data grid): From 1998-2008, North Carolina demonstrated a decrease in the colorectal cancer mortality rate from 20.7 deaths per 100,000 population to 15.7 deaths per 100,000 population. Given the state's success in reducing the colorectal cancer mortality rate, the 2020 target was set based upon a 10% improvement in North Carolina's 1998-2008 pace of improvement, which yields a 2020 target of 10.1 per 100,000 population.

f State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. August 10, 2010.

Chronic Disease Data Grid

| | North Carolina | | | | Best States | | | Potential Targets | | | | Selected Targets | | |
|---|----------------------------|--|--|---|--|---|---|-------------------|--|---|--|-----------------------------|-------------------|-------------------------------------|
| | Baseline | Current Rate or Percentage (Most recent NC data) | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | NC's Pace + 10% Improvement | NC's Current Rate | Selection Method |
| 2020 Objectives | | | | | | | | | | | | | | |
| Reduce the cardiovascular disease mortality rate (per 100,000 population)* (Key Performance Indicator) | 363.1 1999 ¹ | 256.6 2008 ² | 34th 1999 ³ 50 states reporting | 33rd 2006 ² 50 states reporting | -3.8% (-29.3% overall decrease over 9 years) | 190.1 Minnesota, 2006 ⁶ | -5.2% Minnesota, 1999-2006 ⁶ (-31.1% overall decrease over 7 years) | 190.1 | 135.6 (-5.2% average annual decrease for 12 years) | 161.5 (-3.8% annual decrease for 12 years) | 230.9 | 145.4 | 256.6 | 161.5 NC's Pace |
| Decrease the percentage of adults with diabetes** | 6.1% 1999 ³ | 9.6% 2009 ⁴ | 36th 1999 ³ 50 states reporting | 39th 2009 ⁴ 50 states reporting | 4.6% (-57.4% overall increase over 10 years) | 5.7% Colorado, 2009 ⁶ | 1.3% Montana, 1999-2009 ⁴ (-13.6% overall increase over 10 years) | 5.7% | 11.0% (-1.3% annual increase for 11 years) | 15.8% (-4.6% annual increase for 11 years) | 8.6% | 14.2% | 9.6% | 8.6% 10% Improvement |
| Reduce the colorectal cancer mortality rate (per 100,000 population)*** | 20.7 1998 ⁵ | 15.7 2008 ⁵ | 21st 1998 ⁵ 50 states reporting | Tied for 18th 2006 ⁷ 50 states reporting | -2.7% (-24.2% overall decrease over 10 years) | 12.6 Utah, 2006 ⁶ | -6.3% South Dakota, 1999-2006 ⁷ (-36.4% overall decrease over 7 years) | 12.6 | 7.2 (-6.3% annual decrease for 12 years) | 11.3 (-2.7% annual decrease for 12 years) | 14.1 | 10.1 | 15.7 | 10.1 NC's Pace + 10% Improvement |

Notes:
 For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting.
 * Cardiovascular disease International Classification of Diseases (ICD)-10 codes: I00-I02 Acute rheumatic fever; I05-I09 Chronic rheumatic heart diseases; I10-I15 Hypertensive diseases; I20-I25 Ischaemic heart diseases; I26-I28 Pulmonary heart disease and diseases of pulmonary circulation; I30-I51 Other forms of heart disease; I60-I69 Cerebrovascular diseases; I70-I78 Diseases of arteries, arterioles and capillaries. State and national data are age-adjusted to the 2000 U.S. standard million population. Mortality coding changed in 1999 from ICD-9 to ICD-10. Because of this change current data are not comparable to data from years before 1999.
 ** Percentage of adult population (18 and older) living in households answering "yes" to the question: "Have you ever been told by a doctor you have diabetes?" Data excludes women with pregnancy-related diabetes.
 *** Colorectal cancer International Classification of Diseases (ICD)-10 codes (1999 and on): C18-C20, C26-0; (CD-9 codes (1998 and before): 153.0-154.1, 159.0. State and national data age adjusted to 2000 U.S. standard million. Mortality coding changed in 1999 from ICD-9 to ICD-10. However, rates are comparable between the ICD-10 and ICD-9 for colorectal cancer mortality rates.
Sources:
 1 State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication, July 9, 2010.
 2 Centers for Disease Control and Prevention, US Department of Health and Human Services. Compressed Mortality File 1999-2006. CDC WONDER On-line Database. <http://wonder.cdc.gov/cgi-bin/fact0.html>. Accessed October 27, 2010.
 3 Centers for Disease Control and Prevention, US Department of Health and Human Services. Behavioral Risk Factor Surveillance System, 1999. <http://apps.nccd.cdc.gov/brfss/list.asp?cat=DB&y=1999&state=All>. Accessed October 27, 2010.
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Strategies to Prevent and Reduce Chronic Disease

| Level of the Socioecological Model | Strategies |
|------------------------------------|---|
| Individual | Eat more fruits and vegetables, increase physical activity level ²¹ ; be tobacco free. ²² |
| Family/Home | Reduce screen time ²³ ; encourage eating healthy and physical activity ²¹ ; maintain a tobacco-free home. ²⁴ |
| Clinical | Screen for colorectal cancer (in adults beginning at age 50 years), type 2 diabetes in adults with high blood pressure, cholesterol abnormalities; screen and offer intensive counseling and behavioral health interventions for obese adults; offer dietary counseling for those at risk of cardiovascular disease or other diet-related chronic diseases; prescribe aspirin for men and women aged 45-79 years to reduce the number of heart attacks ²⁵ ; offer blood pressure management to individuals with diabetes ²⁶ ; offer a follow-up colonoscopy within 15 months of diagnosis and treatment of an individual with colorectal cancer ²⁷ ; prescribe beta-blockers for individuals with prior myocardial infarction. ²⁸ |
| Schools and Child Care | Offer high-quality physical education and healthy foods and beverages ^{21,29,30} ; implement evidence-based healthful living curricula in schools. ²⁹ |
| Worksites | Offer worksite wellness programs intended to improve diet and amount of physical activity. ³¹ |
| Insurers | With no cost sharing, cover colorectal cancer and diabetes screening as recommended by the USPSTF; cover obesity screening for children aged more than 6 years and adults and for counseling and behavioral interventions for those identified as obese; offer nutrition counseling for adults with hyperlipidemia and other known risk factors for cardiovascular disease ^{f,32} ; offer diabetes case management by appointing a professional case manager who oversees and coordinates all of the services received by someone with diabetes. ³³ |
| Community | Offer diabetes self-management education programs ³⁴ ; implement <i>Eat Smart, Move More</i> community-wide obesity prevention strategies ²⁹ ; promote menu labeling in restaurants ³⁰ ; build active living communities ³⁰ ; support joint use of recreational facilities ²⁹ ; support school-based and school-linked health services. ^{22,35} |
| Public Policies | Provide community grants to promote physical activity and healthy eating ³⁰ ; support community efforts to build active living communities ³⁰ ; fund <i>Eat Smart, Move More</i> community-wide obesity prevention plans ²⁹ ; provide funding to support school-based and school-linked health services and achieve a statewide ratio of 1 school nurse for every 750 middle and high school students. ³⁵ |

f Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.

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Background

Each of the focus areas addresses a specific topic within public health; however, the cross-cutting focus area contains objectives that cross one or more focus areas. It captures objectives not represented in the other focus areas, but that are seen as important to include as they address additional timely and significant public health issues, such as the obesity epidemic and health insurance coverage, as well as summary population health indicators, such as self-reported health status and life expectancy.

Two objectives in this focus area concentrate on improving the summary population health indicators of life expectancy and self-reported health status. Sustained improvements in health and declining mortality have resulted in a steady improvement in life expectancy over the past 20 years.¹ Maintaining this trend and continuing to improve the overall health of North Carolinians will require implementing strategies to address determinants of health and a wide variety of public health indicators, such as those included in the HNC 2020 objectives. Making progress in reaching the 2020 objectives has the potential to improve self-reported health status as well.

Another objective focuses on increasing health insurance coverage in North Carolina. An estimated 1.7 million North Carolinians were uninsured in 2009.² Many individuals lack access to preventive health care services and primary care in general due to a lack of insurance.³ In addition, health insurance coverage has been linked to improved health outcomes and lower mortality.⁴ Increasing health insurance coverage is critical to improving access to necessary health care services and improving population health in North Carolina.

Finally, the last objective focuses on the prevalence of obesity. Reducing obesity is critical to improving the overall health status of North Carolinians. Obesity increases the risk for a wide range of chronic diseases, including heart disease, stroke, and cancer.⁵ Adult obesity is one of the largest public health issues afflicting the country. The Centers for Disease Control and Prevention calls obesity a “national health threat” and “a major public health challenge.”⁶ Over the past 30 years, the national obesity percentage among adults has doubled, and today more than one-third of Americans are obese.^{7,8} The increased prevalence of obesity is projected to reduce the life expectancy of children in the United States to below that of their parents for first time in over 200 years.⁹ As a contributing risk factor to multiple serious health problems, reducing and preventing obesity will require comprehensive action from individuals, local communities, and governments.

Healthy North Carolina 2020: Cross-Cutting Objectives

The HNC 2020 experts identified the following four measures as objectives in the cross-cutting focus area: the average life expectancy; the percentage of adults reporting good, very good, or excellent health; the percentage of non-elderly uninsured individuals (aged less than 65 years); and the percentage of adults who are neither overweight nor obese. The data grid on page 109 shows baseline and current North Carolina data, national rankings (when available), data from select states (when available), potential targets, selected targets, data sources, and relevant notes.

OBJECTIVE 1: INCREASE AVERAGE LIFE EXPECTANCY TO 79.5 YEARS (KEY PERFORMANCE INDICATOR)

Rationale for selection: Life expectancy is a summary measure of health that expresses mortality rates across age groups in a given year.¹⁰ Life expectancy is typically reported as life expectancy at birth and represents the age a newborn would be expected to live if the age-specific mortality rates in that year stay constant throughout his or her life.¹¹ One of the most impressive changes during the 20th century was the dramatic increase in life expectancy, rising from 49.2 years at the beginning of the century to over 77 years today.¹² The first half

of the century saw rapid increases in life expectancy, driven by improvements in public health interventions, the control and prevention of infectious diseases, and reductions in infant and child mortality.¹² Since 1950, improvements in life expectancy have been largely attributable to improvements in treating and preventing adult chronic diseases, particularly heart disease and stroke; improvements in medical care and treatment; and changes in individual behaviors and other risk factors for chronic health conditions.¹² More recently, since 1990, the national trend has been of gradual yearly increases in life expectancy.¹

In 2008, the life expectancy in North Carolina was 77.5 years.^a However, North Carolina still resides in the bottom third of all states with regards to life expectancy, ranking 39th of all states in 2005. Continuing this trend, and improving life expectancy broadly, requires reducing age-specific mortality rates in North Carolina, which are related to the leading causes of death for each age group. In order to do this, the underlying risk factors for the leading causes of death and disability must be addressed.

The top three overall causes of death for North Carolinians of all ages are cancers, heart diseases, and cerebrovascular diseases (stroke). In 2008, cancer surpassed heart disease as the leading cause of death in North Carolina.¹³ While there are differences in the leading causes of death between age groups and the related age-specific mortality rates, there are commonalities across all age groups, many of which are related to preventable deaths. This includes deaths related to heart diseases and stroke, along with deaths related to unintentional injury, suicide, and diabetes.¹³ Continuing to improve the life expectancy of North Carolinians will therefore require improving the prevention and treatment of a wide range of chronic health conditions and public health issues—many of which are addressed by the HNC 2020 objectives. For this reason, this objective was chosen as the key performance indicator for this focus area.

Rationale for target (refer to data grid): From 1998-2008, life expectancy in North Carolina increased from 75.9 years to 77.5 years. The HNC 2020 experts felt that targets based on the best state's life expectancy value and the best performing state's pace—81.7 and 82.0 years, respectively—were both not achievable targets for North Carolina. However, the HNC 2020 experts decided that maintaining North Carolina's pace would be an aspirational and achievable target. Reaching this target requires continued improvements in public health in North Carolina. Based upon this method, the 2020 target is 79.5 years.

OBJECTIVE 2: INCREASE THE PERCENTAGE OF ADULTS REPORTING GOOD, VERY GOOD, OR EXCELLENT HEALTH TO 90.1%

Rationale for selection: One of the primary aims of having a set of health objectives, such as the HNC 2020 objectives, is to provide structure and direction for improving the overall health status of North Carolinians by making progress on a wide array of public health issues. Self-report assessments of health status measure an individual's perceptions of their own health, ranging from poor to excellent. Self-reported health status is a validated measure of population health across populations, and studies have found a consistent association between higher reported health status and lower mortality rates.¹⁴ Additionally, self-reported health status is a commonly used measure for tracking population health and identifying health disparities.¹⁵⁻¹⁷ Nationally in 2009, 85.9% of adults report having good, very good, or excellent health, compared to 81.9% of adults in North Carolina.¹⁸

Rationale for target (refer to data grid): In North Carolina, the percentage of adults reporting good, very good, or excellent health remained relatively unchanged between 1999 and 2009 at 82.1% and 81.9%, respectively. Nationally, North Carolina's self-reported health status falls in the bottom 10 of states (41st in 2009 with all states reporting). The HNC 2020 experts decided that breaking this trend and increasing self-reported health status was an important goal. Targets based upon the best-performing state's pace or North Carolina's

a State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. July 9, 2010.

pace—85.5% and 81.7%, respectively—were not regarded as aspirational targets for 2020. Therefore, the HNC 2020 experts selected the target based upon a 10% improvement in the current percentage of North Carolina adults reporting good, very good, or excellent health. A 10% improvement in the current value yields a 2020 target of 90.1%. The HNC 2020 experts also noted that there is little difference between this target and a target set according to the best state's percentage of 89.8%.

OBJECTIVE 3: REDUCE THE PERCENTAGE OF NON-ELDERLY UNINSURED INDIVIDUALS (AGED LESS THAN 65 YEARS) TO 8.0%

Rationale for selection: According to 2009 data, there are an estimated 1.7 million individuals in North Carolina aged less than 65 years who are uninsured, which represents 20.4% of all individuals in the state under the age of 65.² The majority of individuals who are uninsured are from working families with low or moderate incomes.¹⁹ In North Carolina, two-thirds of the uninsured are in households earning less than 200% of the federal poverty guideline (FPG; \$21,660 for an individual or \$44,100 for a family of four in 2010), and 90% of the uninsured are below 400% of the FPG (\$43,320 for an individual or \$88,200 for a family of four in 2010).²⁰ Also, 85% of the uninsured are in families in which one or more individuals are part of the workforce.²⁰ Adults are also more likely to be uninsured than children, with young adults being the segment of the population most likely to be uninsured: 36% of all young adults (aged 19-29 years) are uninsured while 11% of children (aged less than 18 years) are uninsured.²⁰ Estimates of the uninsured commonly exclude the elderly because almost all individuals over the age of 65 years receive health insurance coverage through Medicare. There are also significant racial disparities in regards to access to insurance. Minorities are more likely to be uninsured than whites: 51% of all Hispanics and 20% of African Americans are uninsured compared to 14% of whites.²⁰

Access to health insurance is an important component of access to health care services and has been found to improve health outcomes. Individuals who are uninsured have been found to have higher rates of mortality than individuals with insurance.⁴ In addition, having access to insurance has been linked to increased health status, improved health outcomes related to chronic conditions such as heart disease, and better cancer-related outcomes.⁴ The uninsured are also more likely to report having difficulties accessing needed health care and to forgo needed care.¹⁹ In North Carolina in 2000, 50% of the uninsured reported not seeing a doctor when needed because of the cost of care, compared with only 10% of the insured.²¹ The lack of insurance also contributes to individuals not receiving necessary or recommended preventive clinical services. For example, the uninsured are more likely to report not having a personal doctor or care provider, less likely to have ever had their cholesterol checked, and less likely to have had their blood pressure taken in the past six months.²¹ Increasing insurance coverage is a critical strategy for increasing access to necessary health services and improving overall population health.

The Patient Protection and Affordable Care Act (PPACA), passed by Congress in March 2010, will extend affordable insurance coverage to millions of uninsured individuals once implemented.^b The Congressional Budget Office estimates the PPACA will decrease the number of uninsured individuals in the United States by 32 million people by 2019.²² However, states have been tasked with implementing significant components of the PPACA, including establishing health benefit exchanges where individuals without insurance will be able to purchase insurance, educating the uninsured about the available options, and helping individuals to enroll. Successfully increasing health insurance coverage to all North Carolinians will help improve health and increase access to health care—including access to necessary clinical preventive services—across the state.

Rationale for target (refer to data grid): In North Carolina, the percentage of non-elderly individuals who are uninsured increased from 14.8% in 2000 to 20.4% in 2009. While the national percentage of adults who were

b Patient Protection and Affordable Care Act, Pub L No. 111-148.

uninsured also increased during this period, the increase in North Carolina was greater, and North Carolina's current percentage is higher than the national average of 18.8%. The PPACA is expected to significantly reduce the percentage of individuals who are uninsured. The Congressional Budget Office estimated that the PPACA will reduce the national uninsured average to 8.0% by 2019. The HNC experts concluded that setting the 2020 target based upon reaching this national average would be aspirational because the state is currently below the national average. Therefore the 2020 target is to reduce the percentage of individuals who are uninsured to 8.0%.

OBJECTIVE 4: INCREASE THE PERCENTAGE OF ADULTS WHO ARE NEITHER OVERWEIGHT NOR OBESE TO 38.1%^c

Rationale for selection: Overweight and obesity pose a significant threat to the health of North Carolinians. Currently two-thirds of adults in North Carolina are either obese or overweight, at 30.1% and 35.3% respectively, and just 34.6% are considered neither overweight nor obese.²³ Research shows that overweight or obese adults are at higher risk for serious health conditions such as heart disease, type 2 diabetes, certain cancers, and stroke.^{5,24} In addition, overweight and obesity have been linked to other health consequences including higher risk of arthritis, pregnancy complications, asthma, depression, and sleep apnea.³ Obesity also has significant economic impacts; in 2006 obese individuals spent \$1,400 more in medical care costs than those with normal weight, and total obesity-related health care costs were estimated at \$147 billion in 2008 for the nation.⁷

The increasing prevalence of overweight and obesity is caused by the complex interplay of numerous factors. Principal among the determinants of overweight and obesity are the environment and behavior.²⁵ Nutrition and physical activity behavior affect weight status, and these, in turn, are in part shaped by the environment surrounding individuals.²⁵ Genetics, metabolism, and socioeconomic status are also linked to body weight.²⁵ However, because of the significant impact behavior and environment have on overweight and obesity, interventions that jointly target these areas present the best opportunity for action.²⁵ Implementing multifaceted evidence-based strategies that improve nutrition and increase physical activity are necessary to address this national epidemic.

Rationale for target (refer to data grid): Over the past 10 years, the percentage of adults who are neither overweight nor obese has fallen from 42.1% in 1999 to 34.6% in 2009. (In other words, the percentage of adults who are at an unhealthy weight has increased.) Nationally, the percentage of adults who were neither overweight nor obese decreased from 1999-2009 as well. Every state reported a reduction, which means the percentage of adults who are neither overweight nor obese increased in every state during this time period. Given the widespread prevalence of overweight and obesity, and the threat it poses to health, the HNC 2020 experts decided it was imperative for North Carolina to reverse its trend.

North Carolina, at 34.6%, ranks 33rd out of all states, and falls far behind the national leader, Colorado, at 44.3%. A 2020 target based upon Colorado's percentage was not selected because it was seen as unachievable. In addition, since no state made an improvement, it was not possible to use the best-performing state method to set the 2020 target. Therefore, the HNC 2020 experts set the target based upon a 10% improvement in North Carolina's current percentage of adults who are neither overweight nor obese. This results in a 2020 target of 38.1%.

^c Body Mass Index (BMI) is used to measure weight status and BMI is equal to weight in kilograms divided by height in meters squared. An individual with a BMI < 18.5 is considered underweight; a BMI of 18.5-24.9 is normal weight; a BMI of 25.0-29.9 is overweight; and a BMI > 30 is obese. The percentage of adults who are neither overweight nor obese is 100% minus the percentage of adults who are overweight or obese.

Cross-Cutting Data Grid

| | North Carolina | | | Best States | | | Potential Targets | | | Selected Targets | | | |
|---|----------------------------|---|---|---|---|--|---|------------|--|--|--|----------------------------|--|
| | Baseline | Current Rate or Percentage Most recent NC data | Previous National Rank | Most Recent National Rank | NC's Pace Annual percentage change during period | Best State Most recent rate or percentage | Best-Performing State's Pace Annual percentage change during period | Best State | Best-Performing State's Pace Applied to NC's Current Value Out to 2020 | NC's Pace Applied Out to 2020 | 10% Improvement in NC's Current Rate or Percentage | Projected National Average | Selection Method |
| 2020 Objectives | | | | | | | | | | | | | |
| Increase average life expectancy (years)[†] (Key Performance Indicator) | 75.9 1998 ¹ | 77.5 2008 ² | 40th 2000 ³ 50 states reporting | 39th 2005 ⁴ 50 states reporting | 0.2% (-2.1% overall increase over 10 years) | 81.7 Hawaii, 2005 ⁵ | 0.5% Alaska, 2000-2005 ^{6a} (-2.4% overall increase over 5 years) | 81.7 | 82.0 (-0.5% annual increase for 12 years) | 79.5 (-0.2% annual increase for 12 years) | 85.3 | — | 79.5 NC's Pace |
| Increase the percentage of adults reporting good, very good, or excellent health** | 82.1% 1999 ¹ | 81.9% 2009 ² | 43rd 1999 ³ 50 states reporting | 41st 2009 ⁴ 50 states reporting | -0.02% (-0.2% overall decrease over 10 years) | 89.8% Minnesota, 2009 ⁵ | 0.4% Texas, 1999-2009 ^{6b} (-4% overall increase over 10 years) | 89.8% | 85.5% (-0.4% annual increase for 11 years) | 81.7% (-0.02% annual decrease for 11 years) | 90.1% | — | 90.1% 10% Improvement |
| Reduce the percentage of non-elderly uninsured individuals (aged less than 65 years) *** | 14.8% 2000 ¹ | 20.4% 2009 ² | Tied for 30th 2000 ³ 50 states reporting | Tied for 40th 2009 ⁴ 50 states reporting | 3.6% (-37.8% overall increase over 9 years) | 5.2% Massachusetts, 2009 ⁵ | -6.6% Massachusetts, 2000-2009 ^{6c} (-45.8% overall decrease over 9 years) | 5.2% | 9.6% (-6.6% annual decrease for 11 years) | 30.2% (-3.6% annual increase for 11 years) | 18.4% | 8.0% | 8.0% 2019 CBO Projection ⁷ |
| Increase the percentage of adults who are neither overweight nor obese **** | 42.1% 1999 ¹ | 34.6% 2009 ² | Tied for 36th 1999 ³ 50 states reporting | 33rd 2009 ⁴ 50 states reporting | -1.9% (-17.8% overall decrease over 10 years) | 44.3% Colorado, 2009 ⁵ | -0.5% Virginia, 1999-2009 ^{6d} (-4.8% overall decrease over 10 years) | 44.3% | 32.8% (-0.5% annual decrease for 11 years) | 27.9% (-1.9% annual decrease for 11 years) | 38.1% | — | 38.1% 10% Improvement |

Notes: For rankings, first is best. All rankings are based on national, state-level data indicated. Rates and percentages have been rounded to the nearest tenth decimal place, and calculations are based on values before rounding. See Chapter 2 for more information regarding data collection, calculations, and methods used for target-setting. — Indicates calculations that were not possible given data limitations, potential targets that were not available given data limitations, or potential targets that do not apply to or were not considered for a given objective.

¹ National data are from 2000-2005 due to data availability.
² Percentage of adult population (18 and older) living in households responding to the question: "How is your general health?" with either "excellent," "very good," or "good" out of potential responses of "excellent," "very good," "fair," or "poor."
³ 2000 was chosen as the base year instead of 1999 because the Current Population Survey was expanded in 2000, limiting the data comparability of current data to pre-2000 data.
⁴ Current Congressional Budget Office projections for the effect of The Patient Protection and Affordable Care Act on the percentage of uninsured. Meeting this rate by 2020 in North Carolina would be aspirational since the state is currently below the national uninsured average. Source: Congressional Budget Office. March 20, 2010. <http://www.cbo.gov/ftpdocs/113/doc11339c.pdf>. Accessed October 27, 2010.

⁵****The percentage of adults who are neither overweight nor obese equals 100% minus the total percent of adults who are overweight or obese. Adults (18 and older) who are neither overweight nor obese have a body mass index (BMI) less than 24.9. Adults who are overweight have a BMI between 25 and 29.9 and obese individuals have a BMI of 30 or above.
Sources:
¹ State Center for Health Statistics, North Carolina Department of Health and Human Services. Written (email) communication. July 9, 2010.
² US Census Bureau, Interim State Population Projections, 2005. Table 2: Average Life Expectancy at Birth by State for 2000 and Ratio of Estimates and Projections of Deaths: 2001 to 2003. www.census.gov/population/projections/tables/MeiTab2.xls. Published April 21, 2005. Accessed October 27, 2010.
³ The Henry J. Kaiser Family Foundation. Life Expectancy at Birth (in years). 2005. <http://www.stateandlocalfacts.org/comparativedata.asp?cid=624&cat=2>. Accessed October 27, 2010. Data Source: The Centers for Disease Control and Prevention, National Center for Health Statistics mortality data and US Census Bureau population data, 2005. Calculations from the American Human Development Index. Available at: http://www.measureofamerica.org/wp-content/uploads/2009/12/American_HDI_index_by_state.xls.
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⁶ US Census Bureau. Current Population Survey, Annual Social and Economic Supplements. HI-6. Health Insurance Coverage Status and Type of Coverage by State—Persons Under 65: 1998 to 2009. <http://www.census.gov/hhes/www/hlth/data/historical/index.html>. Accessed October 27, 2010.
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Strategies to Address the Cross-Cutting Objectives

| Level of the Socioecological Model | Strategies |
|------------------------------------|--|
| Individual | <i>Improve health status and life expectancy:</i> Be tobacco free ²⁶ ; be substance abuse free ³ ; eat healthy and exercise regularly ²⁷ ; finish high school and pursue higher education. ²⁸ <i>Increase health insurance coverage:</i> Enroll in public or private health insurance coverage. |
| Family/Home | <i>Improve health status and life expectancy:</i> Maintain a safe and tobacco-free home ²⁶ ; immunize children ²⁹ ; promote good nutrition and an active lifestyle. ²⁷ <i>Increase health insurance coverage:</i> Enroll all family members in public or private health insurance coverage; explore new options that may become available in 2014 with the implementation of The Patient Protection and Affordable Care Act (PPACA). ^e |
| Clinical | <i>Improve health status and life expectancy:</i> Provide all screenings and services recommended by the US Preventive Services Task Force (USPSTF) and provide all immunizations recommended by the Advisory Committee on Immunization Practices (ACIP) ^{f,30,31} ; provide all additional services recommended by the Health Resources and Services Administration (HRSA) for children and women ^{g,32} ; help educate the public about health risks. <i>Increase health insurance coverage:</i> Help uninsured patients enroll in public or private health insurance. ^h |
| Schools and Child Care | <i>Improve health status and life expectancy:</i> Promote school and organized child care center-located vaccination programs ³³ ; enforce tobacco-free policies ^{34,35} ; offer high-quality physical education and healthy foods and beverages ^{3,27} ; implement evidence-based healthful living classes in schools ^{3,36} ; ensure that all students receive comprehensive sexuality education. ^{3,37} <i>Increase health insurance coverage:</i> Identify uninsured students and assist with health insurance enrollment. ³⁸ |
| Worksites | <i>Improve health status and life expectancy:</i> Offer worksite wellness programs ³⁹ ; make worksites tobacco free ⁴⁰ ; conduct assessments of office stress, health, and job satisfaction and use interventions to target office stressors ⁴¹ ; inform all employees of applicable safety and health standards and protect all employees who work with hazardous materials. ⁴² <i>Increase health insurance coverage:</i> Offer health insurance and help employees enroll in public and private health insurance coverage. ⁱ |
| Insurers | <i>Improve health status and life expectancy:</i> Provide coverage with no cost sharing for all USPSTF-recommended preventive screening, counseling, and treatment, and for all ACIP-recommended immunizations. ^{j,43} |

f Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.
g Patient Protection and Affordable Care Act, Pub L No. 111-148, §1001, enacting §2713(a)(3),(4) of the Public Health Service Act, 42 USC §300gg.
h Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1003, 2202, 3510.
i Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1103, 3510.
j Patient Protection and Affordable Care Act, Pub L No. 111-148, § 1001, 4105-4106, enacting §2713 of the Public Health Service Act, 42 USC §300gg.

Strategies to Address the Cross-Cutting Objectives

| Level of the Socioecological Model | Strategies |
|------------------------------------|---|
| Community | <p><i>Improve health status and life expectancy:</i> Implement <i>Eat Smart, Move More</i> community-wide obesity prevention strategies³; build active living communities²⁷; provide community interventions in combination to increase vaccination among targeted populations⁴⁴; expand smoking bans or restrictions in community spaces³⁶; support school-based and school-linked health services³⁶; support adoption of healthy, safe, accessible, affordable, and environmentally friendly homes⁴⁵; reduce the stigma related to mental illness⁴⁶; fund expansion of family planning services and community-based pregnancy prevention programs for low-income families, such as the Nurse-Family Partnership^{3,47}; support community water fluoridation.^{48,49}</p> <p><i>Increase health insurance coverage:</i> Actively promote new health insurance options made available under the Patient Protection and Affordable Care Act; help individuals enroll in public and private coverage.^k</p> |
| Public Policies | <p><i>Improve health status and life expectancy:</i> Increase tax on beer and wine^{3,50}; enforce blood alcohol content and “zero tolerance” laws for drunk driving⁵¹; fund injury surveillance and intervention³; expand tobacco-free policies to all workplaces and in community establishments⁴⁰; increase the tobacco tax⁵²; fund <i>Eat Smart, Move More</i> community obesity prevention plans³; build active living communities²⁷; require schools to offer high-quality physical education and healthy foods and beverages^{3,27,53}; require schools to implement evidence-based healthful living curricula in schools^{3,36}; pass policies that ensure comprehensive sexuality education for all students^{3,37}; provide funding to support school-based and school-linked health services and achieve a statewide ratio of 1 school nurse for every 750 middle and high school students³⁶; develop comprehensive systems of mental health care that include prevention, treatment, and recovery supports.^{46,54}</p> <p><i>Increase health insurance coverage:</i> Simplify the eligibility and enrollment process for public insurance programs; conduct aggressive outreach to inform people about public and private insurance⁵⁵; employ patient navigators to help enroll people in public and private coverage.^l</p> |

K Patient Protection and Affordable Care Act, Pub L No. 111-148, § 51103, 3510.
 l Patient Protection and Affordable Care Act, Pub L No. 111-148, §3510.

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| | Current | 2020 Target |
|--|----------------|-------------|
| Tobacco Use | | |
| 1. Decrease the percentage of adults who are current smokers | 20.3% (2009) | 13.0% |
| 2. Decrease the percentage of high school students reporting current use of any tobacco product | 25.8% (2009) | 15.0% |
| 3. Decrease the percentage of people exposed to secondhand smoke in the workplace in the past seven days | 14.6% (2008) | 0% |
| Physical Activity and Nutrition | | |
| 1. Increase the percentage of high school students who are neither overweight nor obese | 72.0% (2009) | 79.2% |
| 2. Increase the percentage of adults getting the recommended amount of physical activity | 46.4% (2009) | 60.6% |
| 3. Increase the percentage of adults who consume five or more servings of fruits and vegetables per day | 20.6% (2009) | 29.3% |
| Injury and Violence | | |
| 1. Reduce the unintentional poisoning mortality rate (per 100,000 population) | 11.0 (2008) | 9.9 |
| 2. Reduce the unintentional falls mortality rate (per 100,000 population) | 8.1 (2008) | 5.3 |
| 3. Reduce the homicide rate (per 100,000 population) | 7.5 (2008) | 6.7 |
| Maternal and Infant Health | | |
| 1. Reduce the infant mortality racial disparity between whites and African Americans | 2.45 (2008) | 1.92 |
| 2. Reduce the infant mortality rate (per 1,000 live births) | 8.2 (2008) | 6.3 |
| 3. Reduce the percentage of women who smoke during pregnancy | 10.4% (2008) | 6.8% |
| Sexually Transmitted Disease and Unintended Pregnancy | | |
| 1. Decrease the percentage of pregnancies that are unintended | 39.8% (2007) | 30.9% |
| 2. Reduce the percentage of positive results among individuals aged 15-24 years tested for chlamydia | 9.7% (2009) | 8.7% |
| 3. Reduce the rate of new HIV infection diagnoses (per 100,000 population) | 24.7 (2008) | 22.2 |
| Substance Abuse | | |
| 1. Reduce the percentage of high school students who had alcohol on one or more of the past 30 days | 35.0% (2009) | 26.4% |
| 2. Reduce the percentage of traffic crashes that are alcohol-related | 5.7% (2008) | 4.7% |
| 3. Reduce the percentage of individuals aged 12 years and older reporting any illicit drug use in the past 30 days | 7.8% (2007-08) | 6.6% |
| Mental Health | | |
| 1. Reduce the suicide rate (per 100,000 population) | 12.4 (2008) | 8.3 |
| 2. Decrease the average number of poor mental health days among adults in the past 30 days | 3.4 (2008) | 2.8 |
| 3. Reduce the rate of mental health-related visits to emergency departments (per 10,000 population) | 92.0 (2008) | 82.8 |

| | Current | 2020 Target |
|--|-----------------|--------------------|
| Oral Health | | |
| 1. Increase the percentage of children aged 1-5 years enrolled in Medicaid who received any dental service during the previous 12 months | 46.9% (2008) | 56.4% |
| 2. Decrease the average number of decayed, missing, or filled teeth among kindergartners | 1.5 (2008-09) | 1.1 |
| 3. Decrease the percentage of adults who have had permanent teeth removed due to tooth decay or gum disease | 47.8% (2008) | 38.4% |
| Environmental Health | | |
| 1. Increase the percentage of air monitor sites meeting the current ozone standard of 0.075 ppm | 62.5% (2007-09) | 100.0% |
| 2. Increase the percentage of the population being served by community water systems (CWS) with no maximum contaminant level violations (among persons on CWS) | 92.2% (2009) | 95.0% |
| 3. Reduce the mortality rate from work-related injuries (per 100,000 equivalent full-time workers) | 3.9 (2008) | 3.5 |
| Infectious Disease and Foodborne Illness | | |
| 1. Increase the percentage of children aged 19-35 months who receive the recommended vaccines | 77.3% (2007) | 91.3% |
| 2. Reduce the pneumonia and influenza mortality rate (per 100,000 population) | 19.5 (2008) | 13.5 |
| 3. Decrease the average number of critical violations per restaurant/food stand | 6.1 (2009) | 5.5 |
| Social Determinants of Health | | |
| 1. Decrease the percentage of individuals living in poverty | 16.9% (2009) | 12.5% |
| 2. Increase the four-year high school graduation rate | 71.8% (2008-09) | 94.6% |
| 3. Decrease the percentage of people spending more than 30% of their income on rental housing | 41.8% (2008) | 36.1% |
| Chronic Disease | | |
| 1. Reduce the cardiovascular disease mortality rate (per 100,000 population) | 256.6 (2008) | 161.5 |
| 2. Decrease the percentage of adults with diabetes | 9.6% (2009) | 8.6% |
| 3. Reduce the colorectal cancer mortality rate (per 100,000 population) | 15.7(2008) | 10.1 |
| Cross-cutting | | |
| 1. Increase average life expectancy (years) | 77.5 (2008) | 79.5 |
| 2. Increase the percentage of adults reporting good, very good, or excellent health | 81.9% (2009) | 90.1% |
| 3. Reduce the percentage of non-elderly uninsured individuals (aged less than 65 years) | 20.4% (2009) | 8.0% |
| 4. Increase the percentage of adults who are neither overweight nor obese | 34.6% (2009) | 38.1% |

The Healthy NC 2020 project to develop the state's 2020 objectives was generously supported by The Duke Endowment, the Kate B. Reynolds Charitable Trust, and the North Carolina Health and Wellness Trust Fund. Partners collaborating with the NCIOM on the Healthy NC 2020 project included the Governor's Task Force for Healthy Carolinians, the Division of Public Health, North Carolina Department of Health and Human Services (NC DHHS); the Office of Healthy Carolinians, NC DHHS; and the State Center for Health Statistics, NC DHHS. All were essential to accomplishing this work. The development of the 2020 objectives would not have been possible without the guidance of the steering committee members, the contributions of the subcommittee members, and the expertise of many other individuals.

We also extend appreciation to specific individuals for their expertise, advice, and continuous involvement in this project, including Jeffrey Spade, FACHE, Executive Director, North Carolina Center for Rural Health Innovation and Performance, Vice President, North Carolina Hospital Association, and Chair, Governor's Task Force for Healthy Carolinians; and to the following individuals within the Division of Public Health, North Carolina Department of Health and Human Services (NC DHHS): Jeffrey P. Engel, MD, State Health Director; Ruth Petersen, MD, MPH, Chronic Disease Section Chief; Lisa Harrison, MPH, Director, Office of Healthy Carolinians and Health Education; Debi Nelson, MAEd, RHEd, Deputy Director, Office of Healthy Carolinians and Health Education; and Laura Edwards, RN, MPA, Prevention Specialist. Appreciation also goes to Karen Knight, MS, Director, State Center for Health Statistics, NC DHHS; Kathleen Jones-Vessey, MS, Manager, Statistical Services, State Center for Health Statistics, NC DHHS; and Steven Cline, DDS, MPH, Assistant Secretary for Health Information Technology, NC DHHS, and former Deputy State Health Director. In addition to the above groups and individuals, NCIOM staff made significant contributions to the Healthy NC 2020 project. Pam Silberman, JD, DrPH, NCIOM President and CEO, and Mark Holmes, PhD, past NCIOM Vice President, developed the framework for the development of the objectives. Jennifer Hastings, MS, MPH, was the Healthy NC 2020 Project Director. Former NCIOM staff member Catherine Liao, MPH, contributed significantly to this work. Paul Mandsager, an NCIOM intern, provided invaluable data and technical support throughout this project. In addition, Berkeley Yorkery, MPP, NCIOM Project Director; Sharon Schiro, PhD, NCIOM Vice President; Kimberly Alexander-Bratcher, MPH, NCIOM Project Director; and Rachel Williams, MPH, NCIOM Research Assistant, made significant contributions, as did NCIOM interns Lauren Short and Lindsey Haynes.

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