

North Carolina MEDICAL JOURNAL

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on Health Reform
in North Carolina

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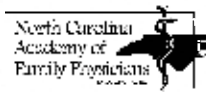
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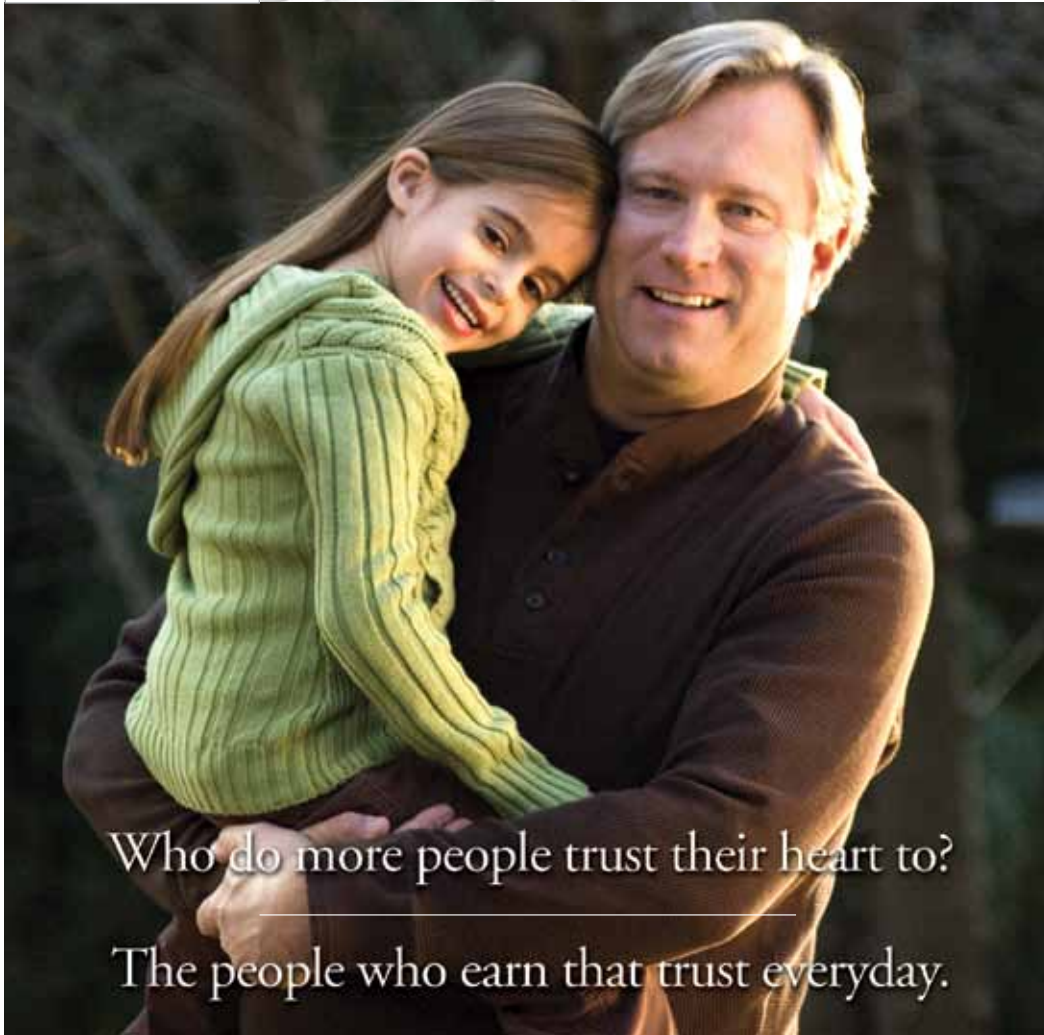
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Tarheel Footprints in Health Care

Recognizing unusual and often unsung contributions of individual citizens who have made health care for North Carolinians more accessible and of higher quality

Christine Smith, MS *Passion and Commitment to Excellence*



Passion and commitment to excellence. These are the words that colleagues have used to describe Christine Smith, family and consumer sciences agent with North Carolina Cooperative Extension in Wayne County. The North Carolina Cooperative Extension is a partnership between federal, state, and local government agencies and uses the resources of both NC State University and NC A&T State University. One of the Cooperative Extension's charges is to help county residents eat healthy foods and increase their physical activity through community outreach and educational programs. Mrs. Smith has been with North Carolina Cooperative Extension for over 26 years and is a vital part of the program's success.

Due to Mrs. Smith's experience and expertise in working with individuals, communities, agencies, and local government, she was asked to participate in the development team for the Eat Smart, Move More, Weigh Less program. Working at the state-level, she helped create a weight management program designed to use evidence-based strategies to encourage individuals to eat healthy and exercise more. This 15-week program is offered onsite to individuals and groups that are interested in taking control of what they eat and how much they exercise. Participants are encouraged to keep food journals and keep track of when they exercise.

As a family and consumer sciences agent for North Carolina Cooperative Extension in Wayne County, Mrs. Smith is committed to excellence in programming and to helping citizens improve their health and well-being. She develops and implements programs in nutrition, wellness, food preservation, and family resource management. She is very visible and active in the community providing educational opportunities, both informal and formal, for citizens to learn about incorporating healthy foods and physical activity into their daily lifestyle. Christine is a featured columnist for the *Goldsboro News-Argus* "Your Health" section and is a featured monthly columnist for the Eat Smart, Move More North Carolina electronic newsletter. Through this media she empowers and challenges citizens to take personal responsibility for their health. The columns have also brought high visibility to Cooperative Extension.

Mrs. Smith is a proponent of developing relationships with community partners to enhance programming opportunities. Most recently, she organized a team of professionals to provide nutrition education and fitness workouts twice a week to help citizens become "Fit & Fabulous in 2010." She truly understands that a team approach benefits all. In addition, she collaborates with local hospitals, faith-based organizations, and county government to change policies about the foods they serve and the environments they offer to their employees and customers. Recently she conducted Eat Smart, Move More, Weigh Less program for five different churches, county employees, and the general public. Her ultimate goal is to help these communities change their physical and social environments to be more conducive to healthy lifestyles.

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When asked about Christine Smith, close colleague and friend Carolyn Dunn says, "The first thing that comes to mind when you say Christine Smith is passion. She is passionate to help people eat smart and move more. She is tenacious and holds herself to a very high standard, so she expects that other people do the same. Everything she does is at full speed. If she can think of a way to make her messages more meaningful to her clients, or reach them in a way that might create a spark to help them eat smart and move more, even if it means more work for her, she will do it."

Christine Smith has a bachelors of science in Home Economics Education from Tennessee State University and a masters of science in Home Economics Education from Oregon State University; she is on the editorial board for *The Forum for Family and Consumer Issues* and a contributing author of the *Heart & Soul* cookbook, a collection of southern style heart healthy recipes (available online at <http://www.ces.ncsu.edu/wayne/>). Additionally, she is the recipient of many awards, including the Distinguished Service Award in 2009, Continued Excellence Award 2008; Communications Award Newsletters, 2008; Communications Award for Written Press Release on Workplace Wellness, 2007; Graduate of the Leadership Seminar Series for New and Aspiring County Extension Directors, 2005; Communications Award for Outstanding Educational Curriculum Package in 2002; Marketing Package Award in 2002; and the 2002 Food Safety Award. She served as a dietetic assistant at Vanderbilt University Hospital and a graduating teaching assistant at Oregon State before starting her career as the Wayne County extension agent in 1983. She was recently named a Robert Wood Johnson Ladder to Leadership Fellow, which is a 16-month-long fellowship meant to groom future leaders in the health care and nonprofit organization fields.

Contributed by Lindsey E. Haynes, a graduate student in the Department of Health Policy and Management, University of North Carolina at Chapel Hill, Gillings School of Global Public Health, with the assistance of Carolyn Dunn, PhD, associate state program leader for the North Carolina Cooperative Extension.

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2 Urgent Cares These two urgent care practices are being sold together. Financials combined and patients total 50 to 60 per day.	Cary Area, NC	\$350,000	Leased	\$350,000
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Urgent Care Upscale practice serving patients in the Triad for about 15 years. Medical equipment includes digital X-Ray.	Greensboro, NC	\$350,000	Leased	\$350,000
Internal Medicine This primary care practice is a medical cornerstone of the community, serving metropolitan Greenville and surrounding areas. Impressive 40 patients per day with owner financing up to \$250,000 for the qualified MD.	Greenville, NC	\$600,000	\$160,000	\$760,000
Orthopaedic Hospital-based orthopaedic and sports medicine practice with X-Ray. \$150,000 owner financing available	Newport News, VA	\$200,000	Leased	\$200,000
Urgent Care This established urgent care is located about 40 minutes south of Raleigh. Fully equipped with X-Ray, and the staff is experienced. The owner has another practice out of the area and wishes to sell this location.	Johnson County, NC	\$185,000	Leased	\$185,000
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Family Practice Treating patients for over 12 years, this upscale practice is nestled in a medical community with aesthetically pleasing amenities. Patient daily totals are 30 to 45 per day, with a lot of room for growth.	Raleigh, NC	\$190,000	\$492,500	\$682,500
Urgent Care This could be the urgent care you have been looking for. Excellent location, well equipped, super staff and ready for the new owner. Steady patient volume of 35 to 55 per day. A "must-see" for the serious buyer.	Angier, NC	\$198,500	Leased	\$198,500

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The Administration of Psychotropic Medication to Children Ages 0-4 in North Carolina: An Exploratory Analysis

Alan R. Ellis, MSW

Abstract

Background: The increasing use of psychotropic medication among preschool children raises concern because there are insufficient clinical guidelines and possible disparities.

Methods: This study explored published administrative data (2001-2006) on the receipt of psychotropic medication by North Carolina Medicaid enrollees ages 0-4 by mental health catchment area. Quarterly prevalence statistics were examined and potential predictors of receipt were identified for future study.

Results: During the study period the state's quarterly prevalence ranged from 2.3 to 3.0 recipients per 1,000 enrollees (range in catchment areas: 0.5 to 9.8). The state rate peaked at 3.0 in the third quarter of 2002 and at 2.9 in the third quarter of 2004.

Limitations: The data are aggregated to a large area level and limited to Medicaid enrollees. The small number of catchment areas (36) limits the utility of statistical associations.

Conclusions: Prevalence rates are high enough to deserve further exploration. Geographic variation exists. Psychotropic medication prescriptions for preschool children should be included as the state's mental health practitioners, policymakers, and planners discuss the service system and the mental health of children in our communities.

Keywords: psychotropic drugs; child; preschool; catchment areas (health); regression analysis; mental health services

Psychotropic medication is part of the standard of care for many mental disorders, but its increasing use among preschool children in the United States^{1,2} has raised concern because of insufficient clinical guidelines and possible racial and economic disparities. Often the medication is a stimulant prescribed for attention deficit/hyperactivity disorder (ADHD) or related symptoms.^{1,3-5} In examining Medicaid claims, Zito and colleagues found that between 1991 and 1995 the annual prevalence of stimulant prescriptions per 1,000 children ages 2-4 had increased from 4.1 to 12.3 in one state and from 4.9 to 8.9 in another.² Smaller but substantial increases were found in prescriptions for other psychotropic medications as well.

These trends are troubling for several reasons. Although ADHD screening instruments do exist for children as young as age 3,^{6,7} not all preschool children who receive stimulants actually have a diagnosis of ADHD⁵ and, among those who do, treatment varies widely.^{3,4} Psychiatric diagnosis is difficult in this population,⁹ especially for other disorders such as depression and psychosis. Most psychotropic drugs are not approved by the Food and Drug Administration (FDA) for

use in people younger than age 6 (i.e., much of the current use is off-label). Especially in the case of antipsychotics and mood stabilizers, there is insufficient evidence of safety and effectiveness for preschool children, who may be particularly vulnerable to medication side effects.^{1,8} Additional areas of concern include polypharmacy,^{9,10} the use of psychotropic medication in the absence of well-child care or psychosocial services,^{3,9} and the prescribing physician's level of preparation.⁹ Most psychotropic medications taken by preschoolers are prescribed by pediatricians and general practitioners rather than by specialists in psychiatry.¹⁵

Regardless of whether increased psychotropic medication use among preschool children is mostly beneficial or mostly harmful, it is important to understand the factors associated with prescribing. Several studies have explored possible racial disparities in prescribing, with mixed results. In a study of 223 Michigan Medicaid recipients ages 0-4 with ADHD, Rappley and colleagues found no association between race and receipt of psychotropic medication.⁴ Khandker and Simoni-Wastila found that African American children enrolled in the Georgia Medicaid program received

Alan R. Ellis, MSW, is a research associate and fellow at the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill. He can be reached at are (at) unc.edu.

significantly fewer prescriptions of any kind than did white enrollees.¹¹ In several studies, mostly using data from individual states or counties, investigators have found less psychotropic medication use among African American and/or Hispanic youths than among white youths.¹²⁻¹⁵ However, Kelleher and colleagues found no such difference.¹⁶ Zito and colleagues found greater racial disparities among economically disadvantaged youths.¹⁵

To the author's knowledge, no published study has examined the use of psychotropic medication among children in North Carolina. This exploratory, descriptive study takes advantage of a limited set of published secondary North Carolina Medicaid data for 2001-2006.¹⁷ The study reports the prevalence of psychotropic medication prescriptions among North Carolina Medicaid enrollees ages 0-4, describes temporal variation, and identifies demographic and geographic predictors that could be included in future analyses of more detailed data. The importance of identifying relevant levels of analysis and including predictors at all levels is highlighted.

Methods

Data and Measures

From July 2001 through December 2006, the North Carolina Division of Medical Assistance¹⁷ published reports covering resource use in each of the state's 36 mental health catchment areas,^a known as Local Management Entities (LMEs). For 15 calendar quarters during this period, the LME data included the number and proportion of Medicaid enrollees ages 0-4 who received psychotropic medication. This formed the basis for the dependent variable: number of psychotropic drug recipients per 1,000 enrollees.

The analyses described here are ecological in that they examine only the state and LME levels and (because of data limitations) not the county, provider, or individual levels. The LME is an appropriate unit of analysis only to the extent to which Medicaid mental health services within a catchment area are uniformly affected by LME policies and practices or by regional resources or demographic characteristics. This issue is addressed further in the Discussion section.

In order to check data accuracy, the author calculated Medicaid enrollment (ages 0-4) by LME and ensured that these counts were consistent with the two LME mergers (both in January 2003) documented in North Carolina legislative and Division of Medical Assistance reports. As an additional consistency check, enrollment was plotted over time by LME. All LMEs had similar trajectories, with small increases at most time points. In the first quarter of 2003 the

denominator increased by 31% at the state level, with larger percent increases in some LMEs than in others. This sudden increase is likely due to the addition of NC Health Choice enrollees ages 0-4.^b The study data and actual Medicaid and Health Choice enrollment counts are consistent with this explanation. A small decrease in prevalence accompanied the denominator change (see Figure 1). The statistical model controls for such changes between time points (see details below). The term "Medicaid enrollees," used in reference to the study population, includes Health Choice enrollees beginning with 2003 Quarter 1.

One error was identified: for the last nine quarters the Johnston County LME was absent from the data file, and there were two entries for Guilford County. In each case one Guilford entry was assigned to Johnston County based on calculated LME enrollment.

Four categories of independent variables—race and ethnicity, socioeconomic status (SES), population-related measures, and provider availability—were identified based on expected associations with access to care and/or quality of care, and therefore with the dependent variable. Year 2000 Census-based data on race and ethnicity (percent white non-Hispanic), SES (per capita income, percent in poverty, percent high school graduates among people age 25 and older, percent of children under age 18 who are uninsured), and population-related measures (population density [population per square mile], metropolitan statistical area [MSA] status, 2003 Rural-Urban Continuum Code) were obtained from the US Census Bureau and the US Department of Agriculture.¹⁸⁻²² Provider availability was measured in two ways: (1) the number of psychiatrists per 10,000 population (for the year 2000) was calculated using data from the North Carolina Health Professions Data System²³ and (2) the number of primary care providers per 10,000 population (for 1998, adjusted for county-level indicators of high need) was calculated from data provided by the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill.²⁴ Because the dependent variable was measured only at the LME level, and because each LME serves one or more whole counties, each independent variable was aggregated from the county level to the LME level. For this purpose, each county was associated with the LME to which it belonged as of July 1, 2003. This was consistent with the data structure and ensured the comparability of measurements over time by holding geographic areas constant. MSA status was aggregated by creating a variable to indicate whether more than 50% of an LME's population lived in a MSA.

-
- a. There were 39 Area Mental Health Programs at the beginning of the study period, each serving one or more of North Carolina's 100 counties. In July 2003, mergers decreased this number to the 36 areas represented in the study data. As of July 2008, additional mergers had decreased the number of catchment areas to 24 and the Area Program designation had been changed to Local Management Entity (LME). The latter term will be used throughout the current paper to refer to a local mental health authority or to its service region.
- b. NC Health Choice is the state's insurance program for uninsured children.

The University of North Carolina's Public Health and Nursing Institutional Review Board determined that Board approval was not required for this study.

Statistical Analyses

Quarterly statistics were calculated to describe the proportion of enrollees ages 0-4 who received psychotropic medication. Potential area-level predictors of psychotropic medication receipt were assessed in two ways: (1) correlations with the dependent variable were calculated, and (2) single-predictor hierarchical linear models (HLMs) were constructed using the MIXED procedure in the statistical software program SAS.²⁵ The HLMs provided a stronger measure of association by utilizing the 15 repeated measures for each LME while controlling for the clustering of observations within LMEs. In order to control for policy or practice changes over time, the 15 calendar quarters were represented by 14 dummy variables. Because this study is exploratory and the number of LMEs is small, multivariate models and parameter estimates are not presented; only the direction and strength of each association is reported. Percentage of variance explained is calculated according to the formula given by Snijders and Bosker.²⁶

Because it had a skewed distribution, the dependent variable—which is exactly 1,000 times a child's probability (p) of receiving psychotropic drugs in a given catchment area and quarter—was transformed for correlation and HLM analyses by calculating $\log(p/(1-p))$, the log odds of receipt. This variable had a normal distribution.

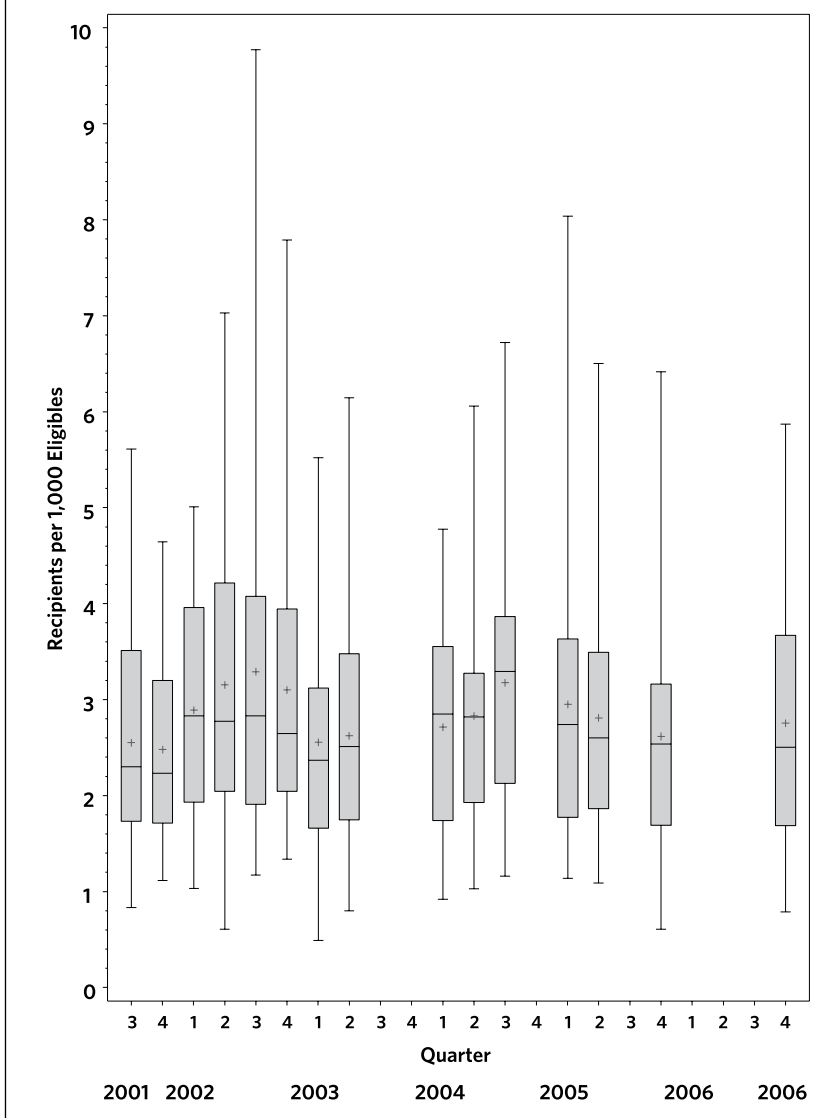
Results

Quarterly administrative files, published alongside the catchment area data, list the psychotropic drugs received by Medicaid enrollees ages 0-4. Most of the drugs listed were antidepressants (20), antipsychotics or mood stabilizers (12), stimulants (7), or anxiolytics (7). One was a combination antipsychotic/antidepressant.^c Figure 1 shows the variation in receipt of psychotropic medication per 1,000 Medicaid enrollees in this age range, both among LMEs and

over time. The mean rate ranged from 2.5 to 3.3 per 1,000 (median 2.2 to 3.3, standard deviation 1.1 to 1.8), with peaks in 2002 Quarter 3 and 2004 Quarter 3. Most LMEs had their highest rates near these two time points (not shown). The minimum LME rate per 1,000 was 0.5 and the maximum was 9.8. The state rate per 1,000 ranged from 2.3 to 3.0 over the same time period, with a mean of 2.6. Similar to the LME rates, the state rate peaked at 3.0 in 2002 Quarter 3 and at 2.9 in 2004 Quarter 3.

Table 1 (page 12) shows the mean LME-level correlation (across the 15 calendar quarters) between each predictor and the log odds of receiving psychotropic medication.

Figure 1.
Psychotropic Drug Recipients Per 1,000 Medicaid Eligibles
Ages 0-4 in 36 Mental Health Catchment Areas, 2001-2006



c. A 24-hour nicotine patch appeared on the drug list for 2005 Quarter 1 only. This is assumed to be a data error but is mentioned here for completeness. The one-time error should have little effect on the results.

HLM results are used to indicate the percentage of variance explained by each predictor and the significance of each association, controlling for the clustering of observations within LMEs. The results are consistent; the five HLMs with significant effects correspond to the five largest mean correlations, and the proportions of variance explained in the HLMs are approximately equal to the squares of the corresponding mean correlations. More rural LMEs and those with proportionally larger white non-Hispanic populations have higher prevalence rates. LMEs with high per capita income, high population density, and high psychiatrist availability have lower prevalence rates.

The HLM results indicated that two-thirds (66.4%) of the variation in the dependent variable reflected differences in prevalence between LMEs rather than change over time within LMEs or residual variation.

Discussion

For North Carolina Medicaid enrollees ages 0-4 the quarterly rate of receipt of psychotropic medication, at the state level, ranged from 2.3 to 3.0 per 1,000 during the study period. Depending on the degree of overlap among groups of children who received psychotropic medication in different quarters during the same year, the annual rates may have been as low as 2.4 to 3.0 or as high as 9.9 to 11.1.^d The latter

rates are comparable to those reported in other studies of preschool-aged Medicaid enrollees after the dramatic increases of the early 1990s. For example, based on year 1996 claims, Zito and colleagues reported annual rates of 9.8 and 15.3 respectively for children ages 0-4 in a mid-Atlantic state and a Midwestern state.²⁷ Based on 1998-1999 Connecticut Medicaid claims, Martin and colleagues reported an annual rate of 11.2 for children ages 2-4.²⁸ (Because medication use increases with age, the rate should be somewhat higher for ages 2-4 than for ages 0-4.) Strikingly, the highest *quarterly* LME rate in the current study (9.8) is on the order of the *annual* state rates reported in the previous studies. Clearly the proportion of North Carolina's youngest Medicaid enrollees who receive psychotropic medication is sufficient to warrant further attention, certainly in some areas and probably statewide.

A few additional issues should be considered when interpreting the current results in the context of previous findings. Medicaid programs in different states may vary in policy, practice, or population served. Historical changes (such as policy or program implementation) may have occurred after the earlier studies were completed. There may also be differences in methods, particularly in the definition of "psychotropic." For example, the following drugs were absent in the administrative data used for

Table 1.
Associations Between Predictors and Log Odds of Receiving Psychotropic Medication Among Children Ages 0-4 (N=36 Mental Health Catchment Areas)

Predictor Category	Predictor	Mean Correlation, 2001 Quarter 3-2006 Quarter 4	Percent Variance Explained in HLM ^a
Race/Ethnicity	Percent white non-Hispanic	0.41	22%
Socioeconomic Status	Per capita income	-0.35	15%
	Percent in poverty	0.03	
	Percent uninsured (under 18)	-0.04	
	Percent high school graduates (age 25+)	-0.08	
Population-Related	Population density	-0.42	23%
	Rural-Urban Continuum Code (2003) ^b	0.29	9%
	>50% in metropolitan statistical areas	-0.24	
Provider Availability	Psychiatrists per 10,000 population	-0.29	10%
	Primary care providers per 10,000 population	-0.26	

a. The hierarchical linear model (HLM) uses repeated observations over 15 calendar quarters, controls for the clustering of observations within Local Management Entities, and controls for change between time points in the mean of the dependent variable. Direction of effect and percent variance explained are shown only for effects significant at the 0.05 level. Percent variance explained is calculated according to the formula given by Snijders and Bosker.²⁶

b. The Rural-Urban Continuum Code is scored from 1 (most urban) to 9 (most rural).

d. For each of the four complete fiscal years (July-June) in the study period, lower and upper bounds on the annual rate were estimated post-hoc. Within each fiscal year the lower bound is the maximum quarterly rate and the upper bound is the sum of the quarterly rates. Quarters with missing data were assigned the mean of the most recent past rate and the next available future rate.

the current study: alpha-adrenergic agonists (included in both previous studies), hydroxyzine hydrochloride (included by Zito and colleagues), and mood stabilizer anticonvulsants (included in both previous studies, at least for certain primary diagnoses).^{27,28} In the current study, the medication lists included mood stabilizers such as lithium and aripiprazole and atypical antipsychotics (e.g., risperidone) that can be used in the treatment of bipolar disorder. Anticonvulsants that are sometimes used as mood stabilizers (e.g., carbamazepine, valproic acid, lamotrigine) were not included. Also, although some of the drugs classified as anxiolytics in the current study could also be classified as sedatives or hypnotics, it is possible that not all anxiolytics, sedatives, and hypnotics were included in generating the administrative data. Thus, the current study may be subject to a narrower definition of “psychotropic” than those used in previous studies.

Although most of the variation in prevalence of psychotropic medication receipt occurs between LMEs, there is some variation over time, including noticeable peaks in 2002 Quarter 3 and 2004 Quarter 3, which appear in the data from individual LMEs (not shown) as well as in the summary statistics (see Figure 1, page 11). Although these trends may appear insignificant, the shift between 2001 Quarter 4 and 2002 Quarter 3 is a 28% increase, resulting in the receipt of psychotropic medication in 2002 Quarter 3 by 204 more children than would have received it had prevalence remained constant during that interval. These peaks appear to be both systematic and temporary, suggesting that they may be related to state or federal factors but were not caused by permanent shifts in policy or practice. It is possible that gradual, temporary increases in prevalence were caused in part by FDA approval of two drugs for the treatment of ADHD in children over 5: dexamethylphenidate hydrochloride on November 13, 2001 and atomoxetine hydrochloride on November 26, 2002. Seasonal variation in the use of psychotropic drugs may also be a contributing factor. An FDA black box warning on antidepressants was issued in 2004 Quarter 4 and may have contributed to the decline in prevalence during 2004-2005. A more definitive interpretation could be sought through quantitative analysis of claims data or through qualitative analysis of administrative and/or interview data from sources such as the state Medicaid and mental health divisions, individual LMEs, and treatment providers.

The variation in the outcome across LMEs is intriguing (see Figure 1, page 11). The difference between the minimum and maximum prevalence reached as high as 8.6 per 1,000 enrollees, and the ratio of maximum to minimum prevalence rates sometimes exceeded 10. This means that at some points in time there was a tenfold difference between the highest and lowest rates of use. This large amount of variation highlights the importance of examining and understanding differences in policy and practice among communities within a given state.

Only narrow and circumscribed inferences can be

made about the relationships between LME-level variables and the receipt of psychotropic medication. The small number of LMEs in the state limits the utility of statistical associations. Further, although LMEs may influence the prescribing of psychotropic medication, county-level and practice-level information is important because some LMEs serve heterogeneous groups of counties and because there may be substantial variation among treatment providers. Individual-level information is also important because the relationships between socioeconomic variables and medication receipt may differ between the child level and the area level. The administrative data used for this study do not include information on child, provider, or even county characteristics, and ecological relationships observed at the LME level cannot be inferred to exist at other levels. Given these caveats, the associations observed here suggest only that rurality, race/ethnicity, per capita income, population density, and psychiatrist availability are good candidates for predictor variables in future studies of more detailed data.

In addition to the limitations discussed in the previous paragraph, the current study focuses on Medicaid and NC Health Choice enrollees, so the findings cannot be generalized to the treatment of the uninsured or of those with private health insurance. However, despite these limitations, two important conclusions can be drawn. First, the administration of psychotropic medication to preschool-aged Medicaid enrollees in North Carolina is common enough to deserve further careful examination. Second, there is substantial geographic variation in prevalence within the state, making it important to consider contextual information in studying the administration of psychotropic medication to this population.

Implications for Research

This investigation should be complemented by both qualitative and quantitative studies. The former should include the perspectives of stakeholders such as providers, caregivers, patients (where possible), and state regulators. The latter should include all relevant levels of analysis (e.g., county, provider, individual) and should use appropriate methods to control for the dependence among observations. Studying North Carolina’s 100 counties and a large number of individuals would allow stronger conclusions to be drawn, especially about the relationships between socioeconomic variables and medication receipt. Additionally, studies of larger data sets may be able to examine subgroups such as children in foster care and issues such as polypharmacy.

Implications for Policy and Practice

For much of the past decade North Carolina has been struggling to reform its mental health system.^{29,30} Although children with mental illness are a target population for public mental health spending, they are also in a system with insufficient community resources, especially for rural and low-income citizens.³⁰ The current findings provide an opportunity

for mental health practitioners, policymakers, and planners to enhance children's mental health care by examining prescribing practices, supporting further development of clinical guidelines, exploring how non-clinical factors (e.g., area-level resources) may influence prescribing practices, and ensuring that policies and practices match the best available evidence. Psychotropic medication prescriptions for preschool children should be part of the ongoing conversation in North Carolina about how the service system should

function and what supports are needed for the mental health of children in our communities. **NCMJ**

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North Carolina Emergency Department Data: January 1, 2007-December 31, 2007

Anna Waller, ScD; Anne Hakenewerth, MS; Judith Tintinalli, MD; Amy Ising, MSIS

Abstract

Background: The purpose of this paper is to describe patient characteristics and clinical conditions seen in North Carolina emergency departments (EDs) in 2007.

Methods: Data were analyzed from a static database of all 2007 ED visits in the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). Data were captured from 80% of North Carolina EDs on January 1, 2007, and 93% as of December 31, 2007. ED visits were analyzed by age, sex, method of ED arrival, return and repeat ED visits, expected source of payment, and ED disposition. Data were also analyzed by selected disease and injury groups that were thought by the authors to be of epidemiologic or demographic importance to North Carolina.

Results: The first and second leading ED visit diagnosis groups in North Carolina were abdominal pain and chest pain. The top three disease groups resulting in ED visits were chest pain/ischemic heart disease (11.9% of all ED visits), substance and alcohol abuse or withdrawal (11.2%), and diabetes (7.8%). Falls were the most common cause of injury-related ED visits in North Carolina, almost twice as common as motor vehicle crashes.

Limitations: This study reports only on acute disorders resulting in ED visits. North Carolina legislation limits the types of data elements collected. All data depend on institutional coding practices.

Conclusions: Emergency department data can provide valuable information on the proportions and rates of ED visits for illness and injury statewide and can help identify vulnerable populations in the state.

Keywords: emergency department data, public health surveillance, descriptive epidemiology

This paper provides an overview of North Carolina emergency department (ED) data for the year 2007, which represent a total of nearly 4 million ED visits in the state. Data are analyzed by the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT), a near real-time statewide ED database which is funded by the North Carolina Division of Public Health. NC DETECT is developed and maintained by faculty and staff at the Carolina Center for Health Informatics in the Department of Emergency Medicine at the University of North Carolina at Chapel Hill, in collaboration with the North Carolina Division of Public Health. To date, NC DETECT is the most comprehensive and mature ED database in the United States. The purpose of this paper is to define the

patient characteristics and clinical conditions seen in North Carolina EDs in 2007 in order to better understand the statewide burden of acute illness and injury. These data are taken from the 2007 NC DETECT Annual Report.¹

Methods

In 2007, NC DETECT received data on an estimated 92% of all ED records from 24/7 acute care hospital-affiliated EDs in North Carolina. Psychiatric, military, and veteran's hospitals did not participate. Data were captured from 90 of 112 North Carolina EDs on January 1, 2007, and 103 of 111 EDs as of December 31, 2007. The ED data in NC DETECT are all secondary data. Hospitals extract their data in near real-time from their respective administrative and clinical

Anna Waller, ScD, is a research associate professor in the Department of Emergency Medicine at the University of North Carolina at Chapel Hill School of Medicine and a lecturer in the Department of Health Behavior and Health Education at the University of North Carolina Gillings School of Global Public Health. She can be reached at anna_waller@med.unc.edu.

Anne Hakenewerth, MS, is a graduate research assistant in the Department of Emergency Medicine at the University of North Carolina at Chapel Hill School of Medicine.

Judith Tintinalli, MD, is a professor and chair emeritus of the Department of Emergency Medicine at the University of North Carolina at Chapel Hill School of Medicine.

Amy Ising, MSIS, is the program director of NC DETECT in the Department of Emergency Medicine at the University of North Carolina at Chapel Hill School of Medicine.

electronic databases to allow timely statewide public health surveillance. Medical coding is done by each hospital for its own operational purposes. Each hospital standardizes the data elements (see Table 1) to Data Elements for Emergency Department Systems (DEEDS)² prior to transmission to a data aggregator. Data files are received securely by NC DETECT every 12 hours in Health Level-7 (HL-7)-like format. HL-7 is a widely recognized and implemented standard for the exchange and transmission of health care data.

For this report, an historical, static database of all ED visits in NC DETECT occurring in 2007 were analyzed by age, sex, method of arrival to the ED, return and repeat ED visits, expected source of payment, and ED disposition. Data are presented with proportions, rates, or both, as appropriate. Rates were determined using 2007 certified North Carolina population estimates which include institutionalized and

military populations.^a Because we estimate that only 92% of all 2007 ED visits were reported and since military, Veterans Administration, and prison hospital EDs are not included in NC DETECT, our reported rates are conservative;^a we did not adjust rates for underreporting. Data were further analyzed by diagnosis code groups and disease and injury groups. Diagnosis code groups were defined by selecting the primary ICD-9-CM diagnosis code in the NC DETECT dataset, following the National Hospital Ambulatory Medical Care Survey 2005 Emergency Department Data Summary Classification.³ We identified the top 20 diagnosis code groups statewide and by age group.

Data were also analyzed by select disease and injury groups thought by the authors to be of epidemiologic or demographic importance to North Carolina. Disease and injury groups were organized using pre-developed ICD-

Table 1.
Emergency Department Data Elements Sent to NC DETECT

DEEDS No.	Element Name	Description/Notes
1.01	Patient ID	Unique identifier permanently masked to prevent reidentification
1.04	Date of birth	Date/time
1.05	Sex	Male/female/unidentified
1.08	Address	City, state, county, zip
1.10	Visit ID	Unique identifier permanently masked to prevent reidentification
2.01	ED facility ID	Location where patient sought care
3.01	Insurance coverage or other expected source of payment	Entity or person expected to be responsible for patient's bill for this ED visit (numeric code)
4.01	Date/time first documented in ED	First date and time documented in patient's record for this ED visit (date/time)
4.02	Mode of transport to ED	Patient's mode of transport to ED (numeric code)
4.06	Chief complaint	Patient's reason for seeking care or attention, expressed in terms as close as possible to those used by patient or responsible informant
4.06a	Triage note	Supporting information for chief complaint
4.08	First ED acuity assessment	First ED assessment of patient's acuity by practitioner
4.18	First ED SBP	Systolic blood pressure (number)
4.20	First ED DBP	Diastolic blood pressure (number)
4.26	First ED temperature	Number
4.27	First ED temperature reading route	Number
5.04	Coded cause of injury	Encoded description of injury event that precipitated patient's ED visit; ICD-9-CM or E-code
6.02	ED procedure	ICD-9-CM codes and CPT codes for procedures
8.02	ED disposition	Patient's anticipated location or status following ED visit (numeric code)
8.23	ED disposition diagnosis description (repeats)	Practitioner's description of condition or problem for which services were provided during patient's ED visit, recorded at time of disposition
8.24	ED disposition diagnosis code(s)	ICD-9-CM code(s) assigned to ED disposition diagnosis

a. Tillman B. North Carolina State Demographics Branch. Written communication (email). North Carolina county population estimates. Office of State Budget and Management. September 2, 2008.

9-CM code sets and were reviewed by one author for face validity (see Table 2).⁴ Disease groups represented both a primary condition as well as comorbidities coded for that ED visit. Disease groups were assembled based on examination of up to 11 recorded ICD-9-CM codes received by NC DETECT that represented either a primary or comorbid diagnosis. Disease groups analyzed were: (1) chest pain and ischemic heart disease; (2) substance abuse/dependency (SAD) and acute intoxication or withdrawal (AIW); (3) diabetes mellitus; (4) psychiatric disorders; (5) asthma; (6) heart failure; (7) neoplasms; and (8) ischemic stroke and transient ischemic attacks (TIA). Injury groups were assembled by capturing the highest of five coded cause of injury (E-codes) captured for an ED visit. Injury groups analyzed were: (1) unintentional injury; (2) falls; (3) motor vehicle traffic crashes (driver or passenger); (4) motor vehicle non-traffic crashes; (5) pedal cyclist injuries; and (6) pedestrian injuries. Injury-related visits were defined as any one of 11 ICD-9-CM diagnosis codes received ranging from 800-999 or as an E-code that was present in any one of five coded cause of injury fields.

This work was reviewed by the University of North Carolina Biomedical Institutional Review Board (IRB). The IRB determined that this submission did not constitute human subjects research as defined under federal regulations [45 CFS 46.102 (d or f) and 21 CFR 56.102(c)(e)(1)] and did not require IRB approval.

Results

Total North Carolina Emergency Department Visits, Repeat Visits, ED Disposition, and Expected Method for ED Payment

In North Carolina, there were 3,853,740 ED visits reported to NC DETECT in 2007, with 70.2% of patients visiting the same ED only once (see Table 3, page 18) and 29.8% visiting the same ED more than once. Using the 2007 North Carolina population as a denominator (9,069,398), approximately 26.3% of North Carolina's population visited the same ED in North Carolina at least once.

The 2007 North Carolina ED visit rate was 424.9 visits per 100,000 total residents including military and institutionalized persons. Most patients were cared for at the initial hospital where they presented for care, with only about 1% of patients transferred to other general hospitals. Expected source of payment is highlighted in Table 3 (page 18). The proportion of ED visits categorized as 'self-pay' in North Carolina in 2007 was 24.1%. The proportion of North Carolina ED visits with the expected source of payment from federal or state sources was 43.5%.

About half of ED visits statewide were by persons ages 24-64. About 15% of ED visits were by those over 64 years of age. Statewide, the proportion of ED visits by women, 55.6%, was greater than visits by men, 44.4% (see Table 4, page 19). The majority of patients arrived at the ED using

Table 2.
ICD-9-CM Codes for Disease Group Aggregations^a

Disease Group	ICD-9-CM Codes Included
Asthma/wheezing	493.0, 493.1, 493.2, 493.8, 493.9, 786.07
Chest pain and ischemic heart disease	410-414, 426, 427, 786.5, 786.50-786.59
Diabetes	250.0, 250.1, 250.2, 250.4, 250.5, 250.6, 250.7, 250.8, 250.9, 251.0 (hypoglycemia) 357.2, 362.0, 648.0, 707.1 (excludes diabetes insipidus)
Heart failure	428, 518.4 (acute pulmonary edema; excludes due to fumes and vapors)
Ischemic stroke and TIA	433, 434, 435, 437.0, 437.1 (excludes subarachnoid hemorrhage, subdural and epidural hematoma, and intracerebral hemorrhage)
Neoplasms	140-239
Psychiatric disorders	290-312 but excluding 305, 292.0, 291.81, 291.0, 291.4, 980, 304
Substance abuse; drug dependence; acute intoxication; acute withdrawal	305; 304; 291.4, 980; 291.0, 291.81, 292.0
Injury	800-999
Unintentional injuries	E800-950, 969-980
Falls	E880-E888
Motor vehicle crashes—traffic	E810.0-819.0 (driver); E810.1-819.1 (passenger)
Motor vehicle crashes—non-traffic	E820.0-825.0 (driver); E820.1-825.1 (passenger)
Pedal cyclist	E810.6-E825.6, E826.1
Pedestrian injury	E826.2, 827.2, 828.2, 829.2

a. All ICD-9-CM codes received for an ED visit were included in these disease groups. This includes up to 11 diagnosis codes and up to 5 coded cause of injury/E-codes.

their own transportation (63.7%). Of the total of visits, 12.9% were transported by vehicular emergency medical services (EMS) and only 0.2% by helicopter or fixed-wing aircraft (data not shown). Method of ED arrival is one of the

most common missing elements in NC DETECT, with 21% of ED visits missing that information.

Diagnosis Code Groups Resulting in ED Visits

Table 3.
Statewide Emergency Department (ED) Visits, Return Visits, ED Disposition, and Expected Method of ED Payment^a

ED VISITS	
Total number of ED visits in 2007	3,853,740
Total number of people who visited an ED in 2007	2,385,033
ED RETURN VISITS (%)	
People who visited an ED only once	70.2
People who visited twice	17.0
People who visited 3 times	6.2
People who visited ≥4 times	6.6
Return visits ≤72 hrs after first visit	4.5
Return visits >3 days after first visit	95.5
ED DISPOSITION (%)	
ED visits discharged from ED	73.4
ED visits admitted to the same hospital ^b	12.4
ED visits transferred to a general hospital ^c	0.9
ED visits transferred to a specialty hospital ^d	0.5
ED visits transferred to skilled nursing facility or intermediate care facility, or discharged to home under care of home care provider	0.3
ED visits terminated w/o medical advice or AMA	2.8
ED visits transferred to observation unit	0.4
ED visits patient died	0.2
ED visits other unspecified discharge	0.3
ED visits missing disposition information	8.9
EXPECTED METHOD OF ED PAYMENT(%)	
Private insurance	27.4
Medicare	18.4
Medicaid	21.4
Worker's compensation	1.2
Other government	2.5
Self pay	24.1
Other (unspecified)	2.8
Missing payment method	2.3

a. Military hospitals in PHRST 2 (Naval Hospital, Camp LeJeune) and PHRST 3 (Womack Army Hospital) do not report data to NC DETECT.

b. Admissions to general hospital; excludes observation and death in ED.

c. Transfers to another short-term general hospital.

d. Transfers to psychiatric, substance abuse rehabilitation, rehabilitation, or veterans' hospitals and transfers to prisons or prison hospitals.

Table 5 (page 20) lists the top 20 diagnosis code groups statewide, based on the primary ICD-9-CM diagnosis code received for each ED visit. In 2007, the first and second leading diagnosis code groups in North Carolina were abdominal pain and chest pain. The top five diagnosis code groups in North Carolina together comprised 17.3% of all reported ED visits and were, in descending order: abdominal pain; chest pain; neck and back pain; upper respiratory infections (excluding pharyngitis); and skin contusions. When data were stratified by age group, fever and upper respiratory and ear infections were the most common diagnoses for preschool-aged children. Injuries increased in school-age children and continued as a major cause of ED visits through middle age. Chest pain appeared as an important diagnosis code group in young adulthood and increased with patient age (data not shown). For NC DETECT, about 12% of all ED visits were missing an ICD-9-CM diagnosis code. Of ED visits with a diagnosis code, about half of the visits had three or more different diagnosis codes (data not shown).

Selected Disease Groups Resulting in ED Visits

The authors selected disease groups based upon clinical experience and issues of public health importance. ED visits for the following disease groups (a primary or comorbid diagnosis identified in Table 2, page 17) were analyzed by age group: (1) asthma; (2) chest pain/ischemic heart disease; (3) heart failure; (4) ischemic stroke/TIA; (5) diabetes; (6) neoplasms; (7) substance abuse/dependence (SAD) and alcohol intoxication withdrawal (AIW); and (8) psychiatric disorders. These disease groups include all diagnosis codes, up to 11, assigned to a patient visit.

Table 6 (page 21) displays proportions and population rates for these disease groups in descending order. The top five disease groups resulting in ED visits were chest pain/ischemic heart disease; substance abuse/intoxication and withdrawal; diabetes; psychiatric disorders; and asthma. These proportions are not additive. Multiple ICD-9-CM diagnoses can be recorded for one ED visit. For example, one ED patient

visit could have diagnoses for both chest pain and diabetes.

Asthma

There were 49,076 ED visits for asthma as an acute or comorbid condition. Asthma represents 1.3% of all ED visits as a primary diagnosis and 4.4% as comorbid diagnosis. About half of ED visits with an acute or comorbid diagnosis of asthma were by individuals ages 25-64. About 20% of asthma-related ED visits were by children of elementary or high school age. Rates of ED visits for asthma are highest in the age group 0-9 years of age (data not shown).

Chest Pain/Ischemic Heart Disease

As a primary diagnosis, the percentage of ED visits for chest pain/ischemic heart disease was 5.2%, but increased to 11.9% as a comorbid diagnosis (see Table 7, page 21). Visits for chest pain/ischemic heart disease constituted the highest proportion of the cardiovascular disease groups selected for review in this report. As expected, those who were 65 years and older had the highest rate of ED visits for chest pain and ischemic heart disease as primary and comorbid diagnoses, at 175.2/1,000 person-years. ED visit rates increased markedly from age 45 upward—35.7/1,000 person-years for age group 25-44, and 63.0/1,000 person-years for age group 45-64. The proportions of women (53.6%) and men (46.4%) with chest pain and ischemic heart disease were similar to the statewide proportions for overall ED visits by women (data not shown).

Heart Failure

The statewide rate of ED visits with an acute or comorbid diagnosis of heart failure is much lower than that of chest pain/ischemic heart disease (see Table 7, page 21). The age group with the highest rate of ED visits for heart failure as a primary or comorbid diagnosis was the group 65 years and older, with a rate of 63.5 visits/1,000 person-years (data not shown).

Ischemic Stroke/Transient Ischemic Attacks

The pathophysiology of ischemic stroke/TIA and brain hemorrhage (subarachnoid, intracerebral, subdural, and epidural hemorrhage) are very different, so for purposes of this study, we report on ischemic stroke/TIA (see Table 2, page 17). Ischemic stroke/TIA as a primary diagnosis accounted for 0.4% of ED visits and for 0.8% of primary or comorbid diagnoses (see Table 7, page 21).

Table 4.
Proportion, Count, and Rate of Emergency Department (ED) Visits Statewide by Age Group and Sex, 2007

	ED Visits (%)	Count of Visits	Population Estimates	Rate Per 1,000 Person-Years
Age in Years				
≤1	5.2	199,961	243,570	820.96
2-4	4.1	157,629	363,565	433.56
5-9	4.2	161,747	617,120	262.10
10-14	3.7	143,574	599,307	239.57
15-18	5.1	197,983	497,966	397.58
19-24	11.0	423,563	817,614	518.05
25-44	30.6	1,178,431	2,565,520	459.33
45-64	20.9	806,374	2,277,294	354.09
≥64	15.2	584,036	1,087,442	537.07
Sex				
Male	44.4	1,711,380	4,477,900	382.18
Female	55.6	2,141,703	4,591,498	466.45

Diabetes

ED visits for diabetes, either as the primary or comorbid diagnosis, represented 7.8% of all ED visits, a statewide rate of 33.1/1,000 person-years, making diabetes the third highest disease group in these data (see Table 6, page 21). The rate of ED visits with diabetes increases dramatically beginning in the 25-44 year age group. Ninety-seven percent of ED visits with diabetes as a primary or comorbid diagnosis were made by those 25 years and older, and nearly 80% were by those 45 years of age or older (data not shown).

Neoplasms

Neoplasm as an ED visit diagnosis typically represents complications of treatment for cancer or problems with pain management in end of life care. Neoplasm as a primary or comorbid diagnosis comprised 1.4% of all 2007 ED visits, with an overall rate of 5.9/1,000 person-years. The rate was highest in the age group over 64 years. Three percent of ED visits with an acute or comorbid diagnosis of neoplasms were younger than 25 years (data not shown).

Substance Abuse/Dependence and Alcohol Intoxication/Withdrawal

The primary or comorbid diagnoses of substance abuse or dependence (SAD) and alcohol intoxication or withdrawal (AIW) represented 11.2% of all 2007 ED visits and a rate of 47.5/1,000 person-years (data not shown). The burden of SAD/AIW represents about 1,180 ED visits per day to North Carolina EDs.

The diagnoses SAD/AIW became evident in the age group 15-18 years (ED visit rate 29.7/1,000 person-years) and

Table 5.
Top 20 Diagnosis Code Groups Statewide, 2007

Top 20 Diagnosis Code Groups,^a All Ages Combined				
Diagnosis	Diagnosis Codes^b	Number of Records	Total Visits (%)	Rate per 1,000 Person-Years
Missing primary ICD-9-CM diagnosis code		469,481	12.2%	
Abdominal pain	789	165,622	4.3%	18.3
Chest pain	786.5	151,438	3.9%	16.7
Spinal disorder (neck and back pain)	720-724	119,209	3.1%	13.1
Acute URI, excl. pharyngitis	460-461;463-466	116,424	3.0%	12.8
Contusion, intact skin surface ^c	920-924	114,376	3.0%	12.6
Rheumatism, excl. back	725-729	79,257	2.1%	8.7
Open wound, excl. head ^c	874-897	78,573	2.0%	8.7
Sprains, strains, neck and back	846,847	74,576	1.9%	8.2
Cellulitis and abscess	681-682	65,615	1.7%	7.2
Pyrexia of unknown origin	780.6	62,438	1.6%	6.9
Heart disease, excl. ischemic	391-392.0;393-398; 402;404;415-416; 420-429	57,936	1.5%	6.4
Fractures, excl. lower limb ^c	800-819	57,303	1.5%	6.3
UTI, unspecified	599.0	52,624	1.4%	5.8
Open wound of head ^c	870-873	52,097	1.4%	5.7
Acute pharyngitis	462	47,276	1.2%	5.2
Sprains, strains, excl. ankle and back	840-844;845.1;848	47,114	1.2%	5.2
Asthma	493	46,001	1.2%	5.1
Otitis Media and eustacian tube disorders	381-382	45,338	1.2%	5.0
Pneumonia	480-486	37,018	1.0%	4.1
Superficial injuries ^c	910-919	36,961	1.0%	4.1
All other diagnoses ^d		1,877,063	48.7%	207.0
Total		3,853,740	100.0%^e	

a. Diagnosis code groups as used in the NHAMCS: 2005 Emergency Department Summary, #386, June 29, 2007.³

b. Groups do not include E-codes.

c. Injuries.

d. This group also includes injuries.

e. Column total greater than 100% due to rounding.

peaked in the age group 25-44 years (74.5 for ages 19-24; 77.5 for ages 25-44; 56.3 for ages 45-64, all in 1,000 person-years). For those older than 64, the rate is just below those aged 15-18, at 24.8/1,000 person-years (data not shown).

Psychiatric Disorders

Psychiatric disorders (which include dementia) as a primary or comorbid diagnosis accounted for 7.7% of ED visits in North Carolina in 2007, representing a rate of 32.9/1,000 person-years (see Table 6, page 21). The burden of psychiatric disorders begins in adolescence and continues through adulthood, but the rate rose dramatically in those over 64 years of age, to 82.3/1,000 person-years (data not shown).

Selected Injury Groups Resulting in ED Visits

Unintentional injuries comprised the vast majority (73%) of injuries treated in North Carolina EDs (see Table 8, page 22). Coded cause of injury (E-code) data were missing for 14.9% of visits identified as injury-related based on ICD-9-CM diagnosis codes.

Falls account for the greatest proportion of injuries, at 20.6%, or about 560 visits per day in North Carolina EDs. The rate of falls for all age groups combined was 22.5 per 1,000 person-years. The elderly experienced the greatest proportion of falls (27%) when compared to all other age groups and also had the highest rate of falls of any age group, 50.6/1,000 person-years (data not shown).

Motor vehicle crashes involving drivers and passengers accounted for 11.7% of all injury-related ED visits, or 2.5% of all ED visits, about 318 visits per day in North Carolina EDs (see Table 8, page 22). The rates of those aged 15-18 and 19-24 (20.7 and 21.7/1,000 person-years, respectively) were the highest of all age groups. Those aged 65 and older comprised 5.3% of all ED visits for injuries sustained in motor vehicle crashes involving driver and passengers, and those who were 65 years or older had the lowest rate of ED visits for these injuries of all age groups (data not shown). Statewide rates for motor vehicle traffic crashes, motor vehicle non-traffic crashes, pedal cyclist crashes, and pedestrian injuries are shown by age group in Table 9 (page 23).

Discussion

Importance of Statewide Emergency Department Data

The aggregation and analysis of North Carolina ED data are important because they represent the most comprehensive population-based data on acute illness and injury in the state. Even with the collection of a limited number of data elements and with privacy protections that include elimination of patient and hospital identifiers, ED data can provide valuable information on acute illness and injury across the state and can identify vulnerable populations for specific disorders. Hospital discharge databases track only those patients admitted to hospitals, about 12% of ED visits, therefore excluding about 88% of ED visits.³ Specialized registries are voluntary and typically capture data from a limited number of hospitals and for a defined subset of patients—most often patients admitted to the hospital. A statewide database such as NC DETECT has the potential to provide a closer approximation of population-based rates than do specialized registries because NC DETECT includes all ED visits, not just ED visits resulting in hospital admission, and can also identify ED visits by comorbid conditions.

The National Hospital Ambulatory Medical Care Survey (NHAMCS) Emergency Department Data Summary,³ a

Table 6.
Selected Disease Groups Resulting in Emergency Department Visits in North Carolina, 2007

Disorder	Statewide ED Visits (%)	Rate per 1,000 Person-Years
Chest pain/ischemic heart disease	11.9	50.5
Substance abuse/intoxication/withdrawal ^a	11.2	47.5
Diabetes	7.8	33.1
Psychiatric disorders	7.7	32.9
Asthma	4.4	18.5
Heart failure	2.7	11.3
Neoplasms	1.4	5.9
Ischemic stroke/TIA	0.8	3.2

a. ICD-9-CM codes for substance abuse/intoxication/withdrawal are those used by NHAMCS.³

retrospective national probability sample survey of visits to United States EDs, has been the gold standard for national ED data. However, data are typically available two years after collection and cannot be stratified by region, state, or county.⁵ Despite differences in methodology and data collection, NC DETECT ED visit data have face and content validity when compared to NHAMCS, are available in a timely fashion, and can be stratified by county.⁵

The proportion of the North Carolina population visiting the same ED in North Carolina at least once is an estimate (see Table 3, page 18), because North Carolina EDs in close proximity to the Virginia, South Carolina, Georgia, and Tennessee borders may have ED visits by individuals residing in these states, and North Carolina residents may have visited EDs in neighboring states. NC DETECT is only able to track repeat visits by patients visiting the same ED. If the patient visits a different ED, that patient is counted as a different individual. The proportion of admissions from the ED to the hospital in our data is similar to the national estimate of 12% (see Table 3, page 18).³

Table 7.
Proportions and Rates of Statewide Emergency Department Visits for Selected Cardiovascular Diseases, 2007

Disorder	Statewide ED Visits by Primary Diagnosis		Statewide ED Visits by Primary and Comorbid Diagnosis	
	Percent	Rate per 1,000 Person-Years	Percent	Rate per 1,000 Person-Years
Chest pain/ischemic heart disease	5.2%	22.3	11.9%	50.5
Heart failure	0.6%	2.5	2.7%	11.3
Ischemic stroke/TIA	0.4%	1.6	0.8%	3.2

Table 8.
Injury Related Visits Statewide, 2007

	All Injury Related Visits (%)	All ED Visits (%)	Category Total	Category of All Injury-Related Visits (%)
All injury-related visits^{a,b} (n=992,541)		25.8%		
Unclassifiable External Cause of Injury			147,816	14.9%
Only E-code is place of occurrence	0.2%	0.0%		
Missing or invalid coded cause of injury	14.7%	3.8%		
Unintentional Injuries			728,211	73.4%
Falls	20.6%	5.3%		
Motor vehicle traffic-related	11.7%	3.0%		
Struck against or struck accidentally by objects or persons	8.5%	2.2%		
Overexertion and strenuous movements	8.0%	2.1%		
Cutting or piercing instruments or objects	5.2%	1.3%		
Natural and environmental factors	3.8%	1.0%		
Poisoning by drugs, medicinal substances, biologicals, other solid and liquid substances, gases, and vapors	1.2%	0.3%		
Fire and flames, hot substance or object, caustic or corrosive material, and steam	1.0%	0.3%		
Machinery	0.4%	0.1%		
Pedal cycle, nontraffic and other	1.5%	0.4%		
Motor vehicle, nontraffic	0.2%	0.1%		
Other transportation	0.3%	0.1%		
Suffocation	0.1%	0.0%		
Firearm missile	0.2%	0.0%		
Drowning or submersion	0.0%	0.0%		
Foreign body	1.6%	0.4%		
Caught accidentally in or between objects	1.1%	0.3%		
Other and not elsewhere classified	1.8%	0.5%		
Mechanism unspecified	6.1%	1.6%		
Intentional Injuries			47,611	4.8%
Assault				
Unarmed fight or brawl, striking by blunt or thrown object	1.9%	0.5%		
Cutting or piercing instrument	0.3%	0.1%		
Firearms	0.1%	0.0%		
Other and unspecified mechanism	1.3%	0.3%		
Self-Inflicted				
Poisoning by solid or liquid substances, gases, and vapors	0.7%	0.2%		
Cutting and piercing instrument	0.2%	0.1%		
Suffocation	0.0%	0.0%		
Other and unspecified mechanism	0.1%	0.0%		
Other causes of violence	0.1%	0.0%		
Injuries of Undetermined Intent	0.4%	0.1%	3,850	0.4%
Adverse Effects of Medical Treatment	6.6%	1.7%	65,053	6.6%
TOTALS	100.0%^c	25.8%	992,541	100.0%^c

a. ED visit for injury: any one of 11 ICD-9-CM codes 800-999 or any one of 5 E-codes E800-999.

b. Injury classifications as used in the NHAMCS: 2005 Emergency Department Summary, #386, June 29, 2007.³

c. Columns may or may not add exactly to 100% due to rounding.

Disease Groups

We did not identify disease groups based on primary diagnosis (see Table 6, page 21) because many conditions, such as diabetes and other chronic illnesses, are not necessarily identified as a primary ED diagnosis if the reason for the ED visit is for an acute condition, such as chest pain, heart failure, or ischemic stroke. It is important, however, to acknowledge the presence of diabetes as a comorbid condition. As another example, a diagnosis of neoplasm will not necessarily be recorded as a primary diagnosis if the acute condition associated with the ED visit is intractable vomiting or dehydration from chemotherapy or febrile neutropenia.

Psychiatric Disorders and Substance Abuse/Dependence/Intoxication/Withdrawal

A total of 18.9% of ED visits were given a diagnosis code for SAD/AIW and/or psychiatric disorders (see Table 2, page 17). This group was based on ICD-9-CM code aggregations used in the 2005 Emergency Department Summary of the National Hospital Ambulatory Medical Care Survey and includes 'Tobacco Use Disorder' (305.1).³ Together, this set of disorders comprised the highest proportion of ED visits in North Carolina of all the diagnosis groups we examined. The epidemiology of these disorders is currently being analyzed by the authors, using the 2008 NC DETECT emergency department static dataset. Psychiatric disorders include a great many conditions, and dementias are included in the ICD-9-CM diagnosis code set 'Mental Disorders.' The demand for geriatric-psychiatric services will be expected to rise as the North Carolina population ages. Substance abuse and dependence is a public health problem not only in North Carolina, but also nationally, and treatment options typically lag behind need.⁶ This report provides additional evidence for prioritizing health policy system research to identify cost-effective intervention for substance abuse and psychiatric disorders.⁷ Our data also identify the ED as one of the key sites for population-based identification and intervention for these disorders.⁸

Injuries

Our data show that injury is a major cause of visits to North Carolina EDs during childhood and young adulthood. This age distribution, similar to that reported elsewhere, possibly represents participation of those age groups in athletic and driving activities.⁹ It also reflects that these age groups are

Table 9.
Statewide Rates/1,000 Person-Years of ED Visits for Motor Vehicle Crashes (MVC) Traffic (Driver and Passenger), MVC Non-Traffic^a (Driver and Passenger), Pedal Cyclist Crashes, and Pedestrian Injuries, by Age Group, North Carolina, 2007

Age Group	MVC, Traffic (Driver and Passenger)	MVC, Non-Traffic (Driver and Passenger)	Pedal Cyclist	Pedestrian
≤1	5.4	0.2	0.2	0.0
2-4	5.0	0.3	1.1	0.1
5-9	5.1	0.5	3.1	0.1
10-14	6.1	1.1	3.1	0.3
15-18	20.7	1.3	1.3	0.4
19-24	21.7	1.0	0.6	0.3
25-44	13.8	0.7	0.5	0.3
45-64	8.2	0.2	0.4	0.2
≥65	5.1	0.2	0.1	0.0

a. Crashes on private roads, driveways, parking lots, and off-road.²²

generally healthy in other respects, thus allowing participation in injury producing activities (e.g., sports) and limiting ED visits for other health conditions (e.g., heart disease).

The incidence, mortality, and morbidity from motor vehicle crashes have decreased with comprehensive trauma programs which include primary, secondary, and tertiary interventions and patient education.¹⁰ The next generation of injury prevention efforts should be directed to the public health problem of injuries from falls, especially among the elderly. Injuries from falls deserve a comprehensive approach including research and improvements in resource allocation, prevention, intervention, and rehabilitation.¹¹

While the United States annual death rate from motor vehicle crashes decreased by 90% from 1925 to 1997, the injury prevention job is not done.¹⁰ Certain populations— young drivers and passengers, alcohol and drug-intoxicated drivers—are at high risk for motor vehicle crashes.¹⁰ Pedestrian injuries continue to be newsworthy in North Carolina, and pedestrian injury is reported to be the second leading cause of unintentional injury-related deaths for children ages 5-14.¹²⁻¹⁸ Pedestrian injury rates deserve yearly reporting, especially as walking activities for health and fitness for all ages is encouraged.

Limitations

A primary caveat to the analysis is that our rate estimates are conservative because the denominator reflects the total North Carolina population, including those in the military and prison populations, while military and prison hospital EDs are not included in NC DETECT. Furthermore, we estimate that only 92% of civilian hospital ED visits were captured by NC DETECT in 2007.

Improvement in completion and recording of ICD-9-CM data elements is important to ensure the integrity and precision of NC DETECT data and is a limitation of a system such as NC DETECT, which relies upon each institution's coding and documentation practices.

According to national data, 90% of ambulatory care visits are made to physician offices or clinics, while 10% are made to an ED.¹⁹ Since there is presently no method for obtaining statewide information on North Carolina clinics, urgent care, or office visits, NC DETECT currently provides the best proxy for population-based acute care data in the state.

Analyses of NC DETECT data are limited by the obvious needs of personal and institutional privacy; legislative boundaries which limit the data elements collected; dependence upon institutional coding and electronic reporting practices; lack of standardization of some important data elements; and inherent limitations in the analyses of aggregated ED data.

Personal and Institutional Privacy Needs

Personal and institutional privacy is protected by the Health Insurance Portability and Accountability Act and by legislation permitting collection of ED data for public health surveillance in North Carolina.^{20,21} However, aggregated data without institutional or patient identifiers are still useful for public health surveillance and policy purposes.

Legislative Boundaries Limit the Data Elements Collected

NC DETECT is limited by North Carolina legislation to the collection of a specific set of data elements (see Table 1, page 16), and the inclusion of additional data elements would require legislative action.

Dependence Upon Institutional Coding and Electronic Reporting Practices

NC DETECT receives information from hospital administrative and clinical systems. Because NC DETECT captures secondary data, it has no control over local data input. While NC DETECT data are of high quality for most data elements collected, the system depends upon the continued cooperation, enthusiasm, and motivation of all of the hospitals in North Carolina.⁵

Lack of Statewide Standardization of Some Important Data Elements

Not all hospitals are able to provide key information, such as the free text 'triage note' which enables a more detailed assessment of the patient's reason for the ED visit. Lack of statewide standardization of some data elements, such as triage acuity and chief complaint, limits or prevents aggregation and analysis of these important items.

Inherent Limitations Restricting Some Analyses

There are a number of inherent limitations, which at present make it impossible to analyze emergency

department data for information on patterns of, and preferences for, ED usage, as well as information about other benefits of ED use for the individual and society. Analyses of North Carolina ED data do not allow for assessment of 'appropriate' or 'inappropriate' use of the ED based upon illness or injury acuity or whether there is timely access to other types of ambulatory care. Return visits to the same ED within 72 hours are tracked, but aggregate analysis does not allow for determining the quality of care for the first ED visit or whether a visit to a primary care physician could substitute for a return ED visit. NC DETECT emergency department data are unable to identify those visits directed to the ED by the primary care or specialist physician, or telephone health or help lines. Nor do aggregated ED visit data allow us to analyze visits in which important public health measures, such as health risk identification or disease and injury prevention education, are incorporated. Regardless of the patient's reasons for the ED visit, the ED can serve as a valuable hub to direct patients to appropriate resources for subsequent care which can be accessed in a timely fashion.

Conclusion

In 2007, the first and second leading emergency department visit diagnosis groups in North Carolina were abdominal pain and chest pain. Of those disease groups studied, the top three disease groups represented in ED visits in 2007 were chest pain/ischemic heart disease, substance and alcohol abuse or withdrawal, and diabetes. ICD-9-CM diagnosis codes for substance abuse/withdrawal/dependence and psychiatric disorders are the largest group of disorders (18.9%) seen in ED visits in North Carolina.

Falls are the most common cause of injury-related ED visits in the state and account for the largest single group of injuries resulting in ED visits, about twice as many as motor vehicle crashes. Twenty-seven percent of all fall injuries resulting in ED visits occur among the elderly.

Statewide emergency department data are a very useful resource for public health surveillance. This report indicates that aggregated static ED data can also provide valuable information on the proportions and rates of ED visits for illness and injury statewide and can identify vulnerable populations in the state. We hope that yearly reports such as this will inspire health policymakers, institutions, administrators, public health officials, and clinicians to continue to participate in the collection of NC DETECT data and to use the data to improve the health of North Carolina citizens. **NCMJ**

Data Source Information: For more information on accessing data for public health surveillance and research purposes, please visit <http://www.ncdetect.org/drequests.html>. The NC DETECT 2007 Annual Report from which this paper is derived can be accessed at www.ncdetect.org.

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HEALTH REFORM IN NORTH CAROLINA

Health Reform. Or Not?

Donald H. Taylor, Jr.

Since I have been eligible to vote, one-third of the presidential elections have ended with a young, energetic, Democratic president promising to tackle health care reform once and for all. It appears likely that 100% of these efforts will end in dismal failure, both for these presidents and their political party. And for the country.

As I write this on February 15, 2010, it seems as though the best chance for health reform is for the House to pass the bill that passed the Senate on Christmas Eve, with or without a reconciliation clean-up bill. I have been telling myself there is a 5% chance of this taking place. The President has invited Republican and Democratic members of Congress to engage in a televised discussion of health reform ideas on February 25, 2010. Perhaps something will come from this effort, but there seems to be little incentive for Republicans to help provide anything that appears to be a victory. We will see, but I still think the most likely outcome of the health reform debate of 2009 is no legislation. But, I hope I am wrong.

Why has the United States had so many failed attempts during the past two centuries at adopting a comprehensive health care reform that provides insurance coverage to (almost) all Americans? There are idiosyncratic reasons for why the varied efforts of Franklin Roosevelt, Harry Truman, Richard Nixon, and Bill Clinton have failed. However, there is one consistent theme to these failures. The proponents and advocates of the reforms failed to convince average middle class persons that their efforts would help them. In addition, organized medicine has consistently opposed reform efforts.

There is one notable change in the latest reform effort: this time organized medicine in the form of the American Medical Association (AMA) has consistently supported efforts at comprehensive reform. Even after the Medicare physician payment update did get enacted in the fall of 2009, the AMA continued to urge passage of a comprehensive bill without insisting on many specific conditions or programs.

In the end, the primary reason reform has likely failed again is that advocates were unable to convince the average middle class person that reform would benefit them. The hurdle to do so was undoubtedly made very high by the willingness of opponents of reform to say just about anything in opposition. A plan that is essentially the Republican alternative to the Clinton Plan (Chafee Plan, 1994) with an individual mandate, a Medicaid expansion, and the development of a private insurance market with an income-based subsidy that would more than double the number of Americans that actually shopped for and purchased their own insurance, became a socialist-statist-government takeover of the health care system.

Senator Tom Coburn (R-OK) said on Meet the Press in August, 2009, that cost-effectiveness research in the Democratic bills will kill people. If you are ever bored, you should read title VIII of the Patients' Choice Act (PCA) of which he is a co-sponsor (pages 206-215 to be exact) and see that he proposed fairly widespread use of cost-effectiveness research supported by an advisory commission. So, a month before the first Democratic bill was reported in the House (PCA was introduced on May 20, 2009), he and Senator Richard Burr (R-NC) had proposed a fairly comprehensive bill with a model for the Independent Medicare Advisory Commission that would be included in the Senate bill that passed Christmas Eve. It is quite a reasonable policy to take a look at what Medicare covers, and when and how it is financed. A Commission allows this to be done in a manner that gets Congress out of the details of Medicare policy, which is a good thing. However, by August, cost-effectiveness research in Democratic bills killed people according to Senator Coburn. This is just an example of the willingness of reform opponents to say anything.

Then approximately six weeks were spent refuting non-existent death panels, a phrase that has now entered the cultural lexicon.

By January, 2010, the primary narrative of health reform was special deals: Nebraska and Louisiana Medicaid provisions and the delay in the imposition of the tax on high cost health insurance for labor

union insurance plans. Or abortion. Somehow, the abortion provisions in the House or Senate bills both rolled back a woman's right to choose and would lead to an explosion of abortions—all at the same time!

The last time reform failed I was in graduate school, the most dangerous of graduate students—one who had finished comprehensive exams and had yet to complete a dissertation. But boy was I smart. And so proud of myself for thinking the Clinton Plan was a sell-out. You see, “single payer” was my preferred alternative, and we would inevitably have one soon. Just you wait. God forgive me, I didn't know what I was saying or thinking. I am just glad we didn't have blogs then so there is no record of my smugness.

My good friend (and dissertation advisor, the person who first got me interested in health policy as an undergrad at UNC Chapel Hill) Tom Ricketts asked me to write this piece and in doing so to reflect on reform, but also my transformation in how I viewed things. I think he meant how did a “single payer guy” become someone who talked so much about costs and the need to slow cost inflation? Of course, one of the primary arguments for single payer is that it would likely be cheaper than what we have now. But, then what wouldn't be? I would be fine with Medicare for everyone. I keep thinking either it's pretty good or my grandmother should be liberated from it.

This time I was happy to not start at single payer, just because I thought it a waste of time politically. A single payer system is not going to happen so why even pretend. My preferred solution now if I were the King would be to provide universal catastrophic coverage via the Medicare program, with people able to purchase private coverage in the gap using after tax dollars. Altering the tax exclusion is key. Over the last few years I have come to believe that not only is the tax exclusion of employer paid insurance distortionary, but that talking about this exclusion and altering or ending it could help ignite a cultural conversation about health care, costs, and the existence of limits.

I became totally convinced of the need to end the exclusion when talking with people where I work (Sanford School of Public Policy) who were griping that Duke's insurance had gone up so much and now cost over \$350 per month for family coverage. I explained that was the employee portion and that Duke was paying over \$600 per month on top of what we pay. Blank stares and disbelief. It can't be good for people to have no idea how much their health insurance costs.

In the end what changed the way I looked at things was having kids and thinking about their future. Kids have this sort of effect on many of us. As I view the baby boomers moving into Medicare I affirm our responsibility to care for them. It is simply one of the most practical ways in which we live out the adage 'Honor thy father and mother' (and grandmother and grandfather, etc.). We must continue doing this; we just don't have to be insane in the manner in which we do it. We don't need apocalyptic statements about the baby boomer generation and what paying for them to age through Social Security and Medicare will do to the nation. We simply need some practical solutions to slow the rate of health care inflation, while covering all persons. In the end, you will never have any hope of getting control of cost inflation without covering all persons with at least a basic level of coverage, because otherwise the costs of the uninsured will be unpredictably spread throughout the system.

The biggest problem with passing no bill is that it is hard to imagine how our country will take on these issues later if the status quo reigns. Will Democrats risk more political failure in the future? They will not likely have as many seats in Congress as they have now any time soon. And Republicans are good on defense with health care, where strident ideological talking points help undermine any proposal. But they have shown no inclination to take on reform proactively when they have been in power. And ideology doesn't easily translate into actual policy in the health care arena.

I have written that the House should pass the Senate bill, because it is a good step ahead. And just as importantly, it would ensure that health policy and health reform will be addressed again in the next few Congresses as inevitable problems emerge, and tweaks are developed. If we turn away with nothing this time, it is hard to imagine how we come back.

Donald H. Taylor, Jr. is an assistant professor of public policy and director of the Benjamin N. Duke Scholarship at Duke University. He is also a regular contributor on the topic of health reform to the Raleigh News and Observer. Read his blog at www.donaldhtaylorjr.blogspot.com.

POLICY FORUM

Prevention for the Health of North Carolina

Introduction

Thomas C. Ricketts III, PhD, MPH; Christine Nielsen, MPH

Issue Brief: Prevention for the Health of North Carolina

*Jennifer Hastings, MS, MPH; Leah Devlin, DDS, MPH;
Jeffrey P. Engel, MD; Robert W. Seligson, MA, MBA;
William L. Roper, MD, MPH; Berkeley Yorkery, MPP;
Jesse Lichstein, MSPH;
Kimberly Alexander-Bratcher, MPH;
Christine Nielsen, MPH; David Jones, MSPH;
Heidi Carter; Catherine Liao; Corey Davis, JD;
Pam C. Silberman, JD, DrPH; Mark Holmes, PhD*

COMMENTARIES

Prevention Takes Center Stage

Kenneth E. Thorpe, PhD

Prevention: A Statewide Perspective

Jeffrey P. Engel, MD

Health Care from a Policy Perspective

Representative Hugh Holliman

*Prevention should
be the cornerstone
in our efforts to
reduce death and
disability in North
Carolina. Far
too many people
die prematurely
or suffer from
disabilities that are
avoidable.*

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*Vandana Shah, LLM; Sally Herndon Malek, MPH;
Tom Brown, MEd; Barbara Moeykens, MS*

Preventing Disease and Promoting Health in North Carolina Communities:

The North Carolina Prevention Action Plan and Healthy Carolinians

Jeff Spade, FACHE

Introduction

POLICY FORUM

Prevention for the Health of North Carolina

Prevention is often considered the single best answer to the problem of our health care system; every presidential candidate in 2008 promoted it as a central strategy in their plan to reform the US health care system to improve health and cut costs. Prevention appears to be the perfect “win-win” solution because people can become healthier and thus avoid seeing the doctor and incurring costs. The ultimate goal of prevention is to help individuals avoid death and disability by focusing on preventable health risk factors. Preventable risk factors include tobacco use, physical inactivity, poor nutrition, risky sexual behavior, alcohol and drug abuse, and injuries. In 2009 America’s Health Rankings listed North Carolina 37th out of 50 states for overall health status (1st being the best, 50th being the worse). Additionally, North Carolina ranks 47th for physically active adults, 45th in recommended childhood vaccinations, 42nd in race and ethnicity equity, 41st in obesity prevalence, and 37th in smoking prevalence. What better time to invest in prevention than now?

The trouble with this picture is that prevention isn’t such a clear winner when we examine preventive services in contrast to health promoting behaviors. Cost-effectiveness studies throw a bit of cold water on claims of clear cut benefits when the costs of screening and prophylaxis are factored in. There are real questions that need to be asked before we decide to invest in prevention at the expense of treatment.

This issue of the *North Carolina Medical Journal* touches on both strategies. The choice between preventive services and promoting health behaviors is not really at issue, though. There are reasons beyond cost-benefit that apply when it comes to letting people know what their risk for disease or death is, advising them to change behavior, and reducing potential threats to well-being and health. However, we are hard pressed at times to bring this all together into a coherent policy where government can lead and citizens follow; it seems that individuals may have as much responsibility to lead as the government, or even health and human service organizations. Citizens should take on this leadership role by looking beyond their individual behaviors and beliefs, and recognizing that they have a responsibility to positively impact their families, social networks, schools, worksites, and communities. Investing in prevention involves these interrelated constructs working together to build a system that supports and fosters healthy lifestyles.

This past year, the North Carolina Institute of Medicine (NCIOM) Task Force on Prevention examined the top 10 leading causes of death and disability and their relationship with preventable risk factors. Based on the Task Force’s findings, the *Prevention Action Plan* was published to be used as a guide for improving population health in North Carolina. This issue of the *Journal* highlights the *Prevention Action Plan* as well as North Carolina’s efforts to move prevention higher on the policy agenda. By recognizing that various levels of individual and societal determinants affect one’s health, we include a collection of commentaries from individual and organizational perspectives on how to incorporate prevention into the daily lives of North Carolinians.

We know that many of the leading causes of death and disability in North Carolina are preventable. We also know that addressing these risk factors will require a lot of time, effort, and collaboration on the parts of multiple stakeholders spanning across the state and encompassing individuals, families, neighborhoods, schools, worksites, communities, and public policies. Priorities will have to be weighed and cost-effectiveness will certainly have to be considered. The NCIOM’s *Prevention Action Plan* and this issue of the *Journal* attempt to balance the picture for prevention by calling attention to effective strategies for both addressing overall costs and for improving the health of all North Carolinians.

Thomas C. Ricketts III, PhD, MPH
Editor-in-Chief

Christine Nielsen, MPH
Managing Editor

Prevention for the Health of North Carolina

Jennifer Hastings, MS, MPH; Leah Devlin, DDS, MPH; Jeffrey P. Engel, MD; Robert W. Seligson, MA, MBA; William L. Roper, MD, MPH; Berkeley Yorkery, MPP; Jesse Lichstein, MSPH; Kimberly Alexander-Bratcher, MPH; Christine Nielsen, MPH; David Jones, MSPH; Heidi Carter; Catherine Liao; Corey Davis, JD; Pam C. Silberman, JD, DrPH; Mark Holmes, PhD

In 1946, leading figures in North Carolina created the Good Health Plan—aiming to improve the health of North Carolinians and the state's position of being ranked 42nd (of the then 48 states) in the number of general hospital beds per population, "and a comparable position in the number of doctors."¹ The Good Health Plan focused primarily on improving access to health services with the goal of improving population health. While there have been many improvements in access, there has been very little improvement in overall population health. North Carolina still ranks poorly when compared to other states. According to America's Health Rankings, North Carolina stood 37th among the 50 states in 2009 for overall health.² The state ranks in the bottom third for many health indicators, including 41st in obesity prevalence, 40th in premature death, 38th in

infectious disease, 37th in smoking prevalence, and 35th in cancer death rates.² When compared to the nation, a higher percentage of the state's adult citizens smoke (20.9% versus a national average of 18.4%), fewer are physically active (44.0% versus 49.5%), and more are obese (29.5% versus 26.7%) (see Table 1).

While rankings and statistics such as these provide a comprehensive overview of population health and health risks in the state, they do not adequately convey the very real consequences to North Carolinians. Consider that approximately 13,000 North Carolinians 35 years and older die *prematurely* from a smoking-related condition every year.^a More than 3 out of 10 children between the ages of 2-18 in this state are overweight or obese, placing them at increased risk for developing diseases such as type 2 diabetes

a. North Carolina Institute of Medicine calculation extrapolating from State Tobacco Activities Tracking and Evaluation (STATE) System and state population estimates.

Jennifer Hastings, MS, MPH, is a project director at the North Carolina Institute of Medicine. She can be reached at jennifer_hastings@nciom.org.

Leah Devlin, DDS, MPH, is the former state health director and a visiting professor in the Department of Health Policy and Management at the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill (UNC).

Jeffrey P. Engel, MD, is the North Carolina state health director and the director of the Division of Public Health.

Robert W. Seligson, MA, MBA, is the executive vice president and CEO of the North Carolina Medical Society.

William L. Roper, MD, MPH, is dean of the School of Medicine, vice chancellor for medical affairs, and CEO of the UNC Health Care System at the University of North Carolina at Chapel Hill.

Berkeley Yorkery, MPP, is a project director at the North Carolina Institute of Medicine.

Jesse Lichstein, MSPH, is a former project director at the North Carolina Institute of Medicine and a PhD student at UNC.

Kimberly Alexander-Bratcher, MPH, is a project director at the North Carolina Institute of Medicine.

Christine Nielsen, MPH, is the managing editor of the *North Carolina Medical Journal*.

David Jones, MSPH, is a former intern at the North Carolina Institute of Medicine and a PhD student at the University of Michigan.

Heidi Carter is a former intern at the North Carolina Institute of Medicine and an MPH candidate at UNC.

Catherine Liao is an intern at the North Carolina Institute of Medicine and an MSPH candidate at UNC.

Corey Davis, JD, is a former intern at the North Carolina Institute of Medicine and an MSPH candidate at UNC.

Pam C. Silberman, JD, DrPH, is president and CEO of the North Carolina Institute of Medicine.

Mark Holmes, PhD, is vice president of the North Carolina Institute of Medicine.

Table 1.
North Carolina Ranks Poorly on Most of the Major Health Indicators

Indicator	North Carolina Data	United States Data	National Rank
Adults who are current smokers (2008) ⁵	20.9%	18.4%	37
Obese adults (2008) ⁵	29.5%	26.7%	41
Physically active adults (2007) ⁵	44.0%	49.5%	46
Incidence of syphilis, gonorrhea, and chlamydia cases per 100,000 (2008) ⁶	593.5	517.4	40
Adults with alcohol and illicit drug abuse or dependence (2006-2007) ⁷	8.2%	9.2%	6
Adults with serious psychological distress (2006-2007) ⁷	10.9%	11.1%	15
Average air pollution (particulate matter of 2.5 microns or less in size per cubic meter of air) (2009) ⁸	12.6	11.7	36
Motor vehicle fatalities per 100,000 (2008) ⁹	15.5	12.3	35
Children ages 19 to 35 months with recommended childhood immunizations (4:3:1:3:3) (2009) ⁸	72.4%	78.2%	45
Low-income families (<200% FPG) (2008) ¹⁰	35.2%	31.9%	41
Graduation rate (2009) ⁸	71.8%	73.4%	37
Race and ethnicity equity (average rank among states) (2009) ¹¹	36.4	24.4	49
Uninsured (ages 19-64 years) (2007-2008) ¹²	21.1%	20.4%	37

or hypertension and making them more likely to face social discrimination and have low self-esteem.^{b,c,3} An estimated 33,000 North Carolinians are living with HIV, an incurable disease requiring regular medical treatment.⁴ The prevalence and burden of these conditions signify an immediate need to make dramatic improvements in population health.

Cancer, heart disease, injury, stroke, and type 2 diabetes are among the leading causes of preventable death and disability in North Carolina. These and other diseases and health conditions that North Carolinians face often stem from underlying health risk behaviors such as tobacco use and physical inactivity. The basis of prevention—a guiding principle of public health practice and an important component of clinical care—is to take action in order to avoid illness, disability, and death. By addressing preventable, underlying health risk factors with evidence-based prevention strategies, death and disability in North Carolina can be reduced and population health can be improved.

The downside of prevention is that it is often undervalued. The current approach to health care in this country is more often aimed at reducing the consequences of poor health rather than maintaining good health. Therapeutic interventions to address chronic and acute conditions supersede preventive interventions. Ironically, “sick” care is the foundation of our “health” care system. Our lack of investment in prevention leads to preventable health conditions that create burdens for individuals, families, businesses, and communities, and strains an already thinly stretched health care system. Investing in prevention can reduce this heavy burden by saving lives, reducing disability, and, in some cases, reducing health care costs.

Nationally, only 1%-2% of health care dollars are spent on prevention. In this issue of the *Journal*, Kenneth E. Thorpe provides a national perspective on prevention. North Carolina spends slightly more of its gross state product on health care than the average for the nation, but fares worse than most of

b. The Nutrition Services Branch, North Carolina Division of Public Health maintains the North Carolina Nutrition and Physical Activity Surveillance System (NC-NPASS) and notes that “NC-NPASS data are limited to children seen in North Carolina public health sponsored WIC and child health clinics and some school-based health centers.” <http://www.eatsmartmovemorenc.com/Data/Texts/2008%20Ages%202%20to%2018.pdf>.

c. Note on the terms “at-risk for overweight,” “overweight,” and “obese”—NC-NPASS data are reported as follows: at-risk for overweight is defined as BMI \geq 85th percentile but < 95th percentile, and overweight is defined as BMI \geq 95th percentile. However, this issue brief uses the following terminology for discussing child and adolescent weight: overweight is defined as BMI \geq 85th percentile but < 95th percentile. Obesity is defined as BMI \geq 95th percentile. The convention used in this issue brief is based on recommendations for defining overweight and obesity as determined by the Expert Committee on the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity convened by the American Medical Association (AMA) and co-funded by the AMA, the Health Resources and Services Administration, and the Centers for Disease Control and Prevention.

the rest of the country on key health indicators.^{2,13} Compared to the majority of other states, North Carolina underspends on public health; only 10 states in the country spend less (relative to population). North Carolina spends an average of \$50 per capita, while neighboring states Virginia and South Carolina spend \$82 and \$81 per capita, respectively.¹⁴

North Carolina needs to invest more heavily in interventions that reduce health risk factors such as tobacco use and physical inactivity. Interventions delivered at multiple levels,

By addressing preventable, underlying health risk factors with evidence-based prevention strategies, death and disability in North Carolina can be reduced and population health can be improved.

including the individual, interpersonal, clinical, community/environment, and policy levels, can work in concert to optimally support healthy behaviors and health in general. For example, evidence has shown that a multilevel approach has worked for reducing substance abuse among adults and adolescents. The same has been shown for cardiovascular disease.¹⁵ Promoting clinical preventive services by practitioners is one component of this multifaceted effort. In their commentaries, Tom Bacon, Elizabeth Tilson, J. Carson Rounds, and Ronald Venezia explore various professional roles in achieving this goal. While more effort and time are needed to implement multilevel interventions, the potential effectiveness of this approach to change individual behavior and ultimately population health status outweighs these limitations. The success of multilevel interventions is best exemplified by the long-term reduction of smoking rates seen throughout the industrialized world.¹⁴ Similarly, North Carolina's success in reducing tobacco use has resulted largely from the use of multilevel interventions. In this issue of the *Journal*, Vandana Shah, Sally Herndon Malek, Tom Brown, and Barbara Moeykens examine North Carolina's success in reducing smoking rates. Also in this issue, Pam Seamans presents the role of advocacy for public policy change and uses recent North Carolina tobacco policies as an example, while Representative Hugh Holliman presents

the North Carolina General Assembly's legislative decision-making process around prevention issues.

An individual's behavior is a major determining factor of health status, as approximately 50% of individual health can be attributed to behavior alone.¹⁶ However, changing individual health behavior is not simple. Knowledge alone is not sufficient to change behavior. People are influenced by their family and friends, the advice they receive from their health care providers, the communities they live in, the environments in which they work and play, and the public policies that guide and shape all of these components. We can help foster positive health behaviors by creating environments, laws, and social norms that make it easier for people to choose healthy behaviors rather than engage in unhealthy behaviors.

The North Carolina Institute of Medicine Task Force on Prevention

The state's leading health foundations—the Blue Cross and Blue Shield of North Carolina Foundation, The Duke Endowment, the Kate B. Reynolds Charitable Trust, and the North Carolina Health and Wellness Trust Fund—recognize the value of prevention and recognized the need for a thoughtful statewide prevention plan. Together, they asked the North Carolina Institute of Medicine (NCIOM) to lead the development of a Prevention Action Plan for the state. Partnering with the North Carolina Division of Public Health, the NCIOM convened a Task Force of experts which met 14 times from April 2008 to August 2009. The Task Force was chaired by Leah Devlin, DDS, MPH, former state health director;^d Jeffrey P. Engel, MD, state health director, Division of Public Health, North Carolina Department of Health and Human Services; William L. Roper, MD, MPH, CEO, University of North Carolina (UNC) Health Care System and dean, UNC School of Medicine; and Robert W. Seligson, MA, MBA, executive vice president and CEO, North Carolina Medical Society. In addition to the co-chairs, the Task Force was comprised of 44 other members including legislators; representatives of state and local agencies; key health care leaders; public health experts; foundation leaders; business, community, faith leaders; and other interested individuals. Representatives from the four supporting foundations also served as Task Force members. A Steering Committee guided the work of the Task Force. (A full listing of Task Force and Steering Committee members is included in the Acknowledgements section of this issue brief, page 43.)

d. Dr. Leah Devlin served as one of the co-chairs for the Task Force from the inception of the work until she retired as state health director. At that time, Dr. Jeffrey Engel became one of the co-chairs. Dr. Devlin remained as a member of the Task Force.

Specifically, the NCIOM Task Force on Prevention was charged with developing a comprehensive, evidence-based, statewide prevention plan to improve population health and thereby reduce health care costs. To do this, the Task Force:

- Identified the 10 leading causes of death and disability in the state (see Figure 1).
- Comprehensively examined the preventable, underlying risk factors which contribute to these 10 leading causes of death and disability.
- Prioritized prevention strategies to improve population health through evidence-based interventions when possible and through best or promising practices when more thoroughly tested evidence-based strategies were not available.
- Developed a comprehensive, multifaceted approach to prevention that includes strategies to address the modifiable factors at different levels of the socioecological model.

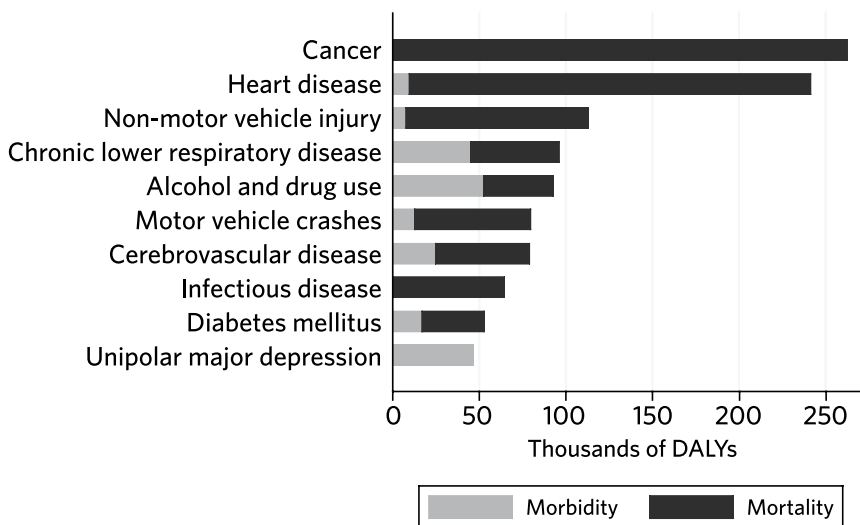
To determine the leading causes of death and disability, the Task Force relied on disability adjusted life years (DALYs)—an indicator that measures the overall burden of a disease or health condition. DALYs are derived by combining years of life lost (YLL) due to an early death and years of life lost due to a disability (YLD). Figure 1 shows the leading causes of death and disability—measured in DALYs—in North Carolina in 2005.^e Preventable risk factors for these leading causes of death and disability were then identified through a literature review (see Table 2, page 34). These preventable risk factors were the topic areas studied by the Task Force.

In its study of each of these areas, the Task Force was asked to consider the best available evidence in the development of its recommendations for the state. Relying heavily on recommendations made by national bodies such as the US Preventive Services Task Force and the US Task Force on Community Preventive Services, the NCIOM Task Force on Prevention developed evidence-

based recommendations for each of the study areas based on strategies that have strong evidence of their effectiveness. For Task Force study areas where evidence-based strategies were not available, the Task Force drew from best and promising practices identified at both the state and national levels. Recognizing that individual health is affected by many factors, the Task Force utilized the socioecological model of health behavior in its development of recommendations.

The Task Force's final report, *Prevention for the Health of North Carolina: Prevention Action Plan*, was officially released in October 2009.^f The *Prevention Action Plan* is the Task Force's recommended course of action to improve population health in North Carolina. The *Prevention Action Plan* also serves as the basis of a much larger initiative currently underway to improve the health of all North Carolinians. In his commentary, Jeff Spade discusses this initiative, as well as the role of Healthy Carolinians in improving population health through work at the community level. The *Prevention Action Plan* is a resource for many individuals and groups in the state working in the field of prevention. It can provide guidance for new legislative funding and foundation grantmaking. Additionally, it can assist in

Figure 1.
Top 10 Diseases and Conditions Leading to Greatest Disability Adjusted Life Years (DALYs) in North Carolina (2005)



Source: North Carolina Institute of Medicine. Internal analysis of North Carolina Vital Statistics (2005 mortality file); Michaud CM, McKenna MT, Begg S, et al. The burden of disease and injury in the United States 1996. *Popul Health Metr.* 2006;4:11; and NCIOM literature review of underlying causes of death and disability for each leading cause.

Notes: Infectious disease includes pneumonia and influenza. Non-motor vehicle injury includes unintentional and intentional injuries.

e. A detailed description of how the DALYs were determined is contained in the full report, which is available at <http://www.nciom.org>.
f. In March of 2009, the Task Force released an interim report with recommendations covering tobacco use, poor nutrition, physical inactivity, substance abuse, and risky sexual behavior.

Table 2.
Diseases and Conditions Leading to Greatest DALYs in North Carolina and Their Underlying Preventable Causes

Leading Preventable Risk Factors Leading to Major Causes of Death and Disability										
Leading Causes of Death and Disability	Tobacco use	Diet, physical inactivity, and overweight/obesity	Risky sexual behavior	Alcohol and drug use	Emotional and psychological factors	Exposure to chemicals and environmental pollutants	Unintentional and intentional injuries	Bacteria and infectious agents	Racial and ethnic disparities	Socioeconomic factors
	Cancer	✓	✓		✓		✓		✓	✓
	Heart disease	✓	✓		✓	✓			✓	✓
	Non-motor vehicle injuries	✓	✓		✓	✓	✓		✓	✓
	Chronic lower respiratory disease	✓	✓						✓	✓
	Alcohol and drug use				✓	✓			✓	✓
	Motor vehicle injuries				✓		✓		✓	✓
	Cerebrovascular disease	✓	✓		✓				✓	✓
	Infectious diseases			✓	✓			✓	✓	✓
	Diabetes		✓						✓	✓
	Unipolar major depression				✓	✓			✓	✓

Source: Data from the North Carolina Institute of Medicine literature review.

prioritizing prevention efforts and focusing the work of the North Carolina Division of Public Health and other state and local agencies, health care and public health professionals, health organizations, insurers, community organizations, companies, the faith community, and other groups. In this issue of the *Journal*, Jeffrey P. Engel discusses in his commentary how the *Prevention Action Plan* will be used to shape the work of the Division of Public Health over the next several years. Working together off a common action plan and wisely using resources, which is especially important during this time of limited funding opportunities, offers the greatest opportunity to improve population health in North Carolina and to lower costs to both individuals and the health care system. Of the 45 recommendations developed by the Task Force, 11 were identified as priority recommendations; these are presented in bold in this issue brief. The full report of the Task Force is available on the North Carolina Institute of Medicine's website at <http://www.nciom.org>.

Tobacco Use

Tobacco use is the leading cause of preventable death in North Carolina. Despite this fact, nearly 2 million, or 20.9%,

of adult North Carolinians smoke.⁵ This means that one in five adult North Carolinians are at increased risk of death and disability due to heart disease, heart attack, cancer, stroke, high blood pressure, and a host of other health conditions caused by smoking. Many efforts to reduce tobacco use have been launched in the state over the last several years, including interventions such as the state quitline, social marketing campaigns, and broader insurance coverage of cessation counseling and medications. This multifaceted approach partially explains the decline in adult smoking from 24.8% in 2003 to 20.9% in 2008.¹⁷ Even more dramatic declines can be seen in youth smoking rates. From 2003 to 2007, high school youth smoking rates dropped from 27.3% to 19.0%, and middle school use rates were cut in half from 9.3% to 4.5%.¹⁸ North Carolina's youth smoking rates are now below the national average, although adult smoking rates continue to exceed the nation's rate. Further, while we have made progress in reducing youth smoking, far too many young people still smoke and use other tobacco products.

The use of other tobacco products (OTPs) is problematic: 20% of adults reported use of smokeless tobacco in 2008 and 4% reported use of other smoke products.^{8,19}

Among youth, 8.6% of high school students and 2.3% of middle school students report current use of smokeless tobacco.²⁰ OTPs are of particular concern among youth as such products are considered a “gateway” to cigarette use. Adolescents who use smokeless tobacco are more likely to use cigarettes. Youth who use tobacco are also more likely to consume alcohol and use illicit substances.²¹

The Centers for Disease Control and Prevention (CDC) recommends increasing the unit price for tobacco products to reduce smoking initiation and to help those who already smoke to quit. Data show that a 10% increase in the price of a pack of cigarettes leads to a 4.1% decrease in tobacco use within the general population. Youth are even more sensitive to price increases; a 10% price increase leads to a 4%-7% decrease in the number of youth who smoke.²² Raising North Carolina’s cigarette tax to the national average (\$1.34 as of January 26, 2009) would reduce youth smoking by 14%, lead to 46,000 fewer adult smokers and 74,400 fewer future youth smokers, and avert 35,900 smoking-related deaths.²³ Comparably increasing the OTP tax to 55% of wholesale would lead to significant health benefits in the state as well.²⁴ Moreover, increasing taxes on both cigarettes and OTPs would create new state revenues of \$350 million.^{h,i,23,24}

The Task Force recommended that the North Carolina General Assembly should increase the tax on a pack of cigarettes to meet the current national average and increase the tax on all other tobacco products to a comparable amount. These new revenues should be used for a broad range of prevention activities including preventing and reducing dependence on tobacco, alcohol, and other substances.

Obesity, Nutrition, and Physical Activity

North Carolina is not alone in its fight against obesity. Over the past 20 years, every state in the nation has experienced an increase in the prevalence of obesity, which is now referred to as an epidemic. Two-thirds (65.7%) of North Carolina adults are either overweight or obese compared to 63.2% of adults nationally. From 1990 to 2008, the prevalence of adult obesity in this state more than doubled, growing from 12.9% to 29.5%.^{25,26} Youth in this state are also struggling with unhealthy weight: over 30% of youth ages 2-18 years were considered overweight in 2008.^{j,27}

Obesity is a risk factor for a number of health conditions including high blood pressure, heart disease, cancer, stroke, and type 2 diabetes.²⁸⁻³¹ Obesity is also a significant driver

of health care costs. According to Be Active North Carolina, our state spent \$2.81 billion in medical costs, \$960 million in prescription drug costs, and \$11.8 billion in lost productivity costs due to excess weight in 2006.³²

There are many reasons why so many North Carolinians, like many people across the country, are confronting overweight and obesity. Larger than necessary portion sizes and sedentary lifestyles are just a few of these reasons. Generally speaking, regular, adequate physical activity balanced with good nutrition is the goal that needs to be met by individuals in order to achieve healthy weight status.

Physical activity and physical education are particularly important to the healthy development of children. Physical education involves “teaching students the skills, knowledge, and confidence they need to lead physically active lives.”³³ The National Association for Sport and Physical Education recommends that elementary school children receive 150 minutes of physical education each week and high school students receive 225 minutes each week. To ensure elementary school children receive the recommended weekly level of quality physical education, and that middle and high school students are receiving a sufficient level of the Healthful Living curriculum that equally emphasizes health and physical education, **the Task Force recommended that the North Carolina General Assembly require the State Board of Education to implement a five-year phase-in requirement of quality physical education that includes 150 minutes of elementary school physical education weekly, 225 minutes weekly of Healthful Living curriculum in middle schools, and two units of Healthful Living curriculum as a graduation requirement for high schools.**

As we learned from successful tobacco interventions, we must address obesity through sustained, multifaceted efforts addressing individuals, families, schools, communities, and policy. The existing *Eat Smart, Move More North Carolina Obesity Prevention Plan* provides a roadmap to do this. **Therefore, the Task Force recommended that the North Carolina Division of Public Health (DPH) along with its partner organizations should fully implement the *Eat Smart, Move More North Carolina Obesity Prevention Plan* to combat obesity in selected local communities and identify best practices for improving nutrition and increasing physical activity that will ultimately be adopted across the state. The North Carolina General Assembly should appropriate \$6.5 million in recurring funds beginning in SFY 2011 to DPH to support efforts in every community**

g. Adult smokeless tobacco users are those who use smokeless tobacco some days or every day. Adult other tobacco product users are those who report current use of cigars, pipes, bidis, kreteks, or other tobacco products.

h. Statistics and revenue projections are dependent on the current national average tax and prevalence of smoking and tobacco use. Projections (e.g., new revenue generated, lives saved) in circulation may differ for this reason.

i. These projections include the September 1, 2009 10-cent increase in the state cigarette tax (projections in the final report do not). They also include the 2009 66-cent federal tax increase that occurred with the federal reauthorization of the Children’s Health Insurance Program.

j. The data on children capture BMIs of children seen in North Carolina public health sponsored WIC and child health clinics and some school-based health centers.

across the state, \$3.5 million annually for six years to support more comprehensive demonstration projects, \$500,000 annually for six years to support adolescent focused interventions, and additional funding to support a social marketing campaign.^k

Risky Sexual Behaviors

Risky sexual behaviors can lead to unintended pregnancies as well as sexually transmitted diseases (STDs), including human immunodeficiency virus (HIV). Sexually transmitted diseases can lead to illness, chronic disease, and death. Unintended pregnancy is associated with greater risk of morbidity for women and potentially compromised infant health due to delay of prenatal care among women who have an unintended pregnancy.³⁴ Unintended pregnancy can lead to significant potential social and economic consequences as well. In addition, these preventable health conditions lead to substantial costs to the state. Evidence-based pregnancy prevention programs and access to family planning resources can help prevent unintended pregnancies. Education and risk-reducing behavior can help prevent STDs, HIV, and unintended pregnancy.

Nearly half of all pregnancies in North Carolina are unintended.³⁵ Most unintended pregnancies occur among adults; however, almost all teen pregnancies are unintended.³⁶ Currently, North Carolina has the 14th highest teen pregnancy rate.³⁷ The annual cost of unintended pregnancy in the Medicaid population alone is over \$500 million.³⁸ According to the National Campaign to Prevent Teen and Unplanned Pregnancy, teen pregnancy in North Carolina cost taxpayers more than \$312 million in 2004.³⁹

Chlamydia, gonorrhea, and syphilis are the most prevalent reportable STDs in North Carolina.^{1,4} Currently, North Carolina has the 14th highest incidence per 100,000 of these three STDs in the country. Annual direct medical costs in the state for all STDs, including HIV, was over \$200 million in 1997.³⁷ Certain population groups are at increased risk of contracting STDs and HIV. African Americans and Latinos—both men and women—have higher rates of chlamydia, gonorrhea, syphilis, and HIV, than do whites. Youth in this state are also at increased risk for STDs and HIV infection. In fact, of all new STD infections, almost half occur in young people between the ages of 15 and 24.⁴

Providing youth with the knowledge and skills to avoid STDs, HIV, and unintended pregnancy is an important prevention strategy. Comprehensive sexuality education programs have been shown to be effective at delaying the

initiation of sex, reducing frequency, reducing the number of sexual partners, increasing contraceptive use, and reducing sexual behavior that increases risk. In contrast, evaluations of many abstinence programs, including abstinence-until-marriage programs, have shown no overall impact on delaying age of initiation of sex, number of sexual partners, or condom or contraceptive use.⁴⁰

Until the passage of HB 88 (SL 2009-213) in 2009, local education agencies (LEAs) were required to offer only abstinence-until-marriage education. The law now calls for LEAs to offer comprehensive sexuality education—referred to as reproductive health and safety education—as part of the Healthful Living Standard Course of Study. While this new legislation is a huge step forward, it does not require that *all* youth receive comprehensive sexuality education. Existing statute indicates that each local board of education is still required to adopt a policy to allow parents or legal guardians to consent or withhold consent for their child's participation in any of this education. If local school boards enacted an opt-out consent process, more young people in North Carolina would receive evidence-based, effective sexuality education. **Thus, the Task Force recommended that local school boards should adopt an opt-out consent process to automatically enroll students in the comprehensive reproductive health and safety education program unless a parent or legal guardian specifically requests that their child not receive any or all of this education.**

Substance Abuse and Mental Health

Alcohol and drug use is the fifth greatest contributor to disability adjusted life years in the state, while depression is the second leading cause of life lived with a disability in North Carolina.⁴¹ According to the 2006-2007 Substance Abuse and Mental Health Services Administration (SAMHSA) annual household survey, one in 12 North Carolinians ages 12 or older reported dependence or abuse of alcohol or illicit drugs.^m One in 12 North Carolinians ages 12 or older also reported having a diagnosable major depressive episode.⁷

Substance abuse increases an individual's risk for premature death, comorbid health conditions, and disability. Individuals with addiction disorders face an increased risk of joblessness, homelessness, and poverty. Aside from the adverse effects addiction has on the individual, addiction also severely impacts families and communities. In 75% of cases where children are placed in foster care, parental use of alcohol or drugs is a contributing factor.⁴² Ninety

k. The Task Force recommended \$16 million for a social marketing campaign based upon the CDC's recommendation of \$1.83 per capita for health communications interventions addressing tobacco use. See *Best Practices for Comprehensive Tobacco Control Programs, 2007* at http://www.cdc.gov/tobacco/tobacco_control_programs/stateandcommunity/best_practices.

l. Hepatitis A and B are also reportable (§ 10A NCAC 41A 0.101 Reportable Diseases and Conditions). However, only the three most common STDs (chlamydia, gonorrhea, and syphilis) were studied by the Task Force.

m. Illicit drugs include marijuana, hashish, cocaine, heroin, hallucinogens, inhalants, and prescription drugs that are used non-medically.

percent of people in the North Carolina prison system have substance abuse problems.⁴³ In addition, substance abuse contributes to more than one-quarter (28.6%) of all vehicle crash-related deaths in the state.⁴⁴

Substance use, abuse, and addiction can be prevented.⁴⁵ Prevention strategies should be aimed at young people; while substance abuse has detrimental effects on adults, youth are at particular risk due to the impact that use has on the developing brain, as the brain is not fully formed until 25 years of age.^{46,47} This is worrisome considering that almost 4 out of 10 North Carolina high school students reported having at least one drink in the last 30 days, and more than 2 out of 10 reported binge drinking.⁴⁸ One in five high school students reported using marijuana in the last 30 days, and 17% reported that they took an unprescribed prescription drug.⁴⁸

Like substance abuse, mental health disorders severely impact individuals. Mental health disorders reach beyond the affected individual and affect interpersonal relationships.⁴⁹ Depression has been linked to reductions in productivity in the workplace and increased use and cost of health services.^{48,50} Depression is also associated with 60% of all suicides—making it the leading cause of suicide.⁵¹ In 2007, suicide was the sixth leading cause of death for children ages 10-14 in North Carolina, the fourth leading cause of death for youth and adults ages 15-34, and the fifth leading cause of death for adults ages 35-44.⁵²

The North Carolina Division of Mental Health, Developmental Disabilities and Substance Abuse Services (DMHDDSAS) currently receives funding from Substance Abuse Prevention and Treatment Block Grants from SAMHSA and from the North Carolina General Assembly. However, these two funding streams do not provide enough funds to provide substance abuse prevention services to all who need them. According to DMHDDSAS, in SFY 2007, more than 275,000 youth were in need of substance abuse prevention services; however, only 42,000 actually received those services.^{n,44,53} Currently, there are a limited number of local substance abuse coalitions, which means few communities have implemented comprehensive substance abuse prevention programs. Schools are required to teach information about substance abuse and use, mental health, and emotional well-being; however, a 2004 study showed that most public schools in the state had not implemented evidence-based substance abuse prevention programs.⁵⁴ To address these gaps in substance abuse prevention, a statewide comprehensive substance abuse prevention plan is needed to reach all North Carolinians in need of prevention services.⁴⁴ Efforts should be evidence-based and should target those population groups at varying risk levels with

the express goal of preventing or delaying use of alcohol, tobacco, or other drugs. To support the development and testing of a comprehensive substance abuse prevention plan, **the Task Force recommended that the Division of Mental Health, Developmental Disabilities and Substance Abuse Services develop a comprehensive substance abuse prevention plan for use at the state and local levels prioritizing efforts to reach children, adolescents, young adults, and their parents. In addition, the North Carolina General Assembly should appropriate funds to support comprehensive local or regional demonstration projects that prevent or delay the onset of use of alcohol, tobacco, or other drugs and promote emotional and mental health.**

Similar to the effect that increasing tobacco taxes has on use, increasing taxes on alcohol has also been shown to reduce its use. Youth and heavy drinkers are sensitive to tax increases on alcohol.⁵⁵⁻⁵⁷ North Carolina increased its alcohol tax in 2009 by 0.8 cents per can of beer and 4-cents per bottle of wine.^o Therefore, to further prevent of the misuse of alcohol, **the Task Force recommended raising the excise taxes on malt beverages and wine. The increased revenue should be used to fund effective prevention and treatment efforts for alcohol, tobacco, and other drugs. In addition, the Task Force recommended that the North Carolina General Assembly support a comprehensive alcohol awareness education and prevention campaign.**

Environmental Risks

Air and water pollution are environmental risks that threaten the health of all North Carolinians. Air pollution can cause and exacerbate respiratory and cardiovascular conditions such as asthma, emphysema, heart attack, and stroke, while water pollution can lead to acute poisoning and can have chronic effects. Both types of pollution have been linked to cancer.⁵⁸⁻⁶¹

Specific population groups are more susceptible to the deleterious effects of air pollution. For example, sulfur dioxide is particularly problematic for the young and old and people with asthma, heart disease, and lung disease.⁶² Ozone is one of the state's most prevalent air quality problems.^{57,63} Major sources of air pollution in North Carolina include motor vehicles,⁶⁴ coal-fired plants,⁶⁵ poultry waste incineration, hog waste, medical waste incineration, and waste to energy incineration.⁶⁶

Water pollution can occur in groundwater (wells and aquifers) and source water (streams, lakes, and rivers), which are sources of drinking water. Preventing pollution of groundwater is critical—as over half of all North Carolinians rely on groundwater for their drinking water.⁶⁷ In addition, approximately 2.7 million (34%) of North Carolinians rely

n. Certain groups have a higher risk of developing a substance abuse disorder, including those who have a parent with substance abuse problems, have academic difficulties in school, and/or have started experimenting with substances themselves.

o. SL 2009-451, Section 274.4 (a).

on private wells, which are not subject to inspection, for their drinking water.⁶⁸

Naturally occurring contaminants and human activities can cause water pollution. Arsenic is an example of a naturally occurring contaminant. Consumption of arsenic in water has been linked to many cancers, gastrointestinal problems, and other health conditions.^{58,60,69} Other sources of water pollution in North Carolina include agricultural run-off, unlined solid waste facilities, power plants, pharmaceutical manufacturers, and gasoline storage tanks.^{59,70}

To address environmental health hazards, the Task Force recommended a statewide environmental assessment for North Carolina that links exposures to health outcomes. The Task Force also recommended ways to improve the environments of indoor spaces such as schools and homes and to improve the built environment.^p

Injury

Injury is a larger public health problem than is often realized. Every year in North Carolina, injuries result in more than 148,000 hospitalizations, 819,000 emergency department (ED) visits, and an unknown number of outpatient visits and medically unattended injuries.⁷¹ Unintentional injury is the fourth leading cause of death and disability in this state. Unintentional injuries led to 4,300 deaths in 2007 in North Carolina. Because there are so many potential causes of injuries, the Task Force focused on the leading causes of unintentional injuries: motor vehicle crashes, unintentional poisonings, and falls.

Motor vehicle injuries caused more than one in four injury-related deaths, or nearly 1,800 fatalities in 2007.⁷² Younger populations are disproportionately affected by motor vehicle injury. It was one of the leading three causes of injury-related hospitalizations in North Carolina in 2006 for people ages 5-44 years and the leading cause of hospitalization for people ages 15-24 years.⁵¹ Evidence-based strategies to reduce the incidence of motor vehicle injury are available. The Task Force recommended strategies and increased funding to eliminate driving while impaired, reduce speeding and aggressive driving, encourage seat belt use, and ensure proper licensing and training for motorcyclists.

Unintentional poisonings include the use of drugs or chemicals in excessive amounts for recreational or non-recreational purposes.⁷³ This is the second leading cause of injury-related death in the state, accounting for 22% of injury fatalities in the state, and its incidence has been rising dramatically in recent years.^{74,75}

Unintentional falls are the third leading cause of injury-related deaths in North Carolina, accounting for nearly 10% of injury fatalities in 2007.⁷⁶ Of all falls, 10%-20% cause

serious injury, and they disproportionately affect individuals over the age of 65. The risk of death from falling is 23 times greater among those aged 65 or over than it is for individuals less than 65 years of age.⁷⁷

The Task Force also examined violence, or intentional injuries. Specifically, the Task Force focused on family violence, which includes domestic violence and child maltreatment. Unlike the other causes of injury the Task Force examined, data on the prevalence and incidence of family violence are incomplete due to many factors including under-reporting and a lack of well-established terms and measures. There were nearly 15,000 reports of substantiated child maltreatment in North Carolina in 2007.⁷⁸ Child physical abuse has been associated with suicidal behavior, risk-taking, psychiatric disorders, altered brain development, hormonal changes, and impaired sleep.⁷⁹ Major depression, dysthymia, and sexualized behaviors, which can lead to an increased risk of sexually transmitted diseases, have been associated with child sexual abuse.⁸⁰ Domestic violence is also a significant and tragic public health problem. According to some estimates, one in four women in North Carolina has reported experiencing physical or sexual violence since the age of 18. The majority report either physical or sexual violence at the hands of their former or current partner.⁸¹

Historically, the state has not prioritized preventing intentional and unintentional injury as it has other preventable health problems. **Therefore, the Task Force recommended that the General Assembly create an Injury and Violence Prevention Task Force to identify and implement strategies to reduce injury and violence.**

Vaccine Preventable Disease and Foodborne Illness

Vaccine Preventable Disease

Infectious disease, including pneumonia and influenza, was the 10th leading cause of death among North Carolinians in 2007.⁷¹ Fortunately, many infectious diseases such as measles and influenza that once widely afflicted populations are now preventable through vaccinations. Vaccines have been proven to save lives and money. For every dollar spent on childhood vaccination, the United States' childhood immunization program saves \$5 in direct costs and \$11 in additional costs to society.⁸²

However, everyone does not receive recommended immunizations, even when these vaccines are free. The lack of immunization among the population leads to negative, yet preventable health outcomes every year. North Carolina's Universal Childhood Vaccine Distribution Program (UCVDP) provides combined diphtheria and tetanus toxoids and

p. The built environment includes neighborhood design, land use patterns, and transportation systems.

q. Grimshaw A. Data collection and analysis unit supervisor, Immunization Branch, North Carolina Department of Health and Human Services. Written (email) communication. June 30, 2009.

acellular pertussis (DTaP or Tdap); hepatitis A (Hep A); hepatitis B (Hep B); *Haemophilus influenzae* type B (Hib); inactivated polio virus (IPV); measles, mumps, and rubella (MMR); and varicella to all children in the state.⁸³ The program removes financial barriers, assures vaccination access for all children, and simplifies the vaccination process for health care providers. Both public and private medical providers receive all required vaccines for children ages 0 through 18 at no charge.⁸³ In general, North Carolina's UCVDP is working well. In fact, North Carolina's childhood vaccination rates have been higher than the national rate since 1995.⁸⁴ Although recent changes to the UCVDP, combined with reduced funding, and cost of newly developed vaccines have lowered our rates.^r

While many childhood vaccines are covered through UCVDP, other newer vaccines are not. For example, UCVDP does not currently cover the vaccines for human papillomavirus (HPV), rotavirus, meningococcal, or pneumococcal although children who are uninsured, eligible for Medicaid, Alaskan Native, American Indian, or who are receiving care from a health department or federally qualified health center can receive these immunizations for free through the Vaccines for Children program. Given the need to increase immunization rates, **the Task Force recommended that the North Carolina Division of Public Health aggressively seek to increase immunization rates for all vaccines recommended by the Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices which are not currently covered through the state's Universal Childhood Vaccine Distribution Program (UCVDP). In addition, it recommended that all public and private insurers provide first dollar coverage (no co-pay or deductible) for all CDC-recommended vaccines that the state does not provide through the UCVDP and should provide adequate reimbursement to providers to cover the cost and administration of the vaccines. The North Carolina General Assembly should appropriate \$1.5 million in recurring funds in SFY 2011 to support greater education and outreach efforts.**

Foodborne Illness

In most cases of foodborne illness the exact pathogen is unknown.⁸⁵ However, foodborne illnesses are extremely common infectious diseases. There are more than 200 known diseases transmitted through food by viruses, bacteria, metals, toxins, parasites, and prions. Foodborne pathogens lead to 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths each year in the United States.⁸⁴ Fortunately, food safety can prevent foodborne illness.

A recent performance review of the North Carolina food safety system found that the state's system is fragmented as

many agencies—including the North Carolina Department of Agriculture, the North Carolina Department of Environment and Natural Resources, North Carolina Department of Transportation, and the North Carolina Division of Public Health—oversee food safety as food moves from farm to table.⁸⁶ The Task Force recommended that the North Carolina General Assembly enact laws to strengthen the state's ability to prevent and respond to foodborne illness.

Racial and Ethnic Disparities

In 2008, approximately 30% of North Carolina's population was comprised of racial and ethnic minorities: 67.2% of North Carolinians were white, 21.2% African American, 7.4% Latino, 1.9% Asian, 1.1% American Indian, 1.1% two or more races, and 0.1% Native Hawaiian or Pacific Islander.⁸⁷ Compared to non-minorities, racial and ethnic minorities generally have poorer health status and experience poorer health outcomes.^{88,89} Mortality rates due to cancer, heart disease, stroke, and diabetes are generally higher among minorities than whites. Minorities in North Carolina are also more likely to have risk factors for disease and illness than non-minorities (see Table 3, page 40). For example, African Americans are more likely to smoke, be obese, report no leisure time physical activity, report fair/poor health, be uninsured, and report not having a personal provider.

The exact causes of racial and ethnic health disparities are not fully understood, but it is known that minority populations generally have less access to health care and health insurance and lower quality of health care compared to non-minorities.^{88,90} Socioeconomic factors such as housing, income, and education also contribute to poorer health outcomes. Another important factor is our country's history of discrimination, which has shaped and restricted opportunities through interpersonal and institutional bias.⁸⁷ This history has led to many minorities mistrusting medical care and the health care system.^{87,91,92}

The health disparities between the majority and minority populations cannot be ignored. The Task Force recommended that private and public funders support evidence-based prevention initiatives to meet the needs of diverse populations. The Task Force also recommended that the Division of Public Health examine racial and ethnic disparities in all its health promotion and disease prevention activities. The Task Force also made recommendations regarding socioeconomic factors, which contribute to racial and ethnic disparities (see below).

Socioeconomic Factors

Race and ethnicity, income, educational achievement, housing conditions, and other social determinants are among the best predictors of an individual's health status.

r. Cline S. Deputy director, North Carolina Division of Public Health. Personal communication. February 17, 2010.

Table 3.
Minorities in North Carolina are Generally More Likely than Whites to Have Risk Factors for Disease or Illness

	White	African American	Latino	American Indian	Asian	Other Races	Total
Current smoker	21%	22%	14%*	35%*	16%	19%	21%
Obese	27%	41%*	28%	35%*	5%*	22%	30%
No leisure time physical activity	23%	29%*	33%*	36%*	26%	17%	25%
Fair/poor health	15%	20%*	28%*	30%*	13%	25%	17%
Diabetes	8%	16%*	5%*	12%	2%*	5%*	9%
High blood pressure	29%	42%*	12%*	34%	13%	29%	29%
Uninsured	11%	21%*	67%*	27%*	13%*	31%*	18%
Did not see doctor due to cost	13%	23%*	30%*	26%*	10%	28%*	17%
No personal provider	17%	20%	64%*	26%*	19%	35%*	22%

Source: North Carolina Institute of Medicine. Analysis of North Carolina Behavioral Risk Factor Surveillance System 2008 data except for high blood pressure (2005 data).

Note: Shaded cell denotes value, after adjustment for age and income, is significantly different from average for white at 5%.

* Denotes unadjusted (sample average) significantly different from average for white at 5%.

Individuals with higher incomes or greater personal wealth, more years of education, and who live in a healthy, safe environment, have longer average life expectancies and better health outcomes than individuals who do not have these attributes. In this issue of the *Journal*, Ronny Bell delves further into the social determinants of health.

Income

Increasing income levels correspond to gains in health and health outcomes.⁹³ Individuals with higher incomes have greater opportunity to engage in healthy behaviors, live in safe and healthy communities, and afford health insurance coverage. In 2007, nearly 15% of North Carolinians lived below the federal poverty guideline (FPG) (\$20,650 per year for a family of four in 2007), and approximately 35% lived in low-income households with incomes below 200% FPG (\$41,300 for a family of four in 2007).⁵ Due to the recent economic downturn, it is probable that even more North Carolinians are currently living in poverty. The state's unemployment rate between 2007 and January 2009 was the second largest increase in the nation (five percentage points, from 4.7% to 9.7%).⁹⁴ To promote economic security, **the Task Force recommended the North Carolina General Assembly increase the state Earned Income Tax Credit (EITC) to 6.5% of the federal EITC. In addition, the Task Force recommended that the North Carolina Division of Social Services and local departments of social services should conduct outreach to encourage uptake of the Supplemental Nutrition Assistance Program (SNAP), formerly known as food stamps, to low-income individuals and families.**

Housing

Poor housing conditions, including substandard, unhealthy, overcrowded, and unaffordable homes, contribute to a large number of health problems.⁹⁵⁻⁹⁷ Some problems found in substandard housing conditions include dampness, inadequate ventilation, unregulated temperatures, overcrowding, and the absence of hot water, adequate food storage, or sufficient waste disposal. These problems have all been linked to infection, disease, and other illness.⁹⁵ Young children may be at a particularly high risk from health problems resulting from unhealthy home environments since they spend so much time at home.⁹⁸ In addition, poor housing conditions can lead to injuries within the home. An estimated half of all deaths due to falls, one-fourth of all poisoning-related deaths, and 90% of all fire- or burn-related deaths occur in the home.⁹⁹ Not surprisingly, lower-income people are more likely to live in substandard, unhealthy, or overcrowded housing.¹⁰⁰

Housing affordability is also closely connected to health status. Low-income people or families living in unaffordable housing have less money to spend on basic needs such as health care, nutritious foods, heating, and transportation. In fact, those people who have problems paying rent or utility bills report barriers in accessing health care, higher use of the emergency department, and more hospitalizations.¹⁰¹ To increase the availability of affordable housing and utilities, the Task Force recommended that the North Carolina General Assembly appropriate \$10 million in additional recurring funding beginning in SFY 2011 to the North Carolina Housing Trust Fund to increase the availability of affordable housing for low-income families, seniors, and people with disabilities.

s. Holmes M. North Carolina Institute of Medicine. Analysis of the US Census Bureau's Current Population Survey, 2007.

Education

Increasing years of education is one way to improve the health of North Carolinians. On average, people with less education earn less money and are more likely to live in poverty. People with more education have better health outcomes. College graduates live an average of five years longer than those who do not complete high school.¹⁰² Those with more education are also less likely to report functional limitations and are less likely to miss work due to illness or disease. In addition, individuals with four additional years of education are less likely to smoke or binge drink and more likely to get preventive care, such as flu shots and screenings, than those with less education. These positive health impacts persist even after controlling for income, family size, marital status, urban or rural location, race, Hispanic origin, coverage by health insurance, occupation, and industry.¹⁰¹

It is important for young children to be ready to learn once they begin school. Cognitive, language, and socioemotional skills of children who live in poverty lag behind those of more affluent children.¹⁰³ High quality early education programs can increase school readiness among low-income and minority children.¹⁰⁴ Smart Start, North Carolina's early childhood initiative, helps ensure that young children are healthy and ready to learn. While the state generally is considered a national leader in early childhood education, we trail many other states when it comes to the percentage of incoming ninth graders who graduate within four years, ranking 39th nationally.¹⁰⁵ Three of 10 North Carolina students did not graduate from high school in the 2007-2008 school year. The percentage of minority and disadvantaged students who do not graduate is even greater.¹⁰⁶

Recognizing the strong link between education and health outcomes, **the Task Force recommended the North Carolina State Board of Education and the North Carolina Department of Public Instruction expand efforts to support and further the academic achievement of middle and high school students with the goal of increasing the high school graduation rate.**

Cross-cutting Strategies in Schools, Worksites, and Clinical Settings

Multifaceted prevention efforts that promote healthy behaviors at the individual, interpersonal, clinical, community, and policy levels have a better chance of positively impacting the health of a population than solitary interventions. Most of the Task Force's work focused on evidence-based strategies to reduce specific risk factors (e.g., tobacco use, lack of exercise, substance use, or risky sexual behavior). However, the Task Force also wanted to examine site-specific strategies, such as those that address multiple risk factors in schools, worksites, and clinical settings.

Schools

Schools play a leading role in helping young people learn skills and gain knowledge critical to a lifetime of good health.

While educating students is the foremost goal of public education, the North Carolina State Board of Education also has a goal of ensuring that students are healthy and responsible. Research shows improved academic performance and greater readiness to learn among students who are healthy.^{107,108} In this issue of the *Journal*, June St. Clair Atkinson and Paula Hudson Collins discuss the role schools play in producing healthy youth.

The aim of the North Carolina Healthy Schools Initiative—a collaborative effort of the North Carolina Department of Public Instruction, the North Carolina Division of Public Health, and other state agencies funded by the CDC—is to unify learning and health within the public school setting.³² The initiative works to establish and support the Coordinated School Health Program (CSHP), which is recommended by the CDC to promote student and staff well-being. The eight major components of the CSHP are health education, physical education, health services, nutrition services, mental and behavioral health services, healthy school environment, health promotion for staff, and family and community involvement.

Research has shown that school districts that have local school health coordinators are more likely to implement evidence-based health education curriculum.¹⁰⁹ The National School Boards Association found in their review of 25 schools with exemplary school health programs that all schools had designated a central person to be the healthy schools coordinator.¹¹⁰ **The Task Force recommended that the NCGA appropriate \$1.5 million in recurring funds (increased by a similar amount for the next five years) to hire a local healthy schools coordinator in each Local Education Agency.** The Task Force also made a recommendation for use of evidence-based curricula in the Healthful Living Standard Course of Study when available.

Worksites

Employers can benefit from implementing comprehensive wellness programs for their employees. Comprehensive programs include five elements: health education and promotion programs, supportive social and physical environments, screening and education, integration into the organizational structure, and linkages with other related worksite programs.¹¹¹ They have been shown to be effective in reducing risky health behaviors and improving health outcomes.¹¹² Healthy employees miss fewer days of work, are more productive, and have lower health care costs.^{113,114} In her commentary in this issue of the *Journal*, Laura Linnan discusses why businesses should invest in the health of their employees.

There are evidence-based strategies that employers can implement to improve health outcomes of their employees. Smoke-free policies, point-of-decision prompts to use the stairs, and access to places to be physically active are some examples of such strategies.¹¹¹ Health risk appraisals (HRAs), when combined with employee feedback, have also been

shown to be effective in changing employee health behaviors and outcomes.¹¹¹ To support worksite wellness programs throughout North Carolina, the Task Force recommended that the North Carolina General Assembly provide start-up funding to create the North Carolina Worksite Wellness Collaborative to provide support to businesses in implementing comprehensive worksite wellness programs.

Clinical Setting

Currently, there are 30 clinical preventive services recommended by the US Preventive Services Task Force (USPSTF). Some of the recommended services are intended to prevent a condition or disease from occurring in the first place (e.g., tobacco screening and cessation counseling to prevent lung cancer). Other clinical preventive services are recommended for early detection and to prevent existing health conditions from getting worse (e.g., colonoscopies to detect cancer in its early stage). Increasing the number of North Carolinians who receive the recommended clinical preventive services is critical to preventing premature death and disability and improving population health.

In general, people who have a regular source of care are more likely to receive preventive services than those who do not have a regular source of care.¹¹⁵ Individuals who do not have health insurance coverage are less likely to have a primary care home and not as likely to receive the recommended preventive services (see Table 4). An estimated 1.75 million non-elderly North Carolinians are currently uninsured.⁹³

The Task Force felt strongly that every North Carolinian should have access to health insurance coverage. **Thus, the Task Force recommended expanding coverage to those groups at the greatest risk of being uninsured, including children, low-income adults, and employees who work for small businesses. The Task Force also recommended better surveillance of existing insurance policies to determine**

whether private insurance policies cover all the clinical preventive services recommended by the USPSTF. In this issue of the *Journal*, Meg Molloy discusses the status of insurance coverage for preventive benefits in North Carolina in her sidebar, and Jack W. Walker, Anne B. Rogers, and Sally Morton discuss the North Carolina State Health Plan's use of prevention strategies to improve member health and lower costs in their commentary.

Data

Access to robust, accurate data is essential to developing effective strategies to improve population health. A strong data infrastructure system is important for public health practitioners, educators, advocacy groups, health associations, and legislators who use related information in implementing prevention efforts or crafting health policy for the state. The Task Force identified gaps in data collected for youth health behaviors, school health, environmental health hazards, and cancer prevalence. The Task Force recommended that North Carolina agencies should enhance specific existing data collection systems to ensure that the state has adequate data for health and risk assessment.

Conclusion

Prevention should be the cornerstone of our efforts to reduce death and disability in North Carolina. Far too many people die prematurely or suffer from disabilities that are avoidable. The Task Force's intensive study of preventable risk factors resulted in a plan that, if implemented, could benefit all North Carolinians. The *Prevention Action Plan* will serve as a roadmap to guide local- and state-level actions to improve population health for many years to come. However, leadership and broad-based participation by all segments of the state are needed to reap the benefits of prevention on a population-wide scale. Individuals, employers, schools, advocates, health care providers, communities, and policymakers all have a role to play. A strong statewide effort can reduce preventable death and disability in North Carolina. Such an effort would translate into fewer missed days of school and work, reductions in hospitalizations and emergency department use, and an increase in productivity—all of which are the result of a healthier population. **NCMJ**

Table 4.
The Uninsured are Generally Less Likely to Receive Preventive Screenings or Have a Regular Source of Care (North Carolina, 2008)¹⁹

	Insured	Uninsured
Have one or more people who they consider to be their personal doctor or health care provider	85.3%	44.4%
Had a mammogram in the last two years (women 50 and older)	84.5%	57.2%
Had a Pap smear in the past three years (women 18 and older)	88.4%	79.8%
Received the HPV vaccine	14.0%	8.1%
Tested for diabetes	64.8%	41.8%
Tested for HIV	41.9%	44.1%

t. A small business is defined as having 25 or fewer employees.

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Care; **Peter Lehmueller**, Dean, Culinary Education, Johnson & Wales University at Charlotte; **Michael Lewis, MD, PhD**, Executive Assistant to the Chancellor, East Carolina University; **Meg Molloy, DrPH, MPH, RD**, Executive Director, NC Prevention Partners; **Mary Margaret (Peg) O'Connell, JD**, former Manager of External Affairs, National Forum for Heart Disease and Stroke Prevention; **Robert Parker**, Vice President, Home and Community Health, North Carolina Baptist Hospital; **Mary L. Piepenbring**, Director, Health Care Division, The Duke Endowment; **Austin T. Pittman**, CEO, UnitedHealthcare of North Carolina; **Fran Preston**, President, North Carolina Retail Merchants Association; **Barbara Pullen-Smith, MPH**, Executive Director, Office of Minority Health and Health Disparities, North Carolina Department of Health and Human Services; **William A. Pully, JD**, President, North Carolina Hospital Association; **Senator William R. Purcell, MD**, North Carolina General Assembly; **Senator Joe Sam Queen**, North Carolina General Assembly; **Kelly Ransdell**, Assistant Director, Office of State Fire Marshal, North Carolina Department of Insurance; **J. George Reed, JD, MDiv,^v** Executive Director, North Carolina Council of Churches; **Lynn Scott Safrit**, President, Castle & Cooke North Carolina, LLC; **George L. Saunders III, MD**, President, Old North State Medical Society; **Pam Seamans, MPP**, Policy Director, North Carolina Alliance for Health; **Vandana Shah, LLM**, former Executive Director, North Carolina Health and Wellness Trust Fund; **Florence M. Simán, MPH**, Director/a, Health Programs/Programas de Salud, El Pueblo, Inc.; **William Smith, MPH**, Director, Robeson County Health Department; **Michael Tarwater, FACHE**, President and CEO, Carolinas HealthCare System; **Lisa Ward**, Senior Vice President, Health Care and Life Sciences, Capstrat, Inc.; **Charles F. Willson, MD**, Clinical Professor of Pediatrics, Brody School of Medicine, East Carolina University; **Joyce M. Young, MD, MPH**, Well-Being Director, IBM Corporation. **Steering Committee:** **Danielle Breslin**, Vice President, Blue Cross and Blue Shield of North Carolina Foundation; **Paul A. Buescher, PhD**, former Director, State Center for Health Statistics, North Carolina Department of Health and Human Services; **J. Steven Cline, DDS, MPH**, Deputy State Health Director, Division of Public Health, North Carolina Department of Health and Human Services; **John H. Frank**, former Director, Health Care Division, Kate B. Reynolds Charitable Trust; **Jennifer MacDougall**, Program Officer, Blue Cross and Blue Shield of North Carolina Foundation; **Ruth Petersen, MD, MPH**, Chief, Chronic Disease and Injury Section, Division of Public Health, North Carolina Department of Health and Human Services; **Mary L. Piepenbring**, Director, Health Care Division, The Duke Endowment; **Marcus Plescia, MD, MPH**, former Chief, Chronic Disease and Injury Section,

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- u. Dr. Leah Devlin served as a co-chair from the inception of the work until she retired as state health director in February 2009. At that time, Dr. Jeffrey Engel became a co-chair, and Dr. Devlin remained as a member of the Task Force.
- v. Because the NC Council of Churches is made up of religious bodies with differing positions on sexuality education and on the use of contraceptives, the Council does not speak to these issues. Therefore the Council's executive director, who was a Task Force member, abstained from voting on Task Force recommendation 5.3 regarding comprehensive sexuality education.

Division of Public Health, North Carolina Department of Health and Human Services; **Meka Sales, MS, CHES**, Program Officer, The Duke Endowment; **Vandana Shah, LLM**, Executive Director, North Carolina Health and Wellness Trust Fund; **Kristie Thompson, MA**, Research and Policy Officer, North Carolina Health and Wellness Trust Fund. **Expert Consultants on the Steering Committee: Alice Ammerman, DrPH, RD**, Director, UNC Center for Health Promotion and Disease Prevention; **Carol Runyan, PhD**, Director, UNC Injury Prevention Research Center.

Disclaimer: Any opinion, finding, conclusion, or recommendation expressed in this issue brief are those of the authors and do not necessarily reflect the view and policies of the North Carolina Health and Wellness Trust Fund Commission, the Blue Cross and Blue Shield of North Carolina Foundation, The Duke Endowment, or the Kate B. Reynolds Charitable Trust.

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Unfortunately, its motor is inside playing video games.



Kids spend several hours a day playing video games and less than 15 minutes in P.E. Most can't do two push-ups. Many are obese, and nearly half exhibit risk factors of heart disease. The American Council on Exercise and major medical organizations consider this situation a national health risk. Continuing budget cutbacks have forced many schools to drop P.E.—in fact, 49 states no longer even require it daily.

You can help. Dust off that bike. Get out the skates. Swim with your kids. Play catch. Show them exercise is fun and promotes a long, healthy life. And call ACE. Find out more on how you can get these young engines fired up. Then maybe the video games will get dusty.

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Prevention Takes Center Stage

Kenneth E. Thorpe, PhD

Preventing and more effectively managing chronic illness are critical national health priorities. Rising rates of diagnosed and treated chronic diseases, many associated with obesity, are a key factor in rising US health care spending. Patients with chronic diseases are estimated to account for 75% of overall health spending¹ and at least 96% of Medicare spending.² Multiple chronic conditions are common; more than half of Medicare beneficiaries are treated for five or more chronic conditions yearly.³ Six chronic ailments account for 40% of the recent rise in Medicare spending.³ Despite significant health care spending, chronically ill patients receive just 55% of clinically recommended services,⁴ and that gap in care may explain a significant portion of morbidity and mortality in the United States.

The national spotlight on prevention is justified and long overdue. Research has proven that targeted prevention programs work when they are based on science, when they reach the right people at the right time in the right places with the right interventions. By focusing on prevention, our country has the potential to develop a comprehensive health system that thrives on averting disease and maintaining good health, rather than restoring health once it's lost—a far departure from our current sick care system.

The Impact of Obesity

To control costs in health care, the nation must put the obesity epidemic at the top of the agenda. The Centers for Disease Control and Prevention asserts that “American society [is] ‘obesogenic,’ characterized by environments that promote increased food intake, non-healthy foods, and physical inactivity.”⁵ The rise in the prevalence of adult obesity has been well documented over the last 20 years, increasing from 12% in 1989 to 27% in 2008.⁶ Childhood obesity has tripled in the same period.

A 2009 collaborative report from United Health Foundation, the American Public Health Association, and Partnership

for Prevention—a supplement to America's Health Rankings—provides projections of future health costs directly attributable to obesity for each state and for the nation. Using nationally representative data on adults, the study estimates the effect of the increasing prevalence of obesity on total direct health costs.

According to the report, North Carolina is packing on the weight.⁷ Today, nearly 34% of all adult North Carolinians are obese, and that percentage is projected to increase to 40% in 2013 and 47% in 2018. These percentages equate to \$2.4 million (\$371 per adult) currently spent in North Carolina on obesity-attributable health care, \$4.3 million (\$620 per adult) expected to be spent in 2013, and \$11 million (\$1,473 per adult) spent by North Carolina in 2018 to treat obesity-related illnesses. By 2018, Oklahoma is expected to have the highest obesity rate in the country (56%), with Mississippi, Maryland, Kentucky, Ohio, and South Dakota all having adult obesity rates at over 50%. Colorado will have the lowest state obesity rate in 2018 at 29.8%, the only state projected to have a prevalence of adult obesity that is less than 30%. Other major findings of the report include:

The national spotlight on prevention is justified and long overdue...By focusing on prevention, our country has the potential to develop a comprehensive health system that thrives on averting disease and maintaining good health, rather than restoring health once it's lost...

Kenneth E. Thorpe, PhD, is the Woodruff Professor and chair of the Department of Health Policy and Management in the Rollins School of Public Health at Emory University. He can be reached at kthorpe (at) emory.edu.

- Obesity is growing faster than any previous public health issue our nation has faced. If current trends continue, 103 million American adults will be considered obese by 2018.
- If obesity levels were held at their current rates, the US could save an estimated \$820 per adult in health care costs by 2018—a savings of almost \$200 billion dollars.
- If Americans continue to pack on pounds, obesity will cost the US about \$344 billion in medical-related expenses by 2018, eating up about 21% of health care spending.⁷

Obesity is an epidemic that is expanding our waistlines and our national budget. It not only takes a toll on physical health, but it also places a financial burden on the health care delivery system to treat increased illness as a result of obesity-related health challenges. It is estimated that as much as \$75 billion of our public health spending was attributable to obesity in 2003, about half of which was publically financed.⁸ Adult obesity isn't solely to blame. Given current obesity trends, one-third of all children born in 2000 will develop diabetes over their lifetime.⁹ It is essential to combine the efforts of individuals, community leaders, elected officials, employers, and health care professionals to develop individual and community interventions that slow the rise in obesity.

The Road to Prevention

While recent trends in obesity prove that it should be addressed in national prevention discussions, other preventable causes of death must also be confronted. Smoking is still the number one cause of preventable death in the United States, accounting for about 440,000 deaths annually. Although tobacco use has sharply declined over the last 40-plus years, more than one in five US adults still smoke, accounting for about 46 million people. The majority—70%—say they would like to quit. Smoking-related chronic diseases include cancers, cardiovascular disease, and respiratory diseases.¹⁰ The National Institutes of Health estimate that cancers cost the United States an overall \$219 billion in 2007.¹¹ It is estimated that approximately \$9.6 billion per year is spent in the United States on lung cancer treatment alone.¹²

It is important to note that not all prevention programs work, many because they aren't grounded in science, and not all of them save money. All medical interventions—including secondary and tertiary prevention—cost money. Screening for common and costly diseases, like high blood pressure, diabetes, and high cholesterol, may actually raise spending in the short-term, because people who need treatment will get it. But over the long-term, that treatment is likely to prevent even more costly complications and thereby escape higher health care spending.

Many studies show that well-designed, evidence-based prevention programs are cost-saving. For example, a significant reduction in total health care spending is

linked to community-based lifestyle interventions (primary prevention). Research shows that savings range from a short-term return on investment of \$1 for every \$1 invested, rising to more than \$6 over the long-term. An investment of \$10 per person per year in community-based programs tackling physical inactivity, poor nutrition, and smoking could yield more than \$16 billion in medical cost savings annually within five years. This is a significant return of \$5.60 for every dollar spent, without considering the additional gains in worker productivity, reduced absenteeism at work and school, and enhanced quality of life.¹³

The Breast and Cervical Cancer Early Detection Program, funded by the CDC, is a great example of secondary prevention. It targets uninsured and underinsured women 18 years and older who are at or below 250% of the federal poverty level. Services include clinical breast examinations, mammograms, Pap tests, diagnostic testing for women whose screening outcome is abnormal, surgical consultation, and referrals to treatment. Last year 301,209 women who wouldn't otherwise have had care had mammographies, and nearly 3,800 cases of breast cancers were found. Furthermore, 321,296 women got Pap tests, and more than 5,201 cases of cervical cancers and high-grade precancerous lesions were found.¹⁴

Worksite health promotion programs have also proven to be effective at both primary and secondary prevention. A systematic review of more than 50 studies meeting rigorous guidelines for review by the US Task Force on Community Preventive Services found strong evidence of worksite health promotion program effectiveness in the following specific areas: tobacco use, dietary fat consumption, high blood pressure, total serum cholesterol levels, and days absent from work due to illness or disability, as well as improvements in other general measures of worker productivity.¹⁵ At Citibank, for example, a comprehensive health management program showed a return on investment of \$4.70 for every \$1 in cost.^{16,17} A similar comprehensive program at Johnson & Johnson reduced health risks, including high cholesterol levels, cigarette smoking, and high blood pressure, and saved the company up to \$8.8 million annually.^{15,18}

There is evidence of effectiveness for tertiary prevention strategies as well. Here is one of the best: for nearly 25 years, senior researchers at the University of Pennsylvania have implemented a series of large, randomized controlled trials with high-risk older adults. Their studies have demonstrated that comprehensive tertiary prevention focused particularly on transitional care produces better health outcomes and significant cost savings. Their most recent research showed a 56% reduction in readmissions and 65% fewer hospital days for patients in transitional care. At the 12-month mark, average costs were \$4,845 lower for these patients. If this model were scaled nationally with an investment of \$25 billion over 10 years, savings could reach \$100 billion over the same period.¹⁹

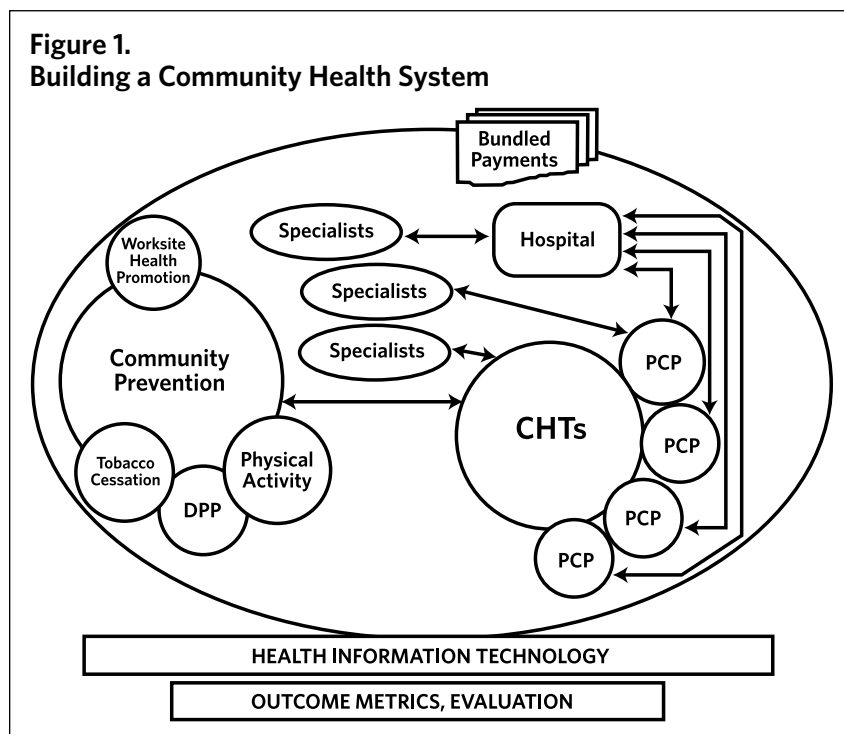
Community Health Teams and Coordinated Care

The solutions to America's health problems are not primarily determined by what happens inside hospitals and doctors' offices, but what happens in our homes, our schools, our workplaces, and our playgrounds and parks. Patients with chronic disease and their families are happier and healthier when their care is coordinated between doctors, clinics, and hospitals. Community health teams (CHTs) include care coordinators, nutritionists, behavioral and mental health specialists, nurses and nurse practitioners, and social, public health, and community health workers. CHT models vary (see Figure 1), but they all use a team approach to coordinate care, target patient and family education and support, enhance provider communication and access, and improve data-driven management.²⁰

Several states (including North Carolina as well as Colorado, New Mexico, Oregon, Pennsylvania, Rhode Island, and Vermont) have already included community-based prevention and care management into traditional fee-for-service programs. There are also examples of large health systems that use care coordination processes and multidisciplinary teams. They offer important anecdotal

evidence of positive effects of care coordination on cost savings and prevention:²⁰

- North Carolina's Medicaid program saved an estimated \$535 million in two coordinated care programs (one targeting children and the second targeting aged, blind, and/or disabled individuals).
- Intermountain Healthcare in Utah and Idaho reduced admissions for patients with complex illness by nearly 8.7% and mortality by 3.4% just two years into their care coordination program. Reported savings per patient range from \$640 to \$1,650 per year.
- At Group Health Cooperative in Washington, a 29% reduction in urgent care and emergency department use in the first year was enough to offset the initial investment in its care management program. There was a 6% decrease in office visits but a 12% increase in phone visits and a 90% increase in physician-directed secure messages.
- The Geisinger ProvenHealth Navigator Program in Pennsylvania reduced total medical costs by 7% for its first 11,000 members and posted an estimated 2:1 return on investment.



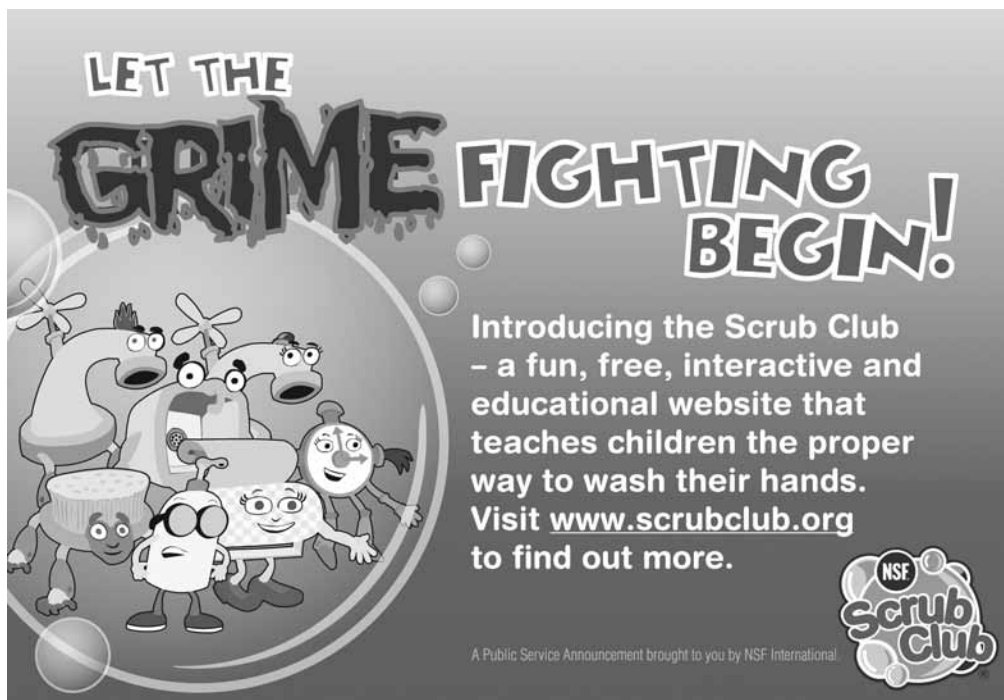
Nearly all of every Medicare dollar—96 cents of each and every one, or more than \$447 billion last year—and 85 cents out of every dollar in Medicaid—nearly \$300 billion—go to care for chronic diseases, most of which are preventable. In one year this amounts to approximately \$1.7 trillion spent treating patients with one or more chronic diseases—roughly 75% of all US health care spending. This is essentially a hidden tax on every taxpayer in America.

Chronic illnesses—mostly preventable—take an increasing toll on Americans' health, productivity, and quality of life. Achieving better health requires action both by individuals and by society. If society supports and enables healthier choices—and individuals make them—we can achieve significant improvements in our nation's health that reverse or at least slow the rise of chronic illness, and we can reduce health spending over the long term. **NCMJ**

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Prevention: A Statewide Perspective

Jeffrey P. Engel, MD

The Parallel Worlds of Pathos and Prevention

The practice of medicine as it is commonly known to the consumer, the public, or the patient, is one devoted to disease and suffering. Indeed, medical school and postgraduate medical curricula are full of *pathos* (from the Greek for suffering), headlined by basic science courses entitled *pathophysiology*, *psychopathology*, and *pathology*, followed by years of clerkships, residency training, and fellowships in hospitals and clinics. Thus a system evolved that relied on costly disease diagnostics and treatment resulting in each American spending roughly \$7,500 for health care in 2007.¹

Concomitantly in the realm of public health practice, a different paradigm emerged. Bolstered by the tremendous discoveries of vaccination and pasteurization, and the impact of modern sanitation, governments realized that they could achieve a dramatic decline in infectious disease morbidity and mortality using the influence of law. Using this approach, small pox was eradicated from the world, paralytic polio was eliminated from most nations, and safe food, clean water, and indoor plumbing led to the disappearance of typhoid fever and hookworm. The core public health functions at the state and local level enforced mandated environmental health standards and immunizations that resulted in the prevention of the major causes of disease and death amongst the entire population. This system of prevention comes with a much smaller price tag with every American spending about \$150 per year.²

With the decline of infectious disease morbidity and mortality in the 20th century, the new killers of cardiovascular disease and cancer became the major causes of disease and death. In the past 25 years, an insidious epidemic of obesity in children and adults has struck the nation and state with the downstream effect of secondary insulin resistance, diabetes, and other obesity-related complications. It is apparent, despite the great progress made (and money spent), in clinical medicine and public health, that the health of the United States population remains poor, and we in the health care profession have been asleep at the switch.³

What lessons have been learned from the last 100 years of disease-oriented clinical medicine and its *pathos* of heart attack, stroke, cancer, etc., in contrast to prevention-

oriented public health (sanitation, pasteurization, and immunization)? Can the burden of chronic diseases of today be addressed and reduced by methods used to control infectious diseases of the past?

Population Health and Public Health

From the experiences of the disease model of clinical medicine and the prevention model of public health has sprung the merged vision of population health. Driven by chronic diseases, the obesity epidemic, and the runaway

...leaders in health policy have recognized that health promotion and wellness has to replace a disease model and that this can only be done by working at both the individual and community level through prevention.

costs of health care, leaders in health policy have recognized that health promotion and wellness has to replace a disease model and that this can only be done by working at both the individual and community level through prevention.⁴

An individual's health is certainly determined by an uncontrollable genetic predisposition to disease. However, other critical determinants such as behavior, access to and quality of clinical care, the environment of the community, and the public and health policies made by government and community leaders profoundly effect health outcomes and are amenable to a preventive approach.⁵ Public health agencies at the state and local level play an important role in these controllable domains of disease determination of population health.

Local health departments provide both individual primary care (especially in women's and children's health) and serve

Jeffrey P. Engel, MD, is the North Carolina state health director. He can be reached at jeffrey.engel@dhhs.nc.gov.

as leaders in their communities in promoting population health. State and local public health agencies work together through health education, surveillance (community health assessments), case management, environmental interventions, and health policy and law, using lessons learned from the control of infectious diseases of the past.³

The Role of the Division of Public Health in Disease Prevention: Intervention and Surveillance

At the state level, the Division of Public Health (DPH) has always focused on prevention to improve population health. Building on the successes of infectious disease prevention, interventions targeting the upstream (or controllable) social and environmental determinants of disease are implemented, and surveillance is used to measure outcomes and success. The sections of Epidemiology, Women's and Children's Health, Oral Health, and Chronic Disease and Injury Prevention use a holistic lifespan view to promulgate best practices in disease prevention and control and health promotion. DPH, through its integrated programs, provides technical assistance and training to state and local partners based on the core mission of prevention.

The North Carolina Institute of Medicine's *Prevention Action Plan*, the result of the work of the NCIOM Task Force on Prevention, provides evidenced-based strategies or interventions that can be used at the community level to improve population health.⁶ The Task Force began by prioritizing the top 10 preventable risk factors that contribute to the leading causes of death and disability in the state (see Table 1). To make the *Plan* actionable, communities determine which population health area they wish to target (e.g., tobacco cessation, physical activity, or nutrition) and DPH will assist partner organizations in selecting and implementing the recommendations from the *Prevention Action Plan* that best suit their community needs.

One of the most fruitful statewide efforts for prevention has been with the Department of Public Instruction (DPI). Pre-kindergarten to 12th grade public education offers a tremendous opportunity for interventions and the *Prevention Action Plan* provides many recommendations for the school environment. DPH and DPI have long collaborated on prevention efforts including the state-funded school nurse funding initiative and school-based health centers, as well as initiatives in physical activity, nutrition, and tobacco control.

Implementing an evidence-based community intervention from one or several of the recommendations from the *Prevention Action Plan* is only part of the journey towards

improved population health. We must also know where we are and be able to tell if we are doing any good. Surveillance, defined as the systematic collection and measurement of disease outcomes and the timely dissemination of the information to those who need to know, is essential in monitoring and controlling disease.³ The effectiveness of a community-based intervention is determined by surveillance. In the past, infectious disease surveillance succeeded because the mandatory reporting laws of communicable diseases ensured timely reports of cases by physicians and laboratories. Chronic disease surveillance is much more passive and less real-time, using data sources such as death certificates, hospital discharge databases, or telephone interviews such as the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System.⁷ The North Carolina State Center for Health Statistics collects, analyzes, and disseminates health outcomes data from all of these sources for use by communities.

Table 1.
10 Leading Health Domains for Prevention
(State and National Level)

National Leading Health Indicators (Healthy People)⁸	State Prevention Action Plan Preventable Risk Factors⁶
1. Physical activity	1. Tobacco use
2. Overweight and obesity	2. Diet and physical inactivity, leading to overweight or obesity
3. Tobacco use	3. Risky sexual behaviors
4. Substance abuse	4. Alcohol or drug use or abuse
5. Responsible sexual behavior	5. Emotional and psychological factors
6. Mental health	6. Exposure to chemicals and environmental pollutants
7. Injury and violence	7. Intentional and unintentional injuries
8. Environmental quality	8. Bacterial and infectious agents
9. Immunization	9. Racial and ethnic disparities
10. Access to health care	10. Socioeconomic factors

Chronic disease surveillance must also include measuring risk factors, not just disease outcomes, to monitor success of prevention and the effective design of intervention strategies. Examples include, for a disease outcome like infant mortality, the prevalence of pregnant women who smoke, or, for obesity, the time spent on physical activity or the number of fast food meals per week.

Healthy People 2020 and Healthy Carolinians

The movement for a report card of the nation's health began with a Surgeon General's report in 1979. Since then, the Office of Disease Prevention and Health Promotion of the US Department of Health and Human Services has adopted the Healthy People campaign.⁸ Using a decade-cycle approach, leading health indicators are selected and reported by state

(see Table 1, page 53). Systematic reports began with Healthy People 2000; we are currently completing the 2010 cycle and preparing for Healthy People 2020. This is essentially the national surveillance system for population health.

Using the Healthy People national reporting system on leading health indicators as a guideline, North Carolina began its endeavor in 1994 with the creation by Executive Order of the Governor's Healthy Carolinians Task Force. The Office of Healthy Carolinians soon followed in DPH and now consists of a regional network of health educators that provide technical assistance, training, and certification to local Healthy Carolinians partnerships. Today, Healthy Carolinians is a robust state and local integrated effort to improve population health.⁹ Led by the Governor's Task Force, the Healthy People indicators are selected for the state (i.e., for 2000, 2010, and 2020), the Office of Healthy Carolinians assists local efforts to address the indicators, and the local partnerships implement the interventions and monitor the results.

There are about 70 local Healthy Carolinians partnerships statewide. Partnerships are led by local health departments and governments, hospitals and health systems, and community-based organizations. A certification process ensures quality and sustainability. The Office of Healthy Carolinians trains and assists local partnerships with community health assessments which help determine what indicators a community should focus on and then provide the surveillance system to monitor progress.

Looking ahead for the next several years, Healthy Carolinians and DPH will select the Healthy People 2020 goals. The *Prevention Action Plan* recommendations will provide the evidence-based interventions for both state and local population health improvement. Implementation of the interventions can be both statewide (e.g., policy and law, DPI-related interventions) and local (e.g., teen pregnancy prevention, fall prevention among the elderly).

Challenges

Perennially, North Carolina ranks in the bottom third of the 50 states for overall health outcomes.⁵ The socioeconomic determinants of disease—poverty, rural isolation, lack of access to health care, health disparities, and high school dropout rates—contributed to North Carolina's 37th place ranking that has not changed appreciably in the past 20 years.⁵ Further, North Carolina is in the bottom 12 states in terms of public health spending, at \$50 per person in 2009.¹⁰ The economic recession has resulted in further budget reductions to DPH and local public health.

Nevertheless, well-implemented prevention efforts embedded in communities can result in improved population health with relatively little cost. Clean air regulations that ban smoking in public places have been shown to result in decreased hospital admissions for asthma, chronic bronchitis exacerbations, and acute myocardial infarctions. Raising the cost of a pack of cigarettes reduces youth smoking rates. A comprehensive sexuality education curriculum in public schools reduces unintended pregnancies and sexually transmitted infections. These three examples, all part of the *Prevention Action Plan*, can guide communities and governments to make the wisest choices given the limited resources.

The lessons learned from the past 100 years in infectious disease control by public health can be applied to the chronic diseases threatening us today.³ Evidence-based, cost-effective interventions at the population level, clearly articulated in well-vetted guideline reports like the *Prevention Action Plan*, provide leaders with the roadmap to healthier communities and a healthier state. Moving from a culture of *pathos* and disease to one of prevention and wellness is the ultimate goal, and we should look to our past successes to get us there. **NCMJ**

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Health Care from a Policy Perspective

Representative Hugh Holliman

Our ideas about health have evolved relatively quickly over the past few decades. Our workforce, once engaged primarily in agriculture and then factory work, now sits behind a desk, resulting in a steep decline in physical activity during the majority of our day. Science has broken down the components of our food and found that some foods contain unhealthy levels of fat, cholesterol, and sodium. In other cases, added ingredients such as trans fats, dyes, or preservatives pose their own health threats. Smoking, once widely accepted, has been found to clog our bodies with tar and nicotine and is regarded as a cause or contributing factor in many types of cancer and other diseases.

Changes in our lifestyles, along with advances in science, have forced us to think about our bodies and our health differently than many of us did just 20 years ago. We can no longer take exercise for granted; we have to plan for it and make it part of our routine in a way that perhaps we didn't have to before. We also have to monitor more closely what we put into our bodies. Not all food is created equal. Tobacco use is not a harmless habit.

In the North Carolina General Assembly, we have a great deal of sway over what happens in public places and places that are state regulated, such as nursing homes, schools, and daycare centers. We also set budgets for the state's Department of Health and Human Services and the Medicaid program. These duties, granted to us by the voters of this state, give us a powerful platform in the public health debate.

This past legislative session, the General Assembly showed its determination to use this platform wisely when it approved landmark legislation that I sponsored to ban smoking in restaurants and bars. This is a law that rightly protects both workers and patrons of these businesses from the proven dangers of secondhand smoke.

While this is not strictly a financial decision, it does make financial sense, as many preventive health measures do. Less exposure to cigarette smoke reduces the chance for smoking-related illnesses and increases the chance

that some people will give up the habit. This would help drive down their personal health costs as well as our state's overall spending on health care.

An example of this is our recent decision to include a wellness provision in the State Health Plan legislation (SB 287). Some people question the wisdom of this decision, but I believe it gives people a strong incentive to stop smoking or to lose weight. The move is coupled with incentives including the State Health Plan sponsored exercise and diet sessions, free nicotine patches, and weight loss drug assistance. As

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a result of the wellness provision, people will have to make a conscious choice about their health. Those who choose to continue living unhealthy lifestyles will pay more to help offset their higher health care costs for others.

The State Health Plan's costs related to smoking and obesity are substantial. Sixty percent of the 661,000 people covered by the State Health Plan are overweight or obese. Each obese person costs the state, on average, \$1,000 more per year than a person of healthy weight. Smokers cost nearly \$2,700 more per year than nonsmokers, and it is only fair that they bear some of the costs of their behavior.

Over the past several years, we have also made other innovative changes in insurance policy that we believe will enhance preventive efforts.

In 2007, we created an insurance program for high-risk patients who had been denied coverage or asked to pay

State Representative Hugh Holliman is the North Carolina House Majority Leader. He represents the 81st House District from Davidson County. He can be reached at [hughh \(at\) ncleg.net](mailto:hughh@ncleg.net).

premiums they couldn't afford because of pre-existing conditions or other aspects of their medical histories. This plan has a cap on premiums, making the insurance affordable for thousands of additional people. The plan also increases the chance that these people will seek care earlier instead of allowing their health to deteriorate to the point that they require expensive treatments or long-term hospitalizations.

The state also passed a mental health parity law in 2007 that requires an insurer to provide the same level of coverage for certain psychiatric diagnoses as it provides for physical ailments. Again, making mental health coverage more affordable and accessible increases the probability for early intervention and ongoing care and treatment. Increased access to ongoing treatment, resulting from insurance parity, should improve individual patient outcomes and quality of life.

These changes in law and policy provide some insight into how the General Assembly has shifted its approach to health care as we have learned more. One of the great driving forces in this shift is the North Carolina Health and Wellness Trust Fund. This fund was the result of visionary legislation approved by the General Assembly in 2000 and receives one-fourth of the state's share of hundreds of millions of dollars paid out as part of the national settlement with tobacco companies. So far, the fund has invested nearly \$200 million to support preventive health initiatives and an additional \$100 million for prescription drug assistance programs that help people better manage their diseases.

This money also pays for the popular TRU (Tobacco. Reality. Unfiltered.) campaign, tobacco-free initiatives at schools and colleges, a program to encourage expectant mothers to stop smoking, a toll-free hotline that connects smokers to a mentor trained to help them quit (QuitlineNC), and fitness initiatives to help children and adults lose weight. The program has been a tremendous asset to our state, helping to cut the number of teen smokers in the state by 34,000 in the past five years, even as our population continues to increase. That is remarkable, and I suspect that the Trust Fund's work will pay off in the future as more of our citizens live longer and healthier lives.

In addition to this, we continue to invest directly in other preventive programs. These programs include efforts to help people at risk of stroke, heart disease, or diabetes;

screenings for breast and cervical cancer; and extra money to support the local health centers and health departments that see many of our state's uninsured patients. We also spent money to help expectant mothers and to try to prevent neural tube birth defects. We added 20 more school nurses statewide to bring that number now to more than 230 so that they can help carry out our public health mission in the schools. We also appropriated money to add more than 9,000 uninsured children this year to NC Health Choice, the state's children's health insurance plan.

This isn't an exhaustive inventory. There are many ways we try to reach the people who need health care, but there is still more work that needs to be done. Cost limits us in many ways and the ever-rising cost of Medicaid exhausts more and more of the discretionary money that we may otherwise invest in health programs. Medicaid expenses account for nearly 20% of the state's total budget for the current fiscal year.

In the years ahead, I believe obesity will play an increasingly central role in health policy. Dealing with obesity requires us to find more holistic approaches to change people's lifestyles. We have to persuade them to change their dietary habits and increase their level of physical activity. Those are hard messages to sell to children and teenagers who often do not understand long-term consequences. It can be an even harder sell to adults, who are often confronted with a myriad of other problems associated with daily living. The key element in this battle, though, will be in developing good habits in our children that they bring forward into adulthood.

I also expect to continue working for a comprehensive ban on workplace smoking in this state. While many employers have voluntarily banned smoking, many more continue to allow this dangerous practice. It is fundamentally unfair for nonsmokers to have to choose between their health and their livelihood, and I believe this state should put a stop to it as many other states already have.

Smoking regulations cost little and generate much in health care savings. Those of us in the General Assembly need to continue to emphasize this point, and we need to enlist others who support preventive health measures to do the same. Health maintenance and prevention efforts can lead to longer and more productive lives as well as substantial savings in public and personal financial resources. **NCMJ**

Clinicians' Perspectives on Prevention

Tom Bacon, DrPH; Elizabeth Tilson, MD, MPH; J. Carson Rounds, MD; Ronald Venezia, DDS, MS

The Vital Role Clinicians Play in Fostering Preventive and Health Promoting Behaviors by Patients

Tom Bacon, DrPH

This section of this issue of the *Journal* focuses on the important role played by clinicians in fostering preventive behavior and includes three excellent commentaries by a pediatrician, a dentist, and a family physician. As each of our contributors note in their articles, the research is clear that the influence of a clinician is one of the most important factors for increasing the likelihood an individual will stop smoking, enter into an exercise or weight loss program, or in some other way change behavior to enhance his or her health status.

All three clinicians give a number of reasons the clinician is important in prevention. Dr. Tilson summarizes it well with her triad of trust, timing, and training. As both she and Dr. Venezia note, clinicians are trained to incorporate prevention into their practice, which is particularly true in primary care medicine and dentistry, where regular visits offer an opportunity for influencing the behavior of both children and adults. The trust that patients have in their doctor, dentist, or other primary care clinician is a unique one and places that clinician in a special role to effect behavior change in those they provide care for.

Having noted the obvious reasons for incorporating prevention into clinical practice, all three authors identify a number of barriers to making it a regular part of primary care medical and dental care visits. Although all acknowledge that prevention is a part of their training, it receives much

less attention than the diagnosis and treatment of disease. Dr. Rounds notes the oft quoted axiom "the health care system gives the results it was designed to give," and our system is simply not designed to emphasize prevention. He and his colleagues also note that reimbursement for preventive activities has improved, but is not given the level of recognition that treatment of disease receives from a reimbursement standpoint.

While reimbursement is an important issue, the shortage of time to devote to prevention is probably the greatest

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barrier clinicians face. Given the limited time of an average clinic visit, there is simply not enough time to appropriately incorporate discussions with a patient about health promotion or prevention into the routine office visit and, although all three writers bemoan this fact, none have been able to effectively solve this issue in their practices.

Tom Bacon, DrPH, is the director of the North Carolina AHEC Program at the University of North Carolina at Chapel Hill School of Medicine. He can be reached at tom_bacon (at) med.unc.edu.

Elizabeth Tilson, MD, MPH, is the medical director for Community Care of Wake and Johnston Counties and a primary care pediatrician at Wake County Human Services Child Health Clinic. She can be reached at btilson (at) wakedocs.org.

J. Carson Rounds, MD, is the president of the North Carolina Academy of Family Physicians Foundation and a practicing family medicine physician in Wake Forest, North Carolina. He can be reached at jcrounds (at) mindspring.com.

Ronald Venezia, DDS, MS, is a board certified pediatric dentist practicing in Apex, North Carolina. He is a past president of the North Carolina Academy of Pediatric Dentistry and the former dental director of the North Carolina Medicaid program. He can be reached at ronvenezie (at) bellsouth.net.

Finally, the authors acknowledge that there are clear limitations in terms of the impact of clinicians on individual behaviors relative to other factors in the environment. In a 15-30 minute visit, which may occur only once or twice a year, it is difficult for a clinician to overcome the powerful influences affecting behavior such as advertising, the ease of availability of unhealthy foods, and the influence of family and peers on behavior. In addition, access to clinicians is uneven in our society, and thus disparities by income level, race and ethnicity, and other factors exist which limit the ability of the clinicians to influence behaviors at the same level for all patients.

As we seek to design a system that more effectively promotes healthy behavior and preventive activities, it is clear that there must be significant changes in our systems of care. One or more of the authors observe that the burden of preventive activities cannot simply fall on the doctor or dentist, but must involve a team effort of all members of a given practice. Prevention needs to be incorporated in a more holistic way into each clinical office visit, including a more active role by other members of the office team to deliver effective evidence-based messages, answer questions about prevention and health promotion, and

reinforce individual efforts to achieve healthier lifestyles. Just as performance improvement is a team activity, incorporating prevention into a practice must be better organized and implemented by the entire health care team to gain maximum effectiveness.

Finally, the authors acknowledge the unique role that doctors and dentists play beyond simply delivering care, and the obligation they have to be engaged beyond clinical practice. The medical, dental, and public health community has been actively engaged for many years in promoting policy changes at the state and federal level, such as advocating for increases in the cigarette tax. Because of the respected role clinicians have in society, they often have a special opportunity to work with legislators and other key policymakers to impact public policy. The role of the primary care clinician is a unique one, and the opportunities these clinicians have to both influence individual behavior and to affect public policy will likely grow in the future as there is an increasing recognition of the need to make prevention a vital part of the efforts to improve health outcomes and to control costs. These three clinicians effectively describe those various roles and make a strong case for the important influence they and their colleagues can have in the future. **NCMJ**

The Role of Pediatricians in Prevention

Elizabeth Tilson, MD, MPH

Pediatricians are primed and well-positioned to address prevention in their practices and with their patients. In fact, prevention is already a core part of pediatric practice. Pediatricians regularly address many issues relevant to prevention, including diet and exercise, physical development, learning, mental health, immunizations, dental health, tobacco, alcohol use, substance abuse, sexually transmitted infections, and environmental exposures.

Pediatricians are well-prepared to address preventive issues for several reasons. First, we are trusted. Pediatricians, like physicians in general, are privileged to have the respect of their patients and are considered a trustworthy source for health advice. Parents value and want a relationship with their pediatrician and look to the pediatrician to partner with them in the care of their children.¹ Second, we are trained. Pediatricians receive specialized training in prevention and early detection during residency and ongoing continuing medical education. We also have the pre-existing visit structure. Our well-child planned visit schedule is the perfect opportunity to promote prevention activities. Also, importantly, we have the right audience. Parent and adult caregiver role modeling and actions are some of the strongest influences on children's health behavior, and these adults accompany children to office visits. During these visits, we have the opportunity to address the adult-child

dyad. And finally, we have the right timing. Many health behaviors are established at a young age and many health and behavioral problems are more easily modified with early detection and intervention. By being involved with the care of a child, often from birth, we have ample opportunity to provide guidance and promote the establishment of healthy behaviors or intervene early to prevent problems before they are well-entrenched.

Despite the fact that pediatricians are well-positioned to address prevention, they encounter some barriers when trying to do so. Despite training, there still may be a perceived lack of knowledge or skill to provide preventive services. Third party payors, such as insurance companies, may not reimburse visits solely dedicated to prevention (e.g., a follow-up visit to address obesity detected at a well-child visit). Completion of an immunization series may be deterred by incomplete or inaccessible prior medical records or parental concerns generated by the lay media. Pediatricians may worry that adult caregivers perceive it to be inappropriate for a pediatrician to comment on adults' behavior, and there are multiple competing demands during the short visit time.

In addition, there may be many linguistic and cultural differences that come into play when dealing with preventive issues. For example, recent immigrants may not trust the safety of tap water and therefore not offer it to their children. Dental caries may develop secondary to the lack of fluoride. There might be cultural differences in the perception of a healthy body image, thus affecting parents' motivation to address weight concerns in their child. There may be

cultural differences in food preparation, thus affecting the acceptance of standard American dietary advice. There may be social stigmas surrounding cognitive development and mental health services, thus diminishing parents' willingness to accept these services for their child.

Finally, one of the biggest challenges to prevention is the reality that most of a patient's time is spent outside the influence of the practice. It may be difficult to make office visits so powerful that they can override the negative forces to which the child is exposed the rest of the year. For example, children may be exposed to asthma triggers, toxins, and environments that deter healthy eating and exercise in their homes, schools, and neighborhoods. These factors may be pervasive and persistent and can greatly affect a child's health.

While numerous, many of these barriers may be overcome or at least reduced. Pediatricians, and physicians in general, can pursue more training in promoting prevention, such as training in motivational interviewing techniques that can be applied to many health behaviors. Pediatricians can advocate for policies to allow for reimbursement of counseling and prevention visits, either on their own or through their professional societies. Practices can utilize the North Carolina Immunization Registry to obtain and share immunization history across practice sites. Pediatricians can provide and link parents to trustworthy sources of information about vaccines (e.g., American Academy of Pediatrics website) to balance the messages they may receive in the lay media.

Pediatricians can be reassured that many adults perceive advice on health behavior as appropriate and typically welcome it, especially as it affects their child's health. An especially appropriate setting for this advice is in the context of an adult caregiver who smokes. Exposure to parental smoking can not only have ill effects on children's health, but can also greatly increase the risk of the child becoming a smoker. Studies have shown that the majority of parents who smoke believe that pediatricians should offer them cessation advice and would welcome that advice.^{2,3} Offering this advice could prevent the immediate and long-term consequences of exposure to environmental tobacco smoke.

In trying to handle multiple competing demands during an office visit, pediatricians can prioritize preventive activities, utilize quick clinical tools, engage in system redesign, and embrace a multidisciplinary approach to prevention. Pediatricians can strive to follow evidence-based screening, practices, and protocols and prioritize those activities with a strong evidence base. The United States Preventive Services Task Force is one source of evidence-based recommendations for preventive services.⁴ Pediatricians can use their quick

screening, assessment, and counseling tools. For example, the Ages and Stages Questionnaire, the PEDS Response Form, the Pediatric Symptom Checklist, and the Edinburgh Postnatal Depression Scale are all quick, validated tools that assess behavior, development, and mental health concerns. In addition, Eat Smart Move More NC has easy to use clinical tools for assessing and counseling about diet and exercise behaviors. Finally, pediatricians, as well as physicians in general, must recognize that they cannot do everything on their own. Embracing a multidisciplinary approach, both within and outside of the practice, can foster success. Physicians can ensure that non-physician staff is working at the top of their licenses and incorporated into prevention activities. Other professional disciplines can be incorporated into the practice setting as well, such as a developmental specialist, a mental health professional, or a dietician. One caveat with a co-located model, however, is that while potentially a benefit from a patient care standpoint, it can be

By being involved with the care of a child, often from birth, [pediatricians] have ample opportunity to provide guidance and promote the establishment of healthy behaviors or intervene early to prevent problems before they are well-entrenched.

a challenge to make this a financially sustainable business model. In the absence of co-location, physicians can know about their community resources and refer patients to them. Further, physicians can take advantage of case management services that may be available through a patient's insurer (e.g., Carolina Access Medicaid) or the public health system (e.g., Child Service Coordinator).

Physicians can seek to recognize and understand the cultural differences that may exist within their practice population, especially as they may relate to health behaviors and other issues relevant to prevention. One way to do so would be to assess how well a practice meets Federal Standards for Cultural and Linguistic Appropriate Services.⁵ The practice could then use these standards as a guide to achieving greater cultural and linguistic competency.

Finally, physicians can promote policy and environmental changes that affect how and where their patients live, learn, and play. Physicians can educate families about and promote healthy home environments and can lend support and advocacy for policy changes in schools and communities

that promote health. In addition, physicians can model healthy behaviors and healthy environments by rewarding children with books or stickers rather than lollipops or other sweets, engaging in healthy behaviors themselves, and promoting workplace wellness efforts for their staff. **NCMJ**

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I Want to Be a Superior Doctor

J. Carson Rounds, MD

*The superior doctor prevents sickness;
The mediocre doctor attends to impending sickness;
The inferior doctor treats actual sickness.*

Chinese proverb¹

*Doctors and undertakers
Fear epidemics of good health.*

Gerald Barzan¹

*It is a lot harder to keep people well than it is to just get them
over a sickness.*

DeForest Clinton Jarvis¹

Benjamin Franklin was actually trying to sell shares in his fire insurance company when he coined the phrase "An ounce of prevention is worth a pound of cure," but it has become one of the most well-known aphorisms about medicine. We all seem to agree with Ben, but it is hard to look at health in the United States today and say we all follow his advice. The leading causes of death in this country are mostly attributed to our behaviors. We merrily eat fast food, smoke, sit on our ever-enlarging buttocks while we watch TV and surf the web, all while complaining about the cost of drugs and medical care. We have mortgaged our families' futures to foreign investors to pay for stents, bypass surgery, chemotherapy, gastric bypass surgery, dialysis, statins, and alcohol-related motor vehicle accidents. While we have the second most productive workforce in the world,² we don't have the healthiest.³ How can we start living in a manner that actually honors what we say we believe?

I fear that I have not yet achieved the status of the superior doctor named in the aforementioned Chinese proverb. How can I practice my art in such a way that my patients and my community truly strive to achieve optimum health? Dr.

Warren Newton is fond of reminding me that a system gives the results it was designed to give. If you don't like the results, you have to change the system. I believe the answer lies in transforming my practice while advocating for major changes in how our communities and nation approach health.

Changing my practice needs to start with my own health behaviors. A recent survey of California physicians found 7% were depressed, 53% reported moderate to severe stress, just over 6% screened positive for alcohol abuse, 35% did not participate in regular exercise, 34% slept less than six hours per night, and 21% reported working over 60 hours per week. There was a correlation between working over 65 hours a week and lack of exercise, less than six hours of sleep, and not eating breakfast.⁴ It is hard to lead others to change a behavior if you aren't "practicing what you preach." From my perspective as a practicing family physician, the traditional model of practice and the current health care system are not conducive to encouraging healthy physician behaviors.

There is also room for improvement in medical education. My medical education was state of the art, and I am quite grateful to all my teachers at the East Carolina University School of Medicine (I am too old to have attended the Brody School of Medicine!) and the Charlotte AHEC Family Medicine Residency. It would be hard to say, however, that we focused as much on prevention as we did on treating disease. I suppose it will always be necessary to emphasize disease and treatment, but we should endeavor to teach more about nutrition, exercise, and strategies to modify behaviors so my future partners can follow (and help me follow) Hippocrates' advice that our food should be our medicine. I know much has changed since my days in training and I would encourage educators to continue to assess how best to create a culture of prevention.

Everything I do in my office is really nothing more than trying to convince another person to modify their behavior, whether it is giving them a prescription for an antibiotic which should be taken twice a day with food, recommending an immunization, or recommending 30 minutes of exercise

five days a week. Helping people realize that they have a behavior they wish to modify and then giving them the tools to do it goes a long way. It can be time consuming, however, and not likely to pay as well as convincing them to change only one behavior—to take a pill. It is also an easier behavior for me, and one that is reinforced in a Pavlovian fashion many times a day.

The current workflow of a typical medical office is not always conducive to prevention. Paper charts have flow sheets which work only as well as the busy physician makes

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them work. Insurance companies that send me multi-page lists of patients for whom they have no claims data for a particular preventive service are, frankly, mostly frustrating. They are often wrong, apply only to a limited number of my patients, come at seemingly random times, and create more uncompensated work for my office. In short, they don't really alter the system of care. Offices that have electronic health records (EHRs) are generally not much better than those still using paper charts. If the EHR does have the capability to prospectively identify and notify patients about the need for a preventive service, arranging to have that functionality implemented during an office visit is either too complicated or costly for many practices.

There are some solutions to these issues. Evidence shows that "wellness visits, recall and reminder systems, and standing orders are associated with higher rates of delivery of preventive services in primary care practices."⁵ There is still much to learn about the best way to implement these and other changes. Findings from the American Academy

of Family Physicians' TransformMED Medical Home National Demonstration Project conclude that "a strategy of many small steps and being willing to learn from our failures will go a long way."⁶ TransformMed has also shown that there "is value in registries [that] allowed adopting population-based, proactive approaches to management of prevention and chronic disease care."⁷ Our office will begin the process of transforming into a patient-centered medical home this year and will be exploring the use of a registry for just this purpose. EHR vendors must design systems that

allow for easy identification of patients who need preventive services whether through registries or database searches. These must be an integral part of the EHR and not an add-on in terms of either cost or implementation. Payment for this type of care must be part of the answer as well. As family physicians around the country move to this new model of care, the payment system has to begin to address innovative ways of payment that recognize both the costs and the benefits of this type of care.

It won't be easy. Most office visits aren't preventive, but a transformed model can change that: all visits can be preventive. Preventive visits are typically still "yearly physicals," with patients saving up all the problems they have and hoping to have them all solved in one visit, often conflicting with our goal of providing preventive services. A study from Duke's Community and Family Medicine department estimated that a family physician with 2,500 patients needed 7.4 hours every working day to provide all recommended preventive services.⁸ Another study from the same department estimated it would take

10.6 hours per working day to provide all the care needed for chronic disease management.⁹ Based on the amount of time it takes me to document in my EHR, I will need to spend 24 hours each day to complete my daily tasks. Clearly, I need a system that involves other team members in my office in ensuring all these services are provided in a timely fashion. My EHR needs to support this system, and it has to be simple to implement. I need to allow my team to help with the preventive services and lifestyle changes my patients need.

Changing how I practice will only go so far in improving the health of my community, however. In December, I was fortunate to be able to attend the 17th Annual Healthy Carolinians Conference and NCIOM Prevention Summit. Dr. Thomas Frieden, director of the Centers for Disease Control and Prevention, was the keynote speaker. Two things in his presentation really caught my eye and graphically demonstrated how much of my patients' health really doesn't depend on me. The first was a pyramid of factors that affect health; what I do in my office and my interactions with my

patients is a small point at the top of the pyramid, among the least effective interventions affecting health. The base of the pyramid included changing the context to make individuals' default decisions healthy decisions, as well as socioeconomic factors. The environment my patients live in every day is the biggest determinant of their behaviors. The *Prevention Action Plan*, presented that day by NCIOM president and CEO Pam Silberman, JD, DrPH, reflects this pyramid as well: only 9 of the 45 recommendations made by the task force reflect activities that take place in my office or in my regular interactions with my patients. The second slide that caught my eye emphasized the relationship between a health information system oriented toward prevention, payment that rewards disease prevention, and practice workflows that support prevention and patient empowerment to prevent disease and optimize health. This also places what I do every day in the broader context of my personal health, my family's personal health, and the health of all my neighbors.

Prevention is encoded in the DNA of family physicians, but it is not fully expressed. Prevention really is the hardest thing I do. It consumes my most precious resource—time—while providing the least financial reward. I do the best I can

right now because it's the right thing to do and because no amount of money can match the joy in someone's face as they tell me of completing their first 5K run or of the weight they've lost. No amount of money can match the feeling of finding an early, likely curable, cancer. I can't recall the last child I saw with meningitis or chickenpox, a testimony to the power of immunizations. I—we—can do better, though. A trip to the mall—actually, just a trip to my reception area—to people watch is all the evidence I need that more work is needed. The time to transform my practice is now. The time to transform our communities is now. Health care reform that does not address the fundamental governmental policies and personal behaviors that lead to poor health outcomes seems to me to be quixotic and perhaps doomed to fail. I need your help at both the practice level and community level to see that we change the system, making me the superior doctor I want to be and you deserve. **NCMJ**

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The Role of Dentists in Prevention

Ronald Venezie, DDS, MS

The dental profession in North Carolina has a proud tradition of focusing on prevention of oral disease and promotion of optimal oral health. In 1918, with the visionary support of the North Carolina Dental Society, our state established the nation's first statewide dental public health program.¹ While the oral disease burdens of the early 20th century demanded an emphasis on restorative and surgical treatment for underserved children, preventive

and educational activities were important parts of this ground-breaking endeavor. Today, almost a century later, our state's dental public health program (the Oral Health Section of the North Carolina Division of Public Health) remains a vital part of the dental profession's commitment to promoting oral health and improving access to dental care. This commitment is realized through activities such as support for community water fluoridation, provision of dental sealants and fluoride mouthrinse targeted to children at high risk of tooth decay, oral health screening, and referral of underserved children both to the private sector and to publicly supported clinics for ongoing preventive and

restorative care. In my view, these community-based efforts are most effective when they are complemented by a strong commitment to prevention on the part of practicing dentists across the state.

As a pediatric dentist, I come face-to-face with the importance of prevention every day. Most of the oral diseases that dentists treat on a routine basis are almost completely preventable. National and statewide epidemiologic data confirm how far we have come as a society in reducing the burden of oral disease and promoting oral health.^{2,3} However, not all groups have benefited equally from these efforts. Much of the disease burden remains concentrated in a small percentage of the population. There also is evidence of what appears to be a troubling reversal of the historical decline in tooth decay prevalence among preschool-aged children.⁴ Often those with the most oral disease are members of low-income families, residents of rural and inner city communities, and members of racial and ethnic minority groups. These individuals often have very limited access to dental care, which makes prevention all the more essential.

The issue of early childhood caries (tooth decay) provides a particularly sobering example of the importance of prevention as well as an opportunity to discuss the role of dentists in oral health promotion. Who could argue with the goal of every North Carolina child starting kindergarten free of tooth decay? Unfortunately, 2008-2009 oral health assessment data produced by the North Carolina Oral Health Section indicate that 37% of North Carolina children already have experienced tooth decay in their primary teeth by the time they reach kindergarten.⁵ Moreover, one of every six kindergartners was found to have untreated tooth decay.

A number of barriers make addressing the problem of early childhood caries particularly challenging. First, parents and other caregivers must be well informed regarding the risk factors for early childhood caries such as harmful dietary habits, inadequate oral hygiene practices, and lack of access to optimal levels of fluoride on a daily basis. Yet, well-educated families regularly visit my practice with children who have been devastated by severe tooth decay by the age of three or four—often requiring extensive restorative treatment with sedation or general anesthesia. A common question I hear from these parents is, “How could this have happened?” These parents often seem reluctant to grasp the multifaceted nature of tooth decay or their primary role in promoting good oral health for their children.

Education alone is not enough. Behavioral change is never easy. In the context of a busy dental practice, it is often

challenging to spend the amount of quality time necessary to inform parents adequately and then to help them accept their responsibility to institute more healthful practices for their children. This seems especially challenging when working with families at highest risk for early childhood caries who may face additional social and financial barriers to making such essential behavioral changes. The challenge of implementing effective behavioral counseling is compounded by a dental reimbursement system that compensates for procedures rather than for the time and expertise devoted by the dentist and dental auxiliaries.

For dentists and our teams to be most effective in prevention, we must see children early and on a regular basis. This allows us to assess each child’s risk for oral disease and offer anticipatory guidance to help parents achieve optimal oral health for their children. This is the rationale behind the

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longstanding efforts of the American Academy of Pediatric Dentistry to promote the establishment of a dental home by a child’s first birthday. Admittedly, it has taken some time for this concept to take hold in the dental profession, in part due to students’ historically limited exposure to treating infants and very young children in dental school curricula. However this has changed dramatically in recent years. As an example, the University of North Carolina at Chapel Hill School of Dentistry has implemented the Baby Oral Health Program (BOHP) to provide hands-on clinical experience for dental students in delivering oral health care to infants and toddlers.⁶ This is an important step in enhancing the capabilities of the dental workforce—the vast majority of whom are primary care providers—to address early childhood caries as well as to think even more broadly about oral health promotion.

Over the past decade, North Carolina has been at the forefront of engaging the primary medical care workforce in

efforts to educate families with young children and to prevent early childhood caries, especially among high-risk groups such as Medicaid and NC Health Choice recipients.⁷ Having played a small part in those early efforts, I am convinced of their value. However, I am equally convinced that they will have limited impact without the full engagement of and partnership with the dental workforce in our state.


Unfortunately, many prevention efforts are hampered by the woefully inadequate funding for oral health services in Medicaid and NC Health Choice. Dentists participating in these programs must be willing to accept reimbursement rates that are far below the actual costs incurred for providing the necessary preventive and restorative treatment. High-risk children often require an amount of time and expertise on the part of the dental team that far exceeds that of a child at lower risk for oral disease. If North Carolinians truly value the goal of every child beginning school healthy and ready

to learn, we cannot ignore the need for good oral health. We must adequately fund dental care for our most vulnerable and underserved children.

Dental-medical collaboration can offer additional avenues to achieve effective health promotion for North Carolina. Scientific research continues to illuminate the connections between poor oral health and cardiovascular disease as well as premature, low birthweight infants. Thus, promoting oral health is likely to pay added dividends in terms of a healthier population. Nor should we ignore the potential for the dental workforce—who has regular contact with broad segments of the population—to make positive impacts on health problems such as childhood obesity, head and neck cancer, and tobacco use. Dentists and dental team members have a long history of focusing on prevention, and the future looks bright to me. **NCMJ**

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Eat Smart, Move More Health Tip

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The State Health Plan's Commitment to Prevention:

Four Key Strategies to Improve Member Health and Strengthen the Plan

Jack W. Walker, PhD; Anne B. Rogers, RN, MPH; Sally Morton, PharmD

The North Carolina State Health Plan for Teachers and State Employees provides health care coverage to more than 661,000 teachers, state agency employees, current and former lawmakers, state university and community college personnel, retirees, and their dependents. This large population is growing older, developing a higher incidence of chronic disease, and demonstrating a growing need for health care services. In the face of these challenges, the Plan strives to ensure that members have easy access to medically appropriate care, as well as access to programs and services that provide prevention and healthy lifestyle behavioral support. A key objective of the Plan is to promote wellness for members, thereby slowing the onset and progression of chronic disease and the associated costs. This article underscores the Plan's commitment to prevention and presents four preventive strategies currently underway on behalf of Plan members and the state of North Carolina.

Prevention Strategy #1: Plan Benefit Structure

The Plan's commitment to increasing its emphasis on prevention was enhanced in 2006 with the offering of a preferred provider organization (PPO). The PPO option improved members' access to primary prevention services by offering coverage for these and other routine services at the primary care copayment rate when provided in a medical office setting. This prevention benefit strategy addresses the goal of primary prevention—to reduce the burden of disease through early detection and intervention.

Prevention Strategy # 2: NC HealthSmart

NC HealthSmart, a program launched in 2005, encourages members to make healthier lifestyle choices and to become partners in meeting their own health care

needs. This innovative program includes health promotion and disease prevention components through worksite wellness programs, telephone health coaching, and web-based educational materials and services.^a In addition, NC HealthSmart addresses the secondary prevention goals of improving health status and modifying outcomes through disease and case management programs that offer members assistance in managing their existing chronic illnesses.

From 2005 through 2008, in partnership with the North Carolina Division of Public Health, the Plan sponsored the development and implementation of the Worksite Wellness Toolkit. This Toolkit addresses nutrition and weight

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a. The NC HealthSmart Personal Health Portal is available to eligible members at <http://www.shpnc.org/nc-healthsmart.html>. Members eligible for NC HealthSmart programs and services are those with primary coverage through the Plan.

Jack W. Walker, PhD, is the executive director for the State Health Plan for Teachers and State Employees. He can be reached at jwalker@shpnc.org.

Anne B. Rogers, RN, MPH, is the director of Integrated Health Management for the State Health Plan for Teachers and State Employees.

Sally Morton, PharmD, is the pharmacist for the State Health Plan for Teachers and State Employees.

North Carolina is Closing the Gap on Preventive Insurance Coverage

Meg Molloy, DrPH, MPH, RD

Health insurance coverage changes behavior for two groups: those who are insured and those who deliver care. Insured consumers change behavior because they are offered access to, and encouraged to use, specific evidence-based tests, procedures, guidance for self-care, and treatment. Health care providers and systems change behavior when reimbursement is available—a process or procedure that is covered by health insurance is more likely to be routinely offered.

Historically, health insurance did not address prevention: insurance was initially established for the high cost of hospital care. In the 1990s, when health care financing began rewarding providers for establishing systems for keeping people healthy and value-based purchasing directed employers' health care dollars to priority services, preventive insurance coverage began to expand.

Tobacco and obesity prevention coverage was limited until the first decade of the 21st century despite being the lead driver of chronic conditions and spiraling health care costs. Coverage recommendations for tobacco cessation began to emerge early in the decade: the US Preventive Services Task Force ranked tobacco cessation as the "gold standard" of clinical prevention (2003),¹ and the Task Force on Community Preventive Services recommended reducing client out-of-pocket expenses for cessation therapies (2001).² A major barrier to obesity coverage was removed in July 2004 when the US Department of Health and Human Services eliminated a Medicare policy stating that obesity was not a disease.

While it is now common for large, self-insured employers to cover these key prevention issues, it is still not the national norm for fully-insured plans to cover either condition.

North Carolina Preventive Insurance Coverage Stronger Through Collaboration

In North Carolina, there is significantly stronger preventive coverage among fully-insured plans than in other states, and there is a convenient way to view a summary of covered preventive benefits by plan (discussed below). All of North Carolina's fully-insured plans address tobacco cessation and, notably, the majority have achieved the gold standard benefit. Gold standard tobacco cessation benefits pay primary care providers to offer brief counseling or to refer patients to more intensive counseling; benefits also cover FDA-approved cessation medications. Obesity benefits in North Carolina are also well ahead of national norms, with several plans covering brief counseling by a primary care provider and multiple counseling sessions by a registered dietitian.

North Carolina's strong preventive health insurance benefits are an outgrowth of a unique voluntary initiative called Preventive Benefits, led by NC Prevention Partners (NCPPI), in partnership with the public and private health insurance plans and supported by the North Carolina Division of Public Health. The initiative established shared goals to:

- Move towards evidence-based preventive benefits while keeping costs affordable.

management, physical activity, tobacco cessation, and stress management.^b To date, 425 individual wellness committees across North Carolina, representing 204 state government organizations, have been established and trained on Toolkit implementation.

Prevention Strategy #3: Modifiable Lifestyle Behaviors Related to Tobacco Use and Weight Management

With the passage of legislation by the North Carolina General Assembly (Senate Bill 287) in 2009, the Plan implemented a Comprehensive Wellness Initiative (CWI) for all non-Medicare members. The goals of this initiative are to encourage participating members to quit their use of tobacco products and to better manage their diet and weight. With respect to tobacco use, members will have access to the North Carolina Tobacco Use Quitline (1-800-QuitNow) tobacco cessation coaching program and generic over-the-

counter nicotine replacement patches, at no additional out-of-pocket cost, effective January 2010. These supports were chosen specifically based on research demonstrating that an individual's ability to stop using tobacco is significantly improved when cessation counseling and medication are employed concurrently. To make medications more affordable and, therefore, more accessible, tobacco cessation medication copayments were lowered.

At the same time, in order to provide support to members for weight management, the Plan implemented the same "preferred" status for FDA-approved weight management medications and removed prior authorization requirements for these drugs to reduce access barriers. In addition, the Plan added coverage for four nutrition visits to registered dietitians annually at a primary care copayment. Because lifestyle behaviors are influenced by the opinions of family and friends, clinical advice, community and environment, and public policies,¹ the Plan is supporting the rollout of the

b. The Toolkit and other worksite wellness committee support materials are available for review on the Plan's website at <http://www.shpnc.org/worksites-wellness.html>.

- Create visibility and transparency for what preventive benefits are available.
- Educate employers and legislators about the value of paying for preventive benefits and how to purchase value-based benefits.
- Educate brokers about what preventive benefits are available so they can assist employers in benefit design.
- Educate providers about current preventive reimbursement codes.
- Educate consumers about what their plans offer so that they can use these key services to support health improvement.

At the outset of the initiative, no North Carolina health insurance plan covered tobacco or obesity benefits. Each year, significant growth has been seen. This past year the high risk insurance pool, which was recently created by the North Carolina General Assembly, established gold standard tobacco and obesity benefits as a result of this partnership. The Preventive Benefits partnership has also aligned NCPP's worksite wellness initiatives with the preventive benefits available to public and private workplaces to enhance employee health across North Carolina.

Preventive Benefits Profile

As a result of this collaboration, North Carolina is the only state in the nation where a detailed summary of preventive

benefits offered by each plan is publicly available. NCPP convenes Health Plan Roundtables each year to focus on opportunities to continue to improve population health and also collects and publishes data on the web about available, fully-insured preventive benefits.^a The web profile provides a description of the benefits covered by each health plan and details what is covered for tobacco cessation, nutrition, physical activity, obesity, diabetes, pre-diabetes, cancer, hypertension, and cholesterol.

The data collected by NCPP is useful to many groups. Employers can increase awareness among their employees about their covered benefits if they are fully insured. Self-insured employers can use this as a menu of options that they can consider when they are developing their benefits. Consumers can use it to easily understand their coverage. Policymakers interested in controlling health care costs can identify what North Carolina's public plans cover.

North Carolina health insurers continue to make progress on strengthening preventive coverage in the state. Employers and health care providers have an opportunity to align their prevention strategies to further support healthy behaviors by North Carolinians.

Meg Molloy, DrPH, MPH, RD, is president and CEO of NC Prevention Partners. She can be reached at meg (at) ncpreventionpartners.org.

a. The Preventive Benefits Profile can be accessed online at <http://www.ncpreventionpartners.org/preventivebenefits>.

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Eat Smart, Move More, Weigh Less (ESMM-WL) program to worksite wellness programs in the five North Carolina counties with the highest concentration of state employees (Guilford, Orange, Mecklenburg, Pitt, and Wake). The remaining 95 counties will be served with existing Division of Public Health and North Carolina Agriculture Extension resources. The ESMM-WL program was piloted in the North Carolina Department of Health and Human Services in 2008, with demonstrated improvement in participant blood pressure, combined with an average reduction in weight of 6.5 pounds per participant following the 15-week program.

Prevention Strategy #4: Address Secondary Prevention Through Improved Drug Adherence

There is evidence to support that decreased member cost sharing improves chronic medication adherence with long-term positive effects. One retrospective study has shown that for diabetes and high cholesterol, increased medication adherence resulted in lower disease-related medical costs.²

In order to decrease the financial barriers to adherence for cholesterol medications, the Plan provided coverage of generic lipid-lowering medications for a \$4 copayment, or a \$10 copayment for a three-month supply, starting on April 1, 2009. This low-cost prescription option, available for members with high cholesterol, is designed to make it easier for members to fill their prescriptions and stay on their medications. The adherence rate for cholesterol-lowering medications will be studied after the 12-month pilot program.

On December 1, 2009, another Medication Adherence Pilot Program (MAPP) was offered to retirees taking diabetes and cardiovascular medications. It is estimated that members with diabetes who take their medications appropriately had a 13% chance of being hospitalized within any year, compared to non-adherent members with diabetes who had a 30% chance. Furthermore, patients with high blood pressure who were adherent to their medications had a 19% risk of hospitalization versus non-

adherent patients who had a 28% risk.³ MAPP offers retirees a financial incentive, through lower copayments, to receive a 90-day supply of generic and brand name diabetes and cardiovascular medications for 2.5 times the regular copayment. In addition, these retirees will be offered clinical counseling by pharmacists trained in diabetes and cardiovascular diseases. Lastly, there is periodic outreach to members who are non-adherent. After 12 months, the MAPP will be evaluated regarding medication adherence improvement and total health care expenditures.

Next Steps: Proposed New Strategies

In the next two years, the Plan will be working on a strategy to engage at least 70%-80%⁴ of its employees and retirees in healthy lifestyle behaviors. The Plan will recommend new benefit options with wellness incentives. For example, members could qualify for significant benefit cost sharing reductions (\$300 to \$600) by participating in a personal health assessment, completing a periodic preventive screening, having a member-designated primary care physician, adhering to an established treatment plan, not using tobacco products, and maintaining a healthy weight. The Plan's objective is to continue engaging those members

who currently have high health risks, while maintaining the health status of those members at low risk. This proposed strategy would require legislative action.

Continued Investment and Data Collection

Prevention is essential to the health of Plan members, to effective medical cost management and Plan affordability, and to the long-term viability of the State Health Plan. As the Plan moves forward, it will continue to prepare for and invest in basic preventive services, with the addition of expanded lifestyle behavior supports and wellness incentives to assist members in achieving attainable health goals. Desired outcomes from this ongoing emphasis on and investment in preventive services include:

- Health status is improved so that the Plan is strengthened long-term.
- Members and their families succeed in reaching optimal health.
- Out-of-pocket costs for all Plan members are reduced.
- The Plan, members, and taxpayers realize cost savings. **NCMJ**

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The Business Case for Employee Health: What We Know and What We Need To Do

Laura A. Linnan, ScD, CHES

Chronic diseases—such as heart disease, stroke, and cancer—are the leading causes of death in the United States and account for seven of every 10 deaths (over 1.7 million deaths each year).¹ The Centers for Disease Control and Prevention estimate that over 400,000 deaths each year are attributable to smoking, and over 300,000 deaths are associated with obesity—two modifiable risk factors associated with the leading causes of death.² Disability affects a reported 47.5 million people (21.8% of Americans) and diminishes both work productivity and the quality of life for nearly 90 million Americans.³ The two leading causes of disability (arthritis and lower back/spine problems) affect over 16 million Americans.⁴ Over 17% of working age individuals report having a disability, and 133 million Americans (one out of two adults) report having at least one chronic disease.⁵ Since more than 60% of US adults over age 18 are employed and spend nearly half of their waking hours at work, the workplace represents an important setting for reaching adults with evidence-based programs that prevent or manage chronic disease and disability among employees.

Unfortunately, the results of the most current national worksite health promotion survey show that only 6.9% of employers with at least 50 employees report offering a comprehensive worksite health promotion program.⁶ Is there not a business case to be made for having healthy employees? Why are so few employers offering a comprehensive health promotion program for their employees? What are evidence-based approaches that employers may consider? The purpose of this commentary is to help build a business case for improving employee health, emphasize evidence-based approaches for improving employee health, and advocate for strategies that create a healthier workplace as a means of improving employee health. By working in partnership with

employers and employees to adopt evidence-based, health-promoting practices and policies, we can begin to address the alarming burden of chronic disease and disability and build the business case for healthy employees and healthy workplaces.

How Might the Business Case for Improving Employee Health be Conceptualized?

Leatherman and colleagues⁷ believe that a business case for any new initiative exists if an investor “realizes a financial return on its investment in a reasonable timeframe, using a reasonable rate of discounting” (e.g., which may result in

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“bankable dollars” (profit), a reduction in losses for a given program or population, or avoided costs). In addition, they believe a business case may exist if an investor believes that “a positive indirect effect on organizational function and sustainability will accrue within a reasonable timeframe.” Ultimately, cost and potential cost savings appear to be central to making the business case. Yet, the value or benefit of a particular health initiative may lead to cost savings via indirect means such as improved job satisfaction or morale that leads to more productive employees and, ultimately, better organizational efficiency. In these economically

Laura A. Linnan, ScD, CHES, is an associate professor in the Department of Health Behavior and Health Education at the UNC Gillings School of Global Public Health. She can be reached at linnan (at) email.unc.edu.

challenging times, it is critically important to build a foundation for health promotion from a sound evidence base in order to ensure that there is good value per dollar spent on these efforts. Thus, a business case for healthy employees may result from potential benefits that are both direct (via health care cost savings) and indirect (via better job satisfaction, fewer absences, and greater productivity) with quality programming as a foundation from which to build on.

The Cost of Health Care and Ill Health Among Employees

Currently, US health care spending is approximately 16% of the nation's gross domestic product.⁸ Employers pay more than one-third of the estimated \$2 trillion that are expended on health care. Medical costs from chronic disease account for 75% of those costs.^{9,10} For example, the costs of heart disease and stroke are projected to be \$448 billion, certain chronic disease risk factors such as smoking are estimated to exceed \$193 billion, and obesity costs may exceed \$117 billion.¹ Since 2001, wages have risen 19%, inflation has risen 17%, but premiums for family health care coverage have increased 78%.^{11,12} Employee pain and suffering from chronic diseases are often not captured in these alarming cost estimates yet they contribute to diminished productivity, job loss and, in some cases, to business closings. Clearly, the cost of ill health among employees takes an enormous toll on the personal health and well-being of individuals, families, and the organizations where they are employed.

Is There Evidence That Improved Employee Health Is Linked To Cost Savings?

Employers have tried a wide range of approaches to address the rising cost of health care, including increasing health insurance premiums, raising deductibles and co-pays, reducing coverage, and/or dropping the option of health insurance coverage altogether. Meta analyses of comprehensive health promotion programs offered by employers as one approach to controlling health care costs showed that they experienced an average 26% reduction in health care costs and an average of \$5.81 returned for every \$1 invested in worksite health promotion programming.^{13,14} Others report a return on investment that ranges between \$3 and \$5 for each \$1 invested in worksite health promotion.¹⁵ The metrics used to build a business case can be influenced by the type of health problem that an employer is aiming to address (e.g., chronic vs. acute), the cost of the intervention offered (more intensive programs tend to be more costly), the likelihood of relapse (certain behaviors have higher relapse rates than others), the type of employees who suffer the most (e.g., higher wage workers will "cost" more to replace due to absence or death), and the magnitude of the health behavior or condition in the workforce (e.g., investment costs differ when prevalence is high vs. low). However, regardless of the metrics chosen, employers are wise to start with a core set of evidence-based interventions

as the foundation of a comprehensive worksite health promotion effort.

Core Elements of Comprehensive Programs and Obstacles to Adoption

The Office of Disease Prevention and Health Promotion defines a comprehensive worksite health promotion program as having five key elements: (1) health education programs; (2) supportive physical and social environment; (3) health screening and appropriate educational follow-up; (4) linkages to other related programs (e.g., safety, employee assistance programs); and, (5) integration within the organization (e.g., staff, budget, resources).⁶ Among a nationally representative sample of employers, only 6.9% reported that they had all five key elements in place, 9.7% had at least three elements, and 16.7% reported offering at least two elements.⁶ Having a dedicated staff person for wellness was an independent predictor of having a comprehensive program. Larger worksites were more likely than smaller worksites to offer all types of health programs, policies, environmental supports, and services. Thus, smaller worksites face the double jeopardy of offering fewer health promotion programs and services, as well as being less likely to offer any type of health insurance for their employees. For example, only 59% of firms with less than 200 workers offered health benefits to employees, while 98% of businesses with 200 or more employees offered health benefits.¹⁶ A lack of health insurance severely limits access to health and medical care for employees and places them, their family members, and the employer in a precarious financial position if injury or illness strike.

Employers in a national survey reported that lack of employee interest in programs was the single most common barrier (over 60%) to offering worksite health promotion programs, followed by lack of staff resources, lack of funding, and low participation among high-risk employees.⁶ However, larger social, structural, and political factors may prevent employers from adopting these programs as well. For example, businesses with traditionally high turnover of employees (e.g., retail) may not see the investment in employee health as something they will benefit from in the short run because their employees will likely leave their positions before benefits are realized. If one state agency implements a comprehensive health promotion program that results in health care cost savings from its employees, but those savings are returned to the General Fund, there is less incentive for any individual agency to start a new health promotion initiative that may require an initial investment when budgets are tight. Similarly, self-insured employers are more likely to adopt comprehensive programs because they see the direct financial benefit returned to the organization without filters from third party administrators. Taken together, a wide range of social, political, structural, and financial factors serve as barriers (or potential enhancers) to the adoption of comprehensive worksite health promotion programs.

Evidence-Based Approaches for Improving Employee Health and Building the Business Case

Comprehensive worksite wellness programs which focus on the health of employees *and* the workplace can be effective in improving morale and job satisfaction,^{17,18} reducing absenteeism¹⁹ and health risk behaviors,²⁰⁻²³ and increasing presenteeism^{24,25} (e.g., on-the-job productivity)—all of which are essential steps for building an effective business case. The national Task Force on Community Preventive Services is an independent group of public health and prevention experts who oversee systematic reviews, carefully consider and summarize review results, make recommendations for interventions that promote population health, and identify areas within the reviewed topics that need more research. Several worksite-related evidence-based reviews have been completed that guide employers and decision-makers who are attempting to build an evidence-based, comprehensive worksite health promotion program. Table 1 is extracted from the Task Force’s *Guide to Community Preventive Services* and illustrates that there is *sufficient evidence* to support assessing employee health risks with feedback when coupled with health education in order to change health behavior; use of incentives and competitions when combined with additional interventions for decreasing tobacco use; smoke-free policies to decrease smoking at work; and the use of worksite programs improving nutrition, physical activity, or both to reduce body weight and BMI.²⁶ Taken together, these evidence-based approaches can be the foundation of a comprehensive worksite health promotion

program. The assessment plus feedback approach can be used to assess employee risk, create awareness, motivate, and monitor changes in employee behavior over time. This data can be fed back to employees with tailored information to stimulate behavior change.^{22,23,26,27} Data may also be aggregated to the workplace level and shared with decision-makers for strategic wellness planning. The evidence is clear for addressing smoking and obesity, as well as healthy eating and physical activity. While the *Community Guide* recommendations are mostly aimed at individual behaviors, the business case for healthy employees will only be complete when one considers the larger workplace context and the independent influence it exerts on health via psychosocial stress, work demands, work-family spillover issues, hazard exposures, policies, work decision-latitude and effort-reward balance, discrimination, and support from co-workers/management.^{28,29}

In 2008, the National Institute for Occupational Safety and Health’s WorkLife Initiative issued the *Essential Elements of Effective Workplace Programs and Policies for Improving Worker Health and Wellbeing* which identifies 20 components of a comprehensive work-based health protection and health promotion program intended to “identify and support comprehensive approaches to reduce workplace hazards and promote worker health and well-being” (see Table 2, page 72).³⁰ These 20 practices and policies address four categories: organizational culture and leadership, program design, program implementation and resources, and program evaluation. These categories emphasize the work environment—both physical and organizational—as well as personal health risks of individual employees. Specific

Table 1.
Selected Worksite-Specific Findings: Task Force on Community Preventive Services

Intervention	Findings
Assessing employee health risks	<ul style="list-style-type: none"> ■ Evidence is <i>sufficient</i> to offer an assessment of health risks with feedback plus health education in order to change employees health based on <i>strong evidence</i> of effectiveness in improving one or more health behaviors or conditions in populations of workers. ■ Evidence is <i>insufficient</i> to recommend use of only an assessment of health risks with feedback.
Decreasing employee tobacco use	<ul style="list-style-type: none"> ■ Evidence is <i>sufficient</i> to recommend incentives and competitions when combined with additional interventions are effective in decreasing tobacco use. ■ Evidence is <i>sufficient</i> in recommending smoke-free policies to reduce tobacco use among workers. ■ Evidence is <i>insufficient</i> to determine whether or not worksite-based incentives and competitions alone work to reduce tobacco use among workers.
Reducing body weight and BMI	<ul style="list-style-type: none"> ■ Evidence is <i>sufficient</i> that worksite health promotion programs aimed at improving nutrition, physical activity, or both, are effective in reducing body weight and BMI.

evidence-based strategies for addressing the multiple influences on worker and workplace health are depicted in Figure 1 (page 73) which draws on an excellent resource adapted from a Robert Wood Johnson Foundation briefing entitled *Work Matters for Health*.²⁹

Healthy Employees, Healthy Workplaces— What to Do Next

Chronic illness has a powerful impact on employee health, health care costs, and the health of businesses. Creating healthy workplaces by building a foundation of evidence-based strategies for improving employee health is an important first step toward establishing the business case for worksite wellness. Measuring the impact of these efforts is critically important—on individual employees, the bottom line of the business (e.g., productivity, cost-effectiveness and return on investment), and the impact on the health of the larger community. The business case is strengthened when

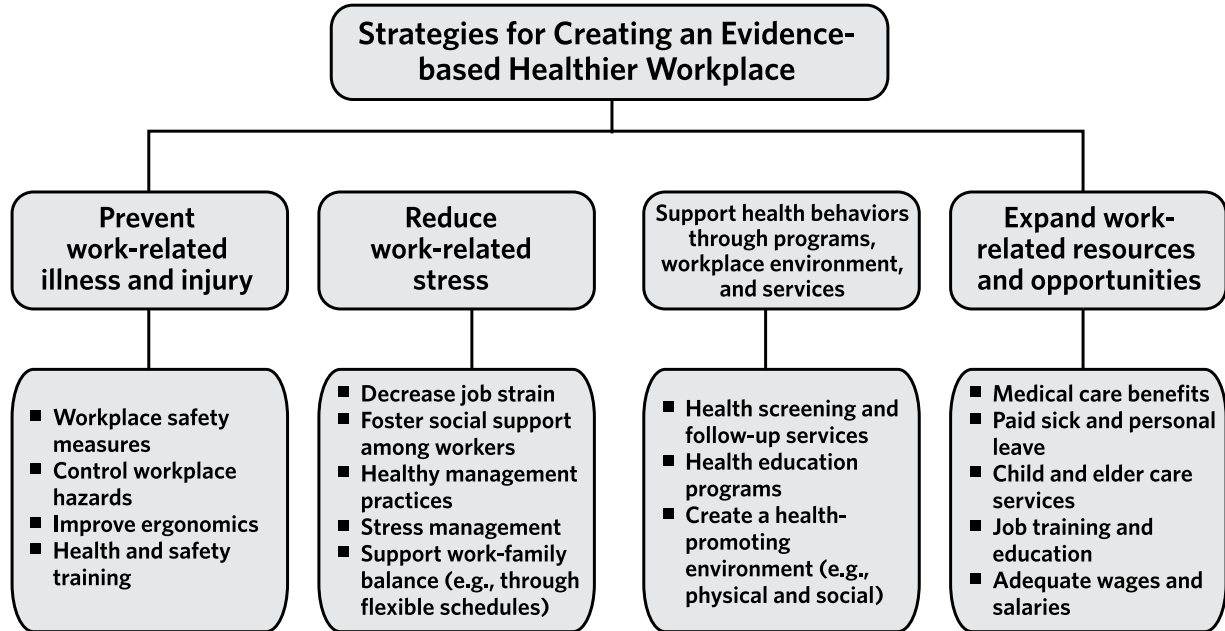
data are available from best practice evaluations³¹ and/or rigorous worksite-based research results. Yet information alone will not be enough to move employers to adopt these programs. Instead, key partnerships, accurate data, and the political will to overcome structural, political, and economic barriers to adoption must be undertaken.

In 2009, The North Carolina Institute of Medicine (NCIOM) issued a *Prevention Action Plan* which proposed two important worksite wellness initiatives.³² First, they recommended the creation of a partnership (e.g., a worksite wellness collaborative) of employers, providers, public health and hospital officials, and researchers, which could drive a strategic planning process for statewide wellness efforts. This collaborative could be useful in mobilizing the political will needed to overcome some of the barriers to adoption of these programs. Second, the NCIOM responded to a call for action on addressing the needs of small employers by recommending that the North Carolina General Assembly award tax credits for small businesses that offer comprehensive, evidence-based worksite wellness programs. Since many adults work in small businesses, and since small employers are less likely to offer health insurance and/or health programming, this tax credit represents an important step toward structural change in support of comprehensive, evidence-based worksite wellness.¹⁶ Specifically, the collaborative “should help businesses implement healthy workplace policies and benefits, implement health risk appraisals, develop comprehensive employee wellness programs, and implement data systems that track outcomes at the organizational and employee level.”³² Employers need technical assistance and support to select and implement evidence-based programs, but they also need help to do strategic planning for wellness that is tailored to their business and employees. Evidence suggests that with minimal technical assistance and resources, program adoption among employers will increase.³³ The North Carolina State Health Department and representatives from local hospitals, insurers, the State Health Plan, voluntary health agencies, NC Prevention Partners, and members of the research community who participate in this collaborative are in a position to create efficiencies for offering needed monitoring, technical assistance, and support to interested employers. This would include creating valid and reliable measurement tools (employee and organizational level measurements), databases that allow monitoring of change over time, and determining ways to best share data with employers to catalyze worksite wellness efforts and create opportunities for North Carolina to lead the way in building and maintaining a convincing business case for healthy employees and healthy workplaces. **NCMJ**

Table 2.
Essential Elements of Effective Worksite Programs and Policies for Improving Employee Health and Well-Being³⁰

Organizational Cultural Leadership
1. Develop a “human centered culture.”
2. Demonstrate leadership.
3. Engage mid-level management.
Program Design
4. Establish clear principles.
5. Integrate relevant systems.
6. Eliminate recognized occupational hazards.
7. Be consistent.
8. Promote employee participation.
9. Tailor programs to the specific workplace and the diverse needs of workers.
10. Consider incentives and rewards.
11. Find and use the right tools.
12. Adjust the program as needed.
13. Make sure the program lasts.
14. Ensure confidentiality.
Program Implementation and Resources
15. Be willing to start small and scale up.
16. Provide adequate resources.
17. Communicate strategically.
18. Build accountability into program implementation.
Program Evaluation
19. Measure and analyze.
20. Learn from experience.

Figure 1.
Strategies for Creating an Evidence-Based Healthier Workplace^a

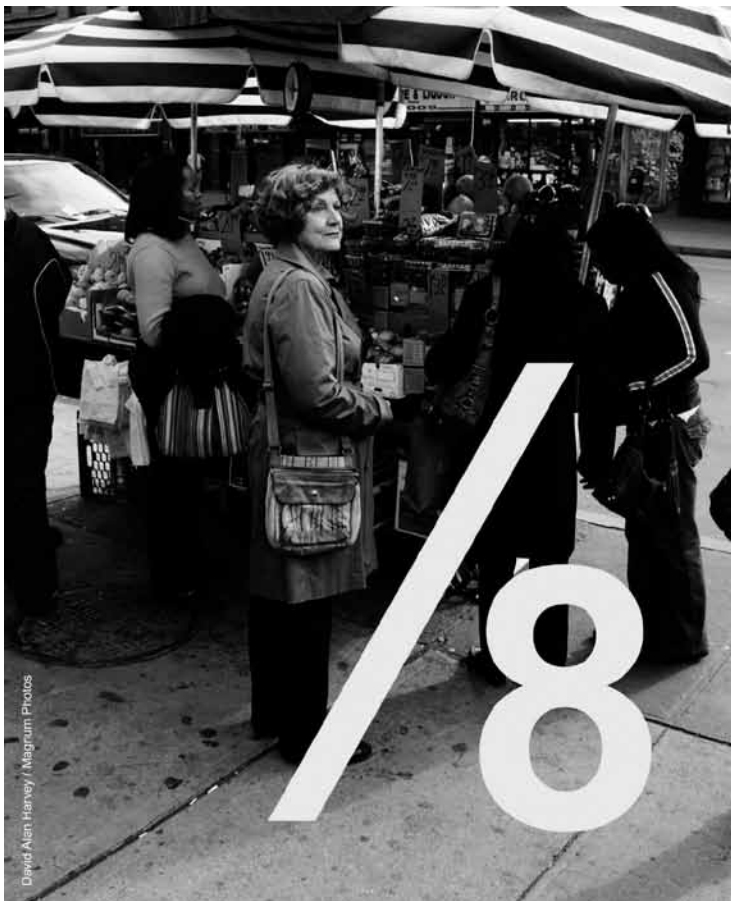


a. Adapted from *Work Matters for Health*.²⁹

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The Role of Schools in Prevention

June St. Clair Atkinson, EdD; Paula Hudson Collins, MHDL, RHEd

The basic purpose of education, relative to health, is prevention. By embracing and promoting healthful living, educators have the opportunity to influence not only students, but their families, the community's workforce, and ultimately society as a whole.

While the core mission of public education is academic achievement, schools can and must play an important role in positively shaping health behaviors in North Carolina's youth. One of the five priority goals of the North Carolina State Board of Education is to ensure that North Carolina public school students are healthy and responsible. Healthy children and adolescents are better learners and are more likely to do better in school. Youth who succeed in school and are healthy tend to seek more education and are more likely to be healthy adults.¹

Schools can best teach, encourage, and promote healthy behaviors among students by being model environments for these behaviors. We do this by providing evidence-based curriculums in a safe and healthy environment. As educators, we focus on content and skill development and how they are applied, and then conduct an assessment of their application.

While the focus of health education is prevention, schools often have roles in health intervention and treatment, not just for the students, but also for their families. Observations of situations where student behaviors seemed to influence adult health behaviors can readily be seen by the recycling movement or an increase in seatbelt use and tobacco education efforts.

Ultimately, students' health behaviors are based on information to which they are exposed, their feelings and developed attitudes about this information, and their use of problem-solving and decision-making skills when addressing health issues. Working together, we can ensure that our students receive the knowledge that will allow them to enjoy a lifetime of fitness based on evidence-based health knowledge and the utilization of health literacy skills.

The current role of North Carolina's schools in promoting the health and well-being of its students is multifaceted. While we operate within a globally competitive environment, our schools are guided by federal, state, and local mandates. Schools enjoy the freedom of local control within the parameters of meeting student achievement goals and benchmarks that are required by each level of government. One of the major charges for a local education agency (LEA) is student academic achievement. Health proponents have long cited the positive link between a student's health status and increased academic gains. By embracing this concept, LEAs position their students for greater success, improved graduation rates, fewer absences, and higher productivity.

Schools can best teach, encourage, and promote healthy behaviors among students by being model environments for these behaviors. We do this by providing evidence-based curricula in a safe and healthy environment.

Likewise, schools want to support their teachers and support staff by offering staff health and wellness programs and by providing them with the necessary tools, curriculum guides, and professional development opportunities for them to be successful.

North Carolina is one of 23 states in the nation to have its state education agency receive funding from the Centers for Disease Control and Prevention (CDC) in order to promote the union of learning and health in the public school setting. Through the CDC-funded North Carolina Healthy Schools Initiative, state level guidance is given to LEAs in order to promote healthier and more successful students through a coordinated school health program.

June St. Clair Atkinson, EdD, is the North Carolina state superintendent of public instruction. She can be reached at jatkinson@dpi.state.nc.us.

Paula Hudson Collins, MHDL, RHEd, is the chief health and community relations officer in the North Carolina Department of Public Instruction.

The eight-component model of the Coordinated School Health program addresses health education and physical education, child nutrition services, health services and mental health services, healthy school environment, staff wellness, and family and community support.

In order to ensure that these components are being implemented, each LEA annually reports to the North Carolina State Board of Education on its status related to the Healthy Active Children Policy, which was passed by the State Board of Education in 2003 (and revised in 2005), and requires the following: school health advisory councils, LEAs to work in a coordinated school health fashion, minimum 30 minutes of daily physical activity in grades K-8, protected recess time, and annual reporting.

The annual report increases local accountability for health prevention and promotion of student health behaviors.

In order for the North Carolina Department of Public Instruction (NCDPI) to be most effective in assisting schools with health prevention, an infrastructure or system of operation must be in place. NCDPI has been successful in creating this operational infrastructure through the implementation of local school health advisory councils, required in each LEA, coupled with the utilization of a healthful living/healthy schools coordinator in each LEA.

North Carolina Healthy Schools, in collaboration with the North Carolina Comprehensive School Health Training Center, provides professional development for teachers on a variety of health topics. NCDPI is responsible for the development of the *Healthful Living Standard Course of Study*, which is the curriculum framework of goals and objectives to be taught at each grade level in health education and physical education.

NCDPI has modeled the importance of coordinated school health by working in a coordinated fashion through state-level Healthy Schools Forums, for NCDPI and for their partners in the Division of Public Health. NCDPI implemented an employee staff wellness program before the state requirement, now modeled by other state agencies, and has reported to CDC on its progress. Websites, online surveys, and listservs are used by the Department of Public Instruction to keep professionals at federal, state, and local levels informed and current on new initiatives and professional development offerings.

Schools face a variety of barriers when addressing health prevention. Two major barriers are related to time and funding. It is difficult for schools to schedule the time necessary to meet all the competing and equally important requirements in a school day, while understanding that the primary initiative is education. There are a wide range of federal, state, and local guidelines to address—within globally competitive expectations—while educators and students attempt to use 21st century teaching and learning skills in an environment

which seems to be focused on testing. All too often health, and its role in prevention and positive health outcomes, is not embraced.

When school leadership does embrace the concept of a healthy school campus, the importance of student health is incorporated into the core functioning of the school. Health education and physical education are considered as vital to student success as every other subject. For example, there would be time for the teaching of healthful living subjects and waivers would not be accepted. There would be protected time for daily physical activity and physical education and adequate time to choose and eat a healthy lunch.

In our current economic environment the lack of funding for many educational programs is no surprise. Especially hard hit are the non-core tested areas as identified by the No Child Left Behind Act, which includes Healthful Living Education. Other areas of concern include lack of funding for facilities, equipment, space, and materials as well as funding for professional development and time for teachers to attend trainings.

So, in a perfect North Carolina, what is our vision for the role of schools in health prevention? We see an integration of the concept of healthful living throughout the educational system. Schools, students, staff, and parents would be fully engaged and embrace healthful living as fundamental for student success.

Class size for physical education would be consistent with other academic classes and there would be enough high-quality and trained teachers for health and physical education. School campuses would have a school-based and school-linked health centers, a school nurse on each campus, and an adequate number of counselors whose roles would not just be for testing. Funds would exist to implement improved nutrition standards and healthier food choices for students. Fitness testing would be part of the required battery of tests for students, and students could earn honors credit for an array of academically rigorous healthful living electives. Technology would be used in innovative ways to ensure healthful living is delivered to each student. And, of course, educators would continue to work with a number of interested partners to make all of this possible.

We envision a North Carolina educational system that would be a national leader and model of healthful living as taught and lived in an educational environment.

Put simply, positive health habits are good for students, families, schools, communities, the workforce, the state, and the nation. In North Carolina we have over 2,400 public and charter schools, 190,000 teachers and staff, and countless dedicated citizens working hard to teach students the benefits of healthy lifestyles; they are working to do this but we know we must do more to help them. **NCMJ**

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Poverty's Impact on the Health of North Carolina: The Socioeconomic Determinants of Health

Ronny Bell, PhD, MS

The current economic crisis has had a significant financial impact on many North Carolina residents. Unfortunately, it may be many years before we know the true impact of this downturn on the health of our citizens.

We have conceptually understood the relationship between socioeconomic status and health for many years and these insights have been previously discussed in the *North Carolina Medical Journal*.¹⁻⁵ For most health indicators, persons living in poverty fair worse than their more affluent counterparts, and as local, state, and national economies flounder, more and more people are adversely affected. Importantly, we have recently expanded our understanding of the socioeconomic determinants of health. For

example, persons who are of low socioeconomic status generally live in areas that are environmentally unhealthy and that increase their risk for the development of asthma, infectious diseases, and other acute conditions. We now know living in impoverished areas also increases the risk for the development of chronic conditions such as obesity, diabetes, and cardiovascular disease. This is, to a large degree, due to the lack of local access to healthy food options, coupled with an abundant access to unhealthy food options, as well as a lack of access to safe and affordable physical activity-promoting facilities and resources. As an example, data from the Multi-Ethnic Study of Atherosclerosis (MESA), which includes a site in Forsyth County, North Carolina, showed that better neighborhood resources for physical activity and healthy eating is associated with a 38% reduction in risk for type 2 diabetes.⁶

Similarly, we have known that being poor generally means having less access to primary and specialty health care. However, we now know that it's not just access per se, but access to quality primary and specialty care that contributes to the socioeconomic disparities in health care. This is especially true for conditions requiring substantial self-management resources and multidisciplinary care teams. Again, looking at the example of diabetes, appropriate management of this condition includes medical care from a diverse group of providers to assist in managing diet, physical activity, medication regimens, blood glucose and lipid levels, blood pressure, psychological health, and monitoring of the complications associated with diabetes.⁷ Patients

need to receive appropriate diabetes self-management education and must have resources available to exercise, eat healthy, and regularly monitor blood glucose and blood pressure. Given these multiple necessary elements to effective control, adequate diabetes medical and self-care management is especially challenging for those with limited financial resources.

Adding to the complexity in how socioeconomic factors determine health are the issues pertaining to the interrelationship between poverty, race, ethnicity, and geographic residence. While North Carolina is blessed to have such a rich racially and ethnically diverse populace, it is unfortunate that the largest racial and ethnic minority

groups in our state, African Americans, American Indians, and Latinos, are more often represented in the numbers of North Carolina residents living in poverty.⁸ While racial and ethnic minority groups are less likely to receive adequate

For most health indicators, persons living in poverty fair worse than their more affluent counterparts, and as local, state, and national economies flounder, more and more people are adversely affected.

Ronny Bell, PhD, MS, is a professor in the Division of Public Health Sciences at the Wake Forest University Baptist Medical Center. He can be reached at rbell (at) wfubmc.edu.

health care due to limited financial resources and the local availability of these resources, they may also have negative perceptions of the health care they do receive due to perceived discrimination or distrust in health care providers or the health care system. North Carolina also has a substantially large rural population. Poverty rates in rural North Carolina communities are generally higher than in urban areas, especially in areas with substantial numbers of racial and ethnic minority group members. Geographic access to primary and specialty health care is also problematic in rural areas, and these two factors explain to some extent the significant disparities in health outcomes among our rural residents.

A discussion of the socioeconomic determinants of health also needs to consider the local, regional, state, and national policies which adversely affect the health of the poor. As previously discussed, local policies have contributed to the lack of local access to healthy food and physical activity resources in low-income communities. As another example, there are well-documented examples of policies across the country which have led to the creation of environmentally toxic dumping areas in low-income areas, which have ultimately been shown to have long-term detrimental impacts on the health of the local residents.

At the core of these issues lies the concept of "health equity," which is defined by the World Health Organization as "the absence of unfair and avoidable or remediable differences in health among population groups defined socially, economically, demographically, or geographically."⁹ Health equity, therefore, aims to identify and alleviate those social factors which contribute to systematic health

disparities and requires a concerted effort among multiple entities.

Fortunately, by better understanding the socioeconomic determinants of health we know we must develop approaches to close the gap in socioeconomic disparities in health. Advocacy efforts led primarily by social justice and public health agencies have led to the recognition and adoption of healthy policies among the most vulnerable populations. For example, the recent adoption of a statewide ban in North Carolina on smoking in restaurants and bars should have a significant impact on workers in those facilities, many of whom are of lower income status. Health care providers have developed creative ways to expand health care to poorer and rural areas through services such as telemedicine, expanded clinic hours, satellite clinics, and parish nurse and lay health education services. One of the most successful programs in addressing breast cancer disparities in low-income women is the patient navigator model, designed to help women diagnosed with breast cancer "navigate" through the health care system in order to receive adequate care for their condition. And, of course, the recent discussions on health care reform in Washington have, as one of their primary aims, the elimination of cost barriers in the receipt of adequate health care for many of our citizens.

The work is not yet done, but progress has been made through research, advocacy, and policy change. While the recent economic downturn may have some immediate and long-term health implications, we are now more prepared to understand these impacts and develop strategies to alleviate the suffering of those most vulnerable residents of our state. **NCMJ**

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The Long Road to Success: Advocating for Public Policy Change

Pam Seamans

The process of crafting legislation has been crudely called “sausage making,” but it can also be a refined process—an art that involves the blending of many perspectives including those of the ideal-driven advocate, the legal expert, and the political negotiator. Influences on public policy come from the grassroots, advocates, and representatives of business and government. Successful public health policy change occurs when leadership from all of these sectors come together to educate, influence, and motivate the passions in others to demand change. This indeed was the case when North Carolina became the first tobacco producing state in the nation to pass legislation—House Bill 2—to ban smoking in restaurants and bars.

The North Carolina Alliance for Health (NCAH) is a statewide advocacy coalition addressing obesity and tobacco use prevention policy issues. Since its creation in 2002, NCAH has had success in both raising North Carolina’s tobacco tax and advancing secondhand smoke reduction legislative campaigns at the state level. Through the hard work of many coalition members, NCAH is now seen as the go-to coalition by policymakers, advocates, and media for tobacco policy. NCAH has achieved several of the coalition’s tobacco policy goals through strategic planning, partnership development, consensus building, media relations, grassroots networks, and vigilant education about evidence-based policy.

Success is Often Built on Previous Successes

One of North Carolina’s first major statewide tobacco control policy accomplishments was the North Carolina Alliance for Health’s successful campaign in 2005 to increase the cigarette excise tax from the lowest in the nation (5 cents) to 35 cents. Raising the cigarette tax reduced cigarette consumption by 18% and increased state tax revenues by more than \$110 million. North Carolina’s middle school smoking rate decreased by 61.3% between 1999 and 2005, dropping from a rate of 15.0% to 5.8%. Similarly, North Carolina’s high school smoking rate decreased by 35.8% between 1999 and 2005, dropping from a rate of 31.6% to 20.3%. In real numbers, that decline amounts to 57,000 fewer young smokers, and it means that 18,200 lives have been saved from a premature cigarette-induced death. It also significantly reduced health care costs to the state by approximately \$1.3 billion.^a

Following the 2005 success with the modest increase in North Carolina’s cigarette tax, the North Carolina Alliance for Health turned its attention to the secondhand smoke issue in the hopes of eliminating exposure to secondhand smoke for all workers in the state. However, NCAH and supportive legislators had a big hurdle to overcome on secondhand smoke policy: North Carolina had been saddled with a weak smoker’s rights state law passed in 1993 that did

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a. Projections provided by the Campaign for Tobacco-Free Kids, November 21, 2006.

Pam Seamans is the executive director of North Carolina Alliance for Health. She can be reached at pamseamans (at) nc.rr.com.

not allow stronger local ordinances and virtually stopped all state-level policy activity.

Success in reducing exposure to secondhand smoke in North Carolina's worksites has been achieved thanks to evidence-based science, continuous education efforts, strong and strategic partnerships, and dedicated leaders. In 2005, NCAH began chipping away at portions of the preemptive law by exempting more smoke-free places. NCAH, with strong support from the Justus-Warren Heart Disease and Stroke Prevention Task Force, began by advocating for a law to eliminate smoking in the North Carolina General Assembly. This proved an effective strategy, for once passed, grassroots, advocates, and government leaders argued that all North Carolina workers deserved the same kind of protection in the workplace from a known health hazard.

While the North Carolina Alliance for Health's resolution called for all worksites and public places to be smoke-free, the coalition agreed to strategically advocate for incremental policy changes that would continue to move the issue forward without threatening any future progress. As a result, by January 1, 2009 the North Carolina General Assembly had prohibited smoking in the following indoor locations: legislative buildings, buildings owned or leased by the state, state vehicles, public school (K-12) campuses and school-sponsored events (prohibits all tobacco use), long-term care facilities, and state correctional facilities, buildings, and grounds. This work culminated on May 19, 2009 when North Carolina became the first tobacco producing state to prohibit smoking in all restaurants and bars after Governor Perdue signed the bill into law.

The incremental efforts around smoke-free protections that preceded House Bill 2 (HB 2) resulted in the education of both lawmakers and the public about the dangers of exposure to secondhand smoke. By the time HB 2 was introduced in the winter of 2009, the education efforts of NCAH had resulted in legislators absorbing much of the scientific information about the dangers of secondhand smoke; the coalition no longer needed to argue the fact that tobacco use and exposure to secondhand smoke was, indeed, a serious health hazard as determined by the US Surgeon General.¹ Most North Carolina lawmakers were ready to move on, opening the doors for the introduction of HB 2 and, more importantly, its passage.

Leadership and Partnerships: Key Components to Success

It is important to note that this successful campaign to ban smoking in restaurants and bars would not have been possible without the passionate leadership of legislative champions Representative Hugh Holliman and Senator William Purcell. The personal experiences of Representative Holliman, a two-time lung cancer survivor, and Senator Purcell, a pediatrician, enabled these two lawmakers to rise above the challenge other legislators felt in confronting the

tobacco industry on their home turf. Bipartisan cosponsors brought unparalleled dedication and passion to moving the issue and willingly shared personal perspectives. During the House floor debate, Representative Jeff Barnhart related a heart-wrenching personal story of the loss of his father-in-law to a chronic disease caused by exposure to secondhand smoke.

As originally introduced, House Bill 2 was model legislation with a comprehensive smoking ban in all North Carolina worksites and public places. However, as is frequently the case, HB 2 was amended during the legislative process. After the bill had an unacceptable provision added in the House to make the law apply only to businesses that serve minors, the health advocacy community received invaluable help from the business community. Most notably, the restaurant and hospitality industry pushed to remove this provision in the Senate, as it was in the interest of business to have a "level playing field" among all businesses that serve food and/or alcohol regardless of the presence of minors. The Senate removed the "minor" provision, but at the same time, limited the scope of the bill to restaurants and bars to earn enough votes for passage. The final product was a strong bill that made virtually all restaurants and bars smoke-free with limited exemptions and restored much of the local control that had been taken away by the 1993 law.

Thanks to the 2006 US Surgeon General's report on the health consequences of secondhand smoke, the dangers of exposure became indisputable.¹ By 2009, the main argument against comprehensive smoke-free policy was around "private property rights" versus the right to protection from secondhand smoke exposure at work or in public. The private property rights arguments were expressed by conservative legislators hailing from current and historically tobacco producing communities. This argument ultimately forced legislative champions to modify the original bill that made all workplaces and public places smoke-free, and focus instead on restaurants and bars, as a means of addressing the most high-risk sector of employees and the public. While limiting the bill's scope meant not protecting all worksites and public places, this new version of the bill still met NCAH's strategic goal of making incremental progress in protecting sectors of employees and the public without thwarting future progress.

Using the Science to Educate Legislators, Grassroots, and Media

A major factor in the success of the new smoke-free law was the tremendous amount of education coalition members provided lawmakers leading up to the consideration of HB 2. Education on the harms of tobacco use and exposure to secondhand smoke began with the cigarette tax campaign in 2003. Education efforts continued with the release of the 2006 Surgeon General's report and were further reinforced by more recent studies by the Centers for Disease Control and Prevention that showed the dramatic health impact

Reducing Tobacco Use in Tobacco Country: North Carolina's Success Story in Lowering Tobacco Use Among Youth

Vandana Shah, LLM; Sally Herndon Malek, MPH; Tom Brown, MEd; Barbara Moeykens, MS

North Carolina has a legacy tied to tobacco that is historic, economic, and social in nature. One outcome of that legacy that is increasingly gaining the attention of North Carolina leaders is the heavy toll tobacco has taken on the health of North Carolinians, a toll that is reflected in the fact that tobacco use remains the leading cause of preventable death and illness in our state, amounting to \$2.4 billion per year in excess medical costs alone.¹

Fortunately, with the turn of the century, a new era commenced, one that focuses on the multiple factors that we know to be effective in reducing tobacco use and improving the health of our state. The teen smoking rate in North Carolina has dropped dramatically from 27% in 2003 to an historic low of 19% in 2007, according to the North Carolina Youth Tobacco Survey.² In real numbers, the decline in youth smoking over the past decade amounts to 57,000 fewer smokers and 18,200 lives that would otherwise have been lost from premature, tobacco-related death.²

A key contributor to this success was the investment of nearly \$17 million annually starting in 2003 when the North Carolina Health and Wellness Trust Fund (HWTF) launched its statewide tobacco prevention and cessation efforts. The HWTF has funded community- and school-based organizations in every county in the state to change policy and social norms related to tobacco use. HWTF championed the 100% tobacco-free schools movement, now established as law for all North Carolina schools, which gave rise to a movement supported by North Carolina Prevention Partners and the North Carolina Hospital Association to make all North Carolina hospitals 100% tobacco-free.

HWTF's programs were built upon the foundation laid by the statewide tobacco control coalition, a group that includes the

Tobacco Prevention and Control Branch of the Division of Public Health, the American Lung Association, and the University of North Carolina at Chapel Hill's Tobacco Prevention and Evaluation Program, all of which tackle different aspects of the problem. Other partners, such as Question Why, NC Spit Tobacco Education Program (NC STEP), and Survivors and Victims of Tobacco Empowerment (SAVE), contribute an impressive array of support services and critical expertise in youth tobacco use prevention and cessation.

HWTF also funded a sustained media presence promoting tobacco use prevention through the Tobacco.Reality.Unfiltered. (TRU) social marketing campaigns. The most recent campaign featured Reena, a 29-year-old mother from Asheville who started smoking at the age of 13. Reena's story was especially powerful because she developed throat cancer symptoms at the age of 19, resulting in a laryngectomy at age 21. For youth who may perceive the health risks of smoking to be a consequence that is in a far-distant future, Reena's words, spoken through an assistive device, were powerful and effective. Today, youth groups are working to change attitudes of their peers from the "bottom up," a technique that can be especially effective when reinforced by powerful social marketing efforts and the support of community leaders.

North Carolina's Tobacco-Free Colleges initiative, funded by HWTF, focuses on young adults as an at-risk group. Following in the success of the tobacco-free schools and hospitals campaigns, North Carolina now leads the nation with a greater number of its colleges and universities (35 of 110) having adopted a 100% tobacco-free policy than any other state in the country. These policies represent health protection to more than 131,000 students, in addition to faculty, staff, and visitors.

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of smoke-free policies through the reduction of the heart attack rate.²⁻⁵ After the introduction of HB 2, education became a daily effort.

One successful educational technique used regularly for policymakers included weekly one-page fact sheet "drops." The drops were also given to media, and press releases were sent at appropriate times. NCAH listened to the arguments that were winning votes and those that caused concern among legislators and the public. Based on these messages, NCAH strategically adjusted its messages weekly, if not daily, for legislators.

The success of HB 2 was also due in large part to strong grassroots and media advocacy. NCAH developed educational materials and a strategy to engage both grassroots advocates and the media. Weekly updates were issued to advocates that provided effective messages and instructions for constituent contact with lawmakers. The

constituent voice is critically important in any advocacy campaign, as legislators will listen to their constituents more than any single lobbyist. Lawmakers gain information from both direct communications from local leaders and advocacy groups, and indirectly through local news sources—especially from local opinion pieces and editorials. Grassroots advocates sent an unprecedented number of emails to their lawmakers about the smoke-free issue, made phone calls, and participated in advocacy days to lobby their legislators. Legislative cosponsors shared that local health directors and hospital administrators were the most trusted local experts on health matters. All hospitals across the state had demonstrated their support by going smoke-free campus-wide, and local health directors actively advocated for the passage of HB 2, further demonstrating their support for this important public health measure. Engaging both constituents and local health leadership in

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An increasingly important element of smoking cessation efforts is QuitlineNC, which has provided free, confidential, and evidence-based smoking cessation services to more than 10,000 North Carolinians since 2005. Outreach efforts to health care providers have vastly increased the number of fax referrals to QuitlineNC in recent years, providing them with a particularly effective means of arranging help for their patients who use tobacco.

Public policy and regulatory developments also play a pivotal role in reducing tobacco's toll on health in our state. North Carolina increased its cigarette tax by 25 cents in 2005 and by another 5 cents in 2006, bringing the state cigarette tax up to its current rate of 35 cents. The current national average is \$1.31 per pack.³ Research shows that a 10% increase in the price of a pack of cigarettes results in a 4%-7% drop in smoking rates, with the largest impact on young people.⁴

Another major milestone was the passage of House Bill 2, a ban of indoor smoking in virtually all restaurants and bars in North Carolina, joining 24 states with similar restrictions. This law eliminates exposure to secondhand smoke—a serious risk factor for heart disease and cancer—for a vulnerable group of North Carolina workers and their customers. With tobacco products falling under the purview of FDA regulation in 2009, there is additional potential to improve the health of our population.

While these accomplishments are encouraging, more needs to be done. In 2008, nearly two million (20.9%) of North Carolina adults smoked,⁵ ranking our state ninth highest in the nation in smoking prevalence. Although overall smoking rates among adults in North Carolina have dropped since 1997, North Carolina's rates consistently remain above national rates.

Given North Carolina's history with tobacco agriculture, policymakers and health leaders face a considerable challenge in addressing tobacco use to protect public health. Tobacco control issues have long been intertwined and related to our state's identity. Experience has proven, however, that an investment in a combination of statewide community programs, strong policy efforts, and effective outreach campaigns can indeed change the social norm.

There is a bumper sticker, often fading, that can still be seen on North Carolina roads. It says, "Pride in Tobacco." With a history that began over 400 years ago and the stream of cash generated from the crop that has flowed ever since, it is not surprising to find this sentiment expressed by some North Carolinians. Even so, every indication is that the day is coming when "Pride in Tobacco" will be replaced by "Pride in a Healthy North Carolina," not only on bumper stickers, but also in a new set of Tar Heel values.

Vandana Shah, LLM, is the executive director of the North Carolina Health and Wellness Trust Fund. She can be reached at vandana.shah (at) healthwellnc.com.

Sally Herndon Malek, MPH, is the branch head at the Tobacco Prevention and Control Branch in the North Carolina Division of Public Health.

Tom Brown, MEd, is the tobacco program officer for the North Carolina Health and Wellness Trust Fund.

Barbara Moeykens, MS, is the social marketing and communications director at the North Carolina Health and Wellness Trust Fund.

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actively advocating for the passage of a strong bill proved to be an effective strategy.

One aspect of media advocacy strategy was to show the strong support of the public through opinion pieces. According to Elon University Poll data from February 2009, the North Carolina public overwhelmingly, by nearly 90%, indicated support for the right of an employee to have a smoke-free workplace.⁶ Many citizens also told their stories in very personal and compelling ways about how they have lost loved ones due to secondhand smoke exposure on the job. This led to over 1,000 news stories across the state

about HB 2, as well as the support of all major daily news editorial boards.

In addition, the Division of Public Health produced data showing that many North Carolinians continue to be exposed to secondhand smoke at their work setting.⁷ This costs North Carolina employers in excess medical care costs, as well as lost productivity. A study conducted by Blue Cross Blue Shield of North Carolina demonstrated that nonsmokers' exposure to secondhand smoke costs North Carolina \$288.8 million each year in excess medical care costs alone.⁸ Thus, the economic argument was an

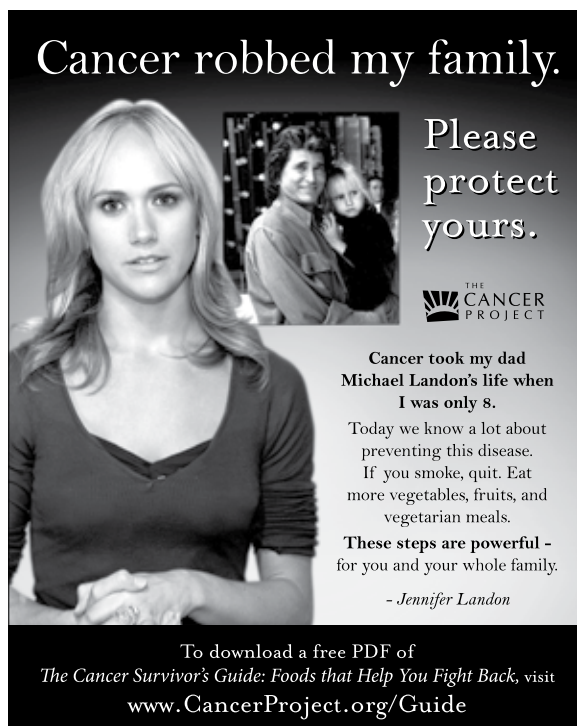
important factor in building support with some decision makers.

NCAH was able to clearly illustrate the social justice aspects of the issue and draw focus to the disparities that exist with respect to exposure to secondhand smoke at the workplace. Messages that no worker should have to be exposed to a toxic substance in order to receive a paycheck were effective and persuasive. Often workers in lower paying jobs with the least amount of power to change their work situation to protect their health are exposed to secondhand smoke in the workplace. The reality is that in North Carolina, almost 75% of white collar workers reported smoke-free worksites, compared to 61% of blue collar workers and 55% of service workers.

It can be said that tobacco control legislation in North Carolina is a challenge, yet with sound science and education, dedicated legislative champions, expert legal technical assistance, the support of the restaurant and hospitality industry, and strong grassroots and media efforts, North Carolina became the first tobacco producing state in the nation to prohibit smoking in all restaurants and bars. It is our hope that the successful implementation of HB 2 will lead to a new smoke-free era in our state that will set the stage for future policy change that ultimately results in the protection of all of North Carolina's workers. **NCMJ**

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Preventing Disease and Promoting Health in North Carolina Communities: The North Carolina Prevention Action Plan and Healthy Carolinians

Jeff Spade, FACHE

In 1994, Governor James Hunt appointed a task force of health care, nonprofit, and community leaders to implement a coordinated effort to plan and create healthy communities throughout North Carolina based upon the national Healthy People model. The initial goals for the Governor's Task Force for Healthy Carolinians were to create and disseminate state-level health objectives for North Carolina, to encourage the organization of local partnerships and coalitions to support community health improvement, and to report on North Carolina's progress in achieving our health improvement objectives.

Healthy Carolinians has grown remarkably from Governor Hunt's original vision to encompass two, decade-long health improvement plans (Healthy Carolinians Objectives for Years 2000 and 2010) and to support 77 Healthy Carolinians partnerships and coalitions promoting health improvement in 83 North Carolina counties. These communities include small and large, urban, suburban, and rural places. The consistent recipe for success in Healthy Carolinians over the years has been the combination of individual leaders and diverse organizations working as partners to improve the health of North Carolinians. They do this by focusing on aligning the health needs, resources, and assets of the local community and surrounding regions.

Governor Beverly Perdue has embraced the Healthy Carolinians concept and expanded the Governor's Task Force by setting a goal of accelerating health improvements for North Carolinians by creating Healthy North Carolina Objectives for the decade 2010 to 2020. The basic strategy of Healthy Carolinians is to embrace evidence-based disease prevention and health promotion mechanisms, with an emphasis on eliminating health disparities; promoting access to health services; developing healthy living, learning, and work environments; and supporting the knowledge and capacity of North Carolinians to pursue healthy lifestyles.

Healthy Carolinians adheres to the belief that the strength and power of engaged communities and leadership can transform and improve health. Accountability, actively engaged partnerships, and measureable results will be the hallmarks of Healthy Carolinians during the next decade.

Emphasis on Prevention and Health Promotion

Since the founding of Healthy Carolinians, disease prevention and health promotion strategies have been the primary health improvement opportunities endorsed and adopted in the statewide objectives. The 2010 Health Objectives specifically addressed access to health care, chronic disease prevention, reducing the impact of disabilities, cutting the state's high infant mortality rates,

Helping communities learn and adequately implement evidence-based strategies for disease prevention and health promotion is a monumental task.

injury prevention, improved oral health, and reducing infectious disease. These priorities were seen to have the highest potential impact for consistent, long-term health improvement. Furthermore, the 2010 Objectives highlighted the critical importance of reversing North Carolina's trends in factors that undermine health such as obesity, poor nutrition, lack of physical exercise, tobacco use, and risky lifestyle choices.

North Carolina has not significantly reduced or reversed these trends, thus, the Healthy NC 2020 Objectives will continue to emphasize evidence-based practices in disease prevention and health promotion as the most cost-effective

Jeff Spade, FACHE, is vice president of the North Carolina Hospital Association and the executive director of the North Carolina Rural Health Center. Mr. Spade is appointed as chair of the Governor's Task Force for Healthy Carolinians. He can be reached at jspade@ncha.org.

and best outcome-driven strategies to achieve breakthrough improvements in the health status of North Carolinians. The value of prevention and health promotion cannot be overstated in the potential to transform North Carolina into a healthier state with a significantly healthier population and dramatically fewer health disparities.

The *North Carolina Prevention Action Plan*, published by the North Carolina Institute of Medicine, represents a significant foundation to build upon the most recent knowledge, research, and expertise in population health improvement. The challenge for Healthy Carolinians has never been to identify the health factors and measures that require change and improvement; we already know the major health issues that demand our attention, the problems that make North Carolina less healthy. The challenge is in helping local health coalitions and communities connect with the best strategies and health improvement practices that have the greatest potential to increase the health of their community.

Helping communities learn and adequately implement evidence-based strategies for disease prevention and health promotion is a monumental task. The *North Carolina Prevention Action Plan* is the first step in the process to create a health improvement plan for North Carolina that is actionable, measurable, and achievable. The critical next step is to engage communities, partnerships, coalitions, organizations, and leaders in adopting best practices for their communities, marshalling and supporting resources to transform health, and sustaining health improvement and disease prevention strategies that achieve results. Learning from each other, rigorously applying the Model for Improvement, which includes setting breakthrough improvement goals, conducting small tests of change, transparently measuring health outcomes, innovating, and spreading best practice strategies—are the building blocks for year-after-year improvements in community health.

Community Partnerships: The True Strength of Healthy Carolinians

The central tenet of Healthy Carolinians is the organization and development of successful community-focused partnerships to assess, plan, structure, and engage community leaders and resources in the rewarding work of implementing and monitoring health improvement strategies. The Governor's Task Force for Healthy Carolinians is charged with the responsibility of officially designating local Healthy Carolinians Partnerships and Coalitions. The Office of Healthy Carolinians and the Governor's Task Force work together to support local coalitions and partnerships in achieving certification status.

The Governor's Task Force for Healthy Carolinians awards certification to communities that have organized broad-based partnerships which adopt and embrace a prevention-oriented mission and that understand, improve, and monitor the health needs of the community. The certification process for a local partnership is conducted every four

years, with approximately 25% of partnerships applying for certification annually. The purpose of the Healthy Carolinians certification is to ensure that local partnerships and coalitions are actively conducting and performing the evidence-based community health organization strategies that are demonstrated to plan, coordinate, and support sustainable improvements in population health.

The local partnerships are capable of organizing and leading health improvement strategies because of these essential, demonstrated capacities, as incorporated in the Healthy Carolinians certification standards:

- alignment with statewide health objectives and action plans to reduce health disparities;
- development of both short-term and long-term health improvement objectives;
- establishment of a partnership with diverse membership and community engagement;
- demonstrated and engaged leadership;
- completion of a comprehensive community health assessment to determine health improvement priorities;
- regular and effective communication strategies;
- support and commitment from community members and leaders involved in the partnership; and
- a resource, funding, and financial sustainability plan to support the improvement plan of the local partnership.

The action plans developed and managed by the local Healthy Carolinians partnerships must be linked to prevention and health promotion strategies with measurable outcomes and results.

How Partnerships, Statewide Goals, and Evidence-Based Strategies Improve Health

Combining the strength of local Healthy Carolinians partnerships with the alignment, focus, and proven concepts of the *North Carolina Prevention Action Plan*, and guiding collaborative work and learning through the performance outcomes defined in the Healthy NC 2020 Objectives will provide a running start for North Carolina leaders, communities, and stakeholders to sustain the decade-long journey towards our healthier destination. However, a well-defined roadmap, engaged partners, and aligned visions will not accomplish ambitious health improvement goals on their own—incredible effort, dedication, and effective work are required, too.

The North Carolina Hospital Association, in creating the NC Center for Hospital Quality and Patient Safety, has learned that improvement strategy must be linked to key improvement concepts and principles in order to guarantee the best probability of meeting expected goals and objectives. These concepts are:

- Effective and sustainable **execution** of evidence-based health improvement strategies.

- **Transparency** of measurable outcomes and results, to inform collaborative learning and to guide improvement.
- **Accountability** for the accomplishment of expected goals and objectives.

The basic improvement model is to specifically identify break-through “how good by when” goals, develop health improvement portfolios that emphasize effective execution of evidence-based strategies to accomplish the goals, then link transparency and accountability in order to understand whether breakthrough performance objectives and improvements are being accomplished. The cycle of goal-setting, effective execution, measurement against expectations, then linking to transparency and accountability is the best methodology to drive consistent, sustainable improvement.¹

Prevention Strategies Accomplished by Healthy Carolinians Partnerships

Healthy Carolinians’ partnerships and coalitions are already embracing these improvement concepts and engaging in the disease prevention and health promotion strategies identified in the *Prevention Action Plan*. The following community engagement stories illustrate the hope and promise of health improvement partnerships linked to prevention strategies:^a

Partnership for a Healthy Durham: Durham Eating Smart and Moving More

The Durham Partnership’s Obesity and Chronic Illness committee, composed of 26 partner agencies, created *Durham Eating Smart Moving More*. This resource compiles Durham trails, parks, recreation centers, water activities, and physical activity and nutrition resources to share with the community. The brochure was officially kicked-off at the 2009 Public Health Day and Earth Day events.

This resource is available online at <http://www.healthydurham.org>. Copies of the guide are also available at Durham Parks and Recreation sites, Duke-affiliated clinics, and community venues. Health care providers are using the resource as a wellness prescription with patients by discussing nutrition and physical activity resources in the patients’ neighborhood.

Overweight and obesity are associated with long-term, costly, and serious health conditions, including heart disease, cancer, and diabetes.^{2,3} Many Durham residents are not aware of the opportunities for physical activity and better nutrition and *Durham Eating Smart Moving More* is just one strategy to improve the health of county residents.

Iredell County Healthy Carolinians: Prostate Cancer Male Peer Educator Program

Iredell County Healthy Carolinians has created a male peer educator program focused on early detection of prostate cancer. Each year, local men volunteer to educate others in the community about prostate cancer and prostate cancer screenings. The three local hospitals work together to coordinate free prostate cancer screenings during the month of September. The objective of the early detection program is to reduce prostate cancer deaths for Iredell County minority men by 10%. In four years, 785 men were screened for prostate cancer. In addition, approximately 2,000 men in Iredell County have received education about prostate cancer.

When the prostate education program began, the prostate cancer death rate for minority men in Iredell County was 70 men per 100,000 population. Since the inception of the program, the prostate cancer death rate has decreased to 67.5 men per 100,000.

Onslow Community Health Improvement Process (CHIP): Jones Onslow Employee Wellness Program

With over 175 employees, Jones Onslow Electric Membership Corporation (JOEMC) understands the importance of a productive, satisfied workforce. JOEMC is an active wellness partner of the Onslow County Community Health Improvement Process (CHIP). A Health Risk Appraisal is conducted for each employee, followed by an employee survey, to guide the Wellness Program’s efforts to address the three top health factors: obesity, inactivity, and heart disease. Activity-based programs were implemented, including ‘The Biggest Loser Weight Loss Program,’ ‘Walking Your Way to Health,’ and vigorous exercise programs. After this program was implemented, employees lost over 300 pounds and logged more than 8,000 miles walking.

JOEMC also partnered with the Onslow County Health Department, CHIP, and Coastal Carolina Community College to bring in 28 medical laboratory and nursing students to perform blood screenings, blood pressure checks, and Body Mass Index measurements for 155 employees. JOEMC’s Wellness Program is successful in educating employees and their families, motivating them to lead a healthier lifestyle, and creating a culture of health to support individual wellness goals.

Healthy Cabarrus Partnerships for Life: Teen Talk—Providing Health Information to Teens in Cabarrus County

Teen Talk is a telephone health information service organized for teens in Cabarrus County. The service was created by the Healthy Cabarrus Teen Task Force in

a. Annotated from: *Healthy Carolinians Partnership Stories, 2007 to 2009*. Available at <http://www.healthycarolinians.org>.

response to teens identifying a lack of resources for accurate information on health issues. The *Teen Talk* line allows callers to access more than 130 pre-recorded health topics or speak with a health professional.

Teen Talk brochures are distributed to 20,000 middle school and high school students in Cabarrus County. *Teen Talk* receives an average of 200 to 250 calls from teens each month. In addition to creating *Teen Talk*, the Teen Task Force tackled a number of teen health issues and developed and implemented educational campaigns including:

- Educating the community about smoke-free environments, helping to launch the Teen Tobacco Use Prevention and Cessation Program in Cabarrus County Schools.
- Created and implemented the Be Empowered campaigns, encouraging teens to make healthy life choices by avoiding drugs, alcohol, and tobacco.
- Implemented bullying awareness campaigns, which reached 8,500 high school students.
- Implemented nutrition, exercise, and body image awareness campaigns for seven local high schools.
- Developed resource manuals on STDs, HIV/AIDS, and abstinence for ninth grade health teachers.

Pitt Partners for Health: Injury Prevention Program Makes an Impact in Pitt County

The Eastern Carolina Injury Prevention Program, created in 1995, is one of the longest-standing injury prevention programs in North Carolina. The mission of the program is to improve the health of eastern North Carolina by reducing the number and impact of injuries. The Program engages community agencies to create safer environments. The projects and interventions are driven by local injury data. Interventions include:

- SAFETeens, an interactive curriculum presented to high school driver education classes, educating teens about the dangers of risky driving habits. Over 700 students participate in the program annually.
- AARP Driver Safety Class, a partnership with Pitt Partners for Health to provide refresher driver safety classes for older drivers. Over 100 drivers completed the course over two years.
- The Bicycle Safety Initiative, offered to fourth grade physical education students. The Safe Communities Coalition provides a helmet for each student and an average of 800 students at six to eight schools participate annually.
- Pitt County SAFE KIDS conducts a weekly child safety seat inspection station. They distribute and properly install child safety seats for 200 indigent families annually and provide 800 child safety seat checks annually.

Healthy Carolinians of Macon County: Macon County Responds to Those in Need of Health Care

Where do you go when you're sick and have no medical insurance or money to pay for a doctor's visit? What do you do when you're given prescriptions for medications that total \$300 and you just lost your job and have no pharmacy insurance? Following a community health assessment by Healthy Carolinians of Macon County that showed a need for access to primary care, a group of concerned citizens, local doctors, and representatives of Healthy Carolinians of Macon County formulated a plan to meet the medical needs of the uninsured and low-income residents of the county.

After 11 months of meeting and planning, the Community Care Clinic of Highlands-Cashiers opened its doors to its first patient on December 8, 2005. The support from the community continues to grow with volunteer doctors, nurses, Spanish translators, and clerical volunteers caring for patients. The clinic is open every Thursday evening and patients can be seen on either an appointment or walk-in basis. The clinic serves both acute and chronic disease patients, ranging in age from birth to 64 years old. Approximately 50% of the patients are of Hispanic origin.

In addition to primary care services, the clinic provides free prescriptions to patients. For patients with ongoing medication needs, the clinic works directly with pharmaceutical companies to obtain free medications. Patients in need of outpatient diagnostic testing may receive services without charge through a partnership between the clinic and the two local hospitals. In the months after opening, the clinic served over 760 patients for a total of 1,520 visits. As demand from uninsured patients grows, other groups within the county are considering the feasibility of opening another free clinic.

Healthy Carolinians of Macon County is providing guidance to these new groups as well as the hope that all residents of Macon County can have access to primary care when needed, regardless of ability to pay.

Connecting Communities, Strategies, and Resources

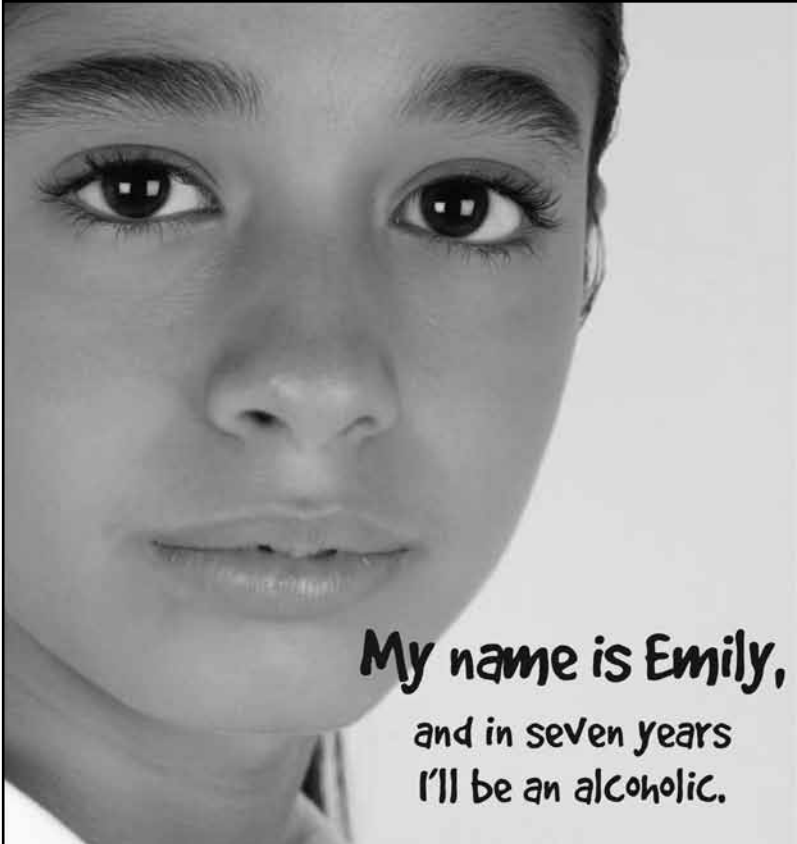
The Office of Healthy Carolinians and the Governor's Task Force are passionate about the ideal of local communities and partnerships actively engaged in and leading community health improvement. We are committed to our partnership with the North Carolina Institute of Medicine, with statewide health care foundations, and with the leadership organizations represented on the Governor's Task Force to disseminate and implement the *North Carolina Prevention Action Plan*, to organize the Healthy NC 2020 Objectives, and to develop a successful health improvement campaign to guide engagement, alignment, transparency, accountability, and leadership. By embracing evidence-based and community-focused improvement strategies, by supporting local health improvement with

policy development and resource deployment, and by helping local coalitions and partnerships connect with robust improvement tools, consulting expertise, health assessment/measurement, and technical assistance, we

can eliminate health disparities, increase health promotion and disease prevention activities, and improve the life-long health of North Carolinians. **NCMJ**

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Spotlight on the Safety Net

*A Community Collaboration
Kimberly Alexander-Bratcher, MPH*

Mobile Clinic Market Project

In these tough economic times, finding new ways to use existing resources is a great way to help meet needs. A new partnership in North Carolina between the Inter-Faith Food Shuttle (IFFS), the North Carolina Community Health Center Association, the North Carolina Foundation for Advanced Health Programs, and the North Carolina Office of Rural Health and Community Care is creating mobile farmers markets at community health centers and rural health clinics for patients with chronic diseases.

The project began through a great example of community collaboration. Susan Yaggy, president and chief executive officer of the North Carolina Foundation for Advanced Health Programs, had previously worked with the Inter-Faith Food Shuttle while in another job. She and David Reese, chief operation officer of food recovery and distribution for IFFS, served as co-chairs on a task force on obesity and chronic disease. Discussions revealed that IFFS needed more locations to deliver food to in rural areas. Following these discussions, Ms. Yaggy convened representatives from the North Carolina Community Health Center Association and the Office of Rural Health and Community Care to meet with Mr. Reese to learn more about IFFS and clinic-based fresh food and vegetable delivery. The group continued meeting to discuss the feasibility of IFFS delivering food to community health centers and rural health clinics. The project would not require any additional funding and could provide people with chronic diseases access to healthy foods—making a connection between fresh fruit and vegetables and medical care.

Inter-Faith Food Shuttle is one of seven Feeding America foodbanks in North Carolina. The Inter-Faith Food Shuttle has been serving the greater Triangle area since 1989. There are more than 165,000 people living in poverty in the seven county service area—putting them at high risk for food insecurity. When a person does not know where or how they will receive three meals a day, 365 days a year, they are considered to be food insecure. IFFS is committed to recovering perishable food, keeping good food out of landfills, and keeping people from food insecurity. The staff recovers products from places like the state farmers market, grocery stores, local farms, and other organizations with food that consumers have not purchased. From its humble beginning recovering unsold breakfast sandwiches, IFFS has grown from recovering 600 pounds of food to more than 6 million pounds of wholesome and nutritious food annually. In addition to food rescue and distribution, the IFFS also operates a culinary job training program, catering service, farms and community gardens, children's nutrition programs, and nutrition and cooking classes focused on affordable, healthy meals. During the school year, IFFS also provides backpacks with six meals and two healthy snacks for children from food insecure homes to eat on weekends.

Another component of the Inter-Faith Food Shuttle is the mobile farmers' market project, a well-established program that addresses access barriers (e.g., price, transportation, and knowledge of resources) to nutritious, affordable food by offering recovered food to low-income neighborhoods. The food is arranged as an open farmers' market and offered to individuals at no cost. IFFS hosted more than 40 of these mobile farmers' markets in the greater Triangle area during the past five years. The mobile farmers' market projects are designed to re-create the farmers' market experience in low-income communities.

The partnership with community health centers and rural health clinics has helped focus on appropriate nutrition for people with chronic diseases. The process is a bit different than the mobile farmers' markets that are usually hosted at senior centers and other neighborhood resource centers. At the mobile clinic markets, health care providers identify patients who have nutritional needs that may help improve their

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medical conditions. Patients are then given a voucher from the clinic to redeem at the mobile clinic market, which may be located in the parking lot or adjoining facility, at no cost to them.

In November 2009, the first mobile clinic market was opened at the Benson Area Medical Center, a rural health center in Benson, in partnership with Tri-County Community Health Center in Newton Grove, North Carolina. The collaboration between the different organizations broke down barriers to healthy, nutritious food and helped connect people in need to available resources. The health care organizations worked with IFFS to set a regular schedule for the food deliveries and two additional mobile clinic markets have been held. In January 2010, a mobile clinic market served more than 40 chronically ill patients at the Carolina Family Health Center in Princeville. Plans are in development for additional pilot locations, including Lincoln Community Health Center in Durham. Using other members of the North Carolina Association of Foodbanks, IFFS plans to expand the mobile clinic market project across the state.

Susan Yaggy notes, "In health care we tell patients to eat healthy, but often they don't have the resources to do that—especially for patients with chronic disease. Immediate translation of a provider's recommendation to eat healthy inside the clinic to fresh fruit and vegetables in the parking lot or back of the same clinic makes that recommendation concrete and achievable."

To learn more about Inter-Faith Food Shuttle, visit <http://www.foodshuttle.org>.

David Reese, MBA, chief operating officer for food recovery and distribution, Inter-Faith Food Shuttle; Susan Yaggy, MPA, president and chief executive officer, North Carolina Foundation for Advanced Health Programs; E. Benjamin Money Jr, MPH, chief executive officer, North Carolina Community Health Center Association; and John Price, MPA, director, North Carolina Office of Rural Health and Community Care, contributed to this article.

Thank you from the *North Carolina Medical Journal*

Without the voluntary assistance and carefully executed reviews of a number of anonymous reviewers, no journal can offer the kind of peer-review for submitted manuscripts that can assure its readers the highest quality of published articles. We are fortunate for the service of a number of individuals who have given generously of their time and expertise in service to the *North Carolina Medical Journal* this past year, and we are pleased to have this annual opportunity to acknowledge their efforts.

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Running the Numbers

A Periodic Feature to Inform North Carolina Health Care Professionals
about Current Topics in Health Statistics

From the State Center for Health Statistics, North Carolina Department of Health and Human Services
<http://www.schs.state.nc.us/SCHS>

The Health and Economic Burden of Chronic Diseases in North Carolina

As with other states, North Carolina's population experiences high rates of certain chronic diseases. Because a comprehensive assessment of the impact of preventable conditions on North Carolina can be lengthy, in this article we focus on the economic effects of selected preventable illnesses resulting in increased hospitalization.

In North Carolina, the direct medical costs related to tobacco use, physical inactivity, and inadequate nutrition alone are estimated to be at least \$6 billion per year.¹ These direct costs are potentially avoidable with changes in tobacco use, physical activity, and nutrition. One specific portion of the economic burden of chronic diseases in North Carolina is apparent in the crude hospitalization rates for the selected diagnosis codes at discharge for persons over 65 years old (see Table 1). Such persons will experience the largest effects from changes in behavior related to tobacco use, physical inactivity, and inadequate nutrition because North Carolina adults are somewhat more likely to smoke, have sedentary lifestyles, and be obese.²

Table 1.
2003-2007 North Carolina Crude Hospitalization Rates (per 100,000 population) for Selected Principal Diagnoses, Ages <65 years

	Total Discharges	NC Population	Crude Rate	Total Charges
COPD	33,507	38,371,194	87.3	\$421,619,932
Lung Cancer	9,957	38,371,194	26.0	\$265,371,112
Diabetes	57,034	38,371,194	148.6	\$787,524,055
CVD	330,137	38,371,194	860.4	\$9,025,569,880
Stroke	47,514	38,371,194	123.8	\$1,124,060,900
HTN	2,682	38,371,194	7.0	\$28,702,085

Source: 2003-2007 North Carolina Resident Inpatient Hospital Discharge Data files. State Center for Health Statistics, November 2009.

Cardiovascular disease (CVD), a general category of disease that includes the first and third leading causes of death in North Carolina—heart disease and stroke—has become a major cause of premature death and years of potential life lost.³ CVD is also a leading cause of hospitalization in North Carolina. During 2003-2007, the total number of discharges for CVD-related illness was 330,137, and the economic burden of CVD and stroke hospitalizations in North Carolina was approximately \$10.1 billion (see Table 1), money that could have been allocated to other needs in North Carolina during these difficult economic times. A comparison between the 2003-2007 rates and costs associated with those hospitalizations and the costs from 1995-1999, reveals that the total charges for hospitalizations doubled. Moreover, approximately 32,000 more discharges occurred during that five-year span (see Tables 1 and 2).

Diabetes is another major cause of disability and death in North Carolina as well as the nation. With a greater prevalence of obesity and an increase of older adults in the state, which are both risk factors for diabetes, that disease is approaching epidemic proportions. The prevalence of diagnosed diabetes in North Carolina has more than doubled during the last decade, increasing from 4.5% of the adult population in 1995 to 9.3% in 2008.² The actual prevalence might be twice as high, given estimates that one undiagnosed case of diabetes exists for every case that is diagnosed. A higher prevalence of all cardiovascular risk factors was identified among persons with diabetes than among those without diabetes.⁴

Chronic obstructive pulmonary disease (COPD) is also a critical public health and economic burden in the United States.⁵⁻¹⁰ During 2003-2007, the total number of hospital discharges associated with COPD in North Carolina was 33,507, and the total hospitalization cost was \$421.6 million, compared with 28,496 and \$225.7 million during 1995-1999 (see Table 2). An estimated 40% of North Carolinians will experience cancer during their lifetime, and lung cancer was one of the leading causes of cancer deaths (5,356 deaths) in 2006.¹¹ Tobacco use is the main cause of lung cancer, which accounted for \$265.3 million in hospitalization costs during 2003-2007 (see Table 1), an increase of \$130 million from the 1995-1999 period (see Table 2). On January 2, 2010, North Carolina House Bill 2/S.L. 2009-27, An Act to Prohibit Smoking in Certain Public Places and Certain Places of Employment, took effect, and this act might help curb and discourage tobacco use in the state. Tobacco use remains the leading preventable cause of death in North Carolina and the nation.¹² It contributes to one of every five deaths in our state—this is more deaths than those attributable to alcohol, drug abuse, motor vehicle crashes, homicide, and HIV/AIDS combined. Approximately 38.1% of adults in North Carolina who are current smokers reported having COPD.¹³

Table 2.
1995-1999 North Carolina Crude Hospitalization Rates (per 100,000 population) for Selected Principal Diagnoses, Ages <65 years

	Total Discharges	NC Population	Crude Rate	Total Charges
COPD	28,496	33,597,767	84.8	\$225,690,716
Lung Cancer	8,663	33,597,767	25.8	\$136,481,326
Diabetes	43,227	33,597,767	128.7	\$342,811,840
CVD	298,124	33,597,767	887.3	\$4,260,891,597
Stroke	39,762	33,597,767	118.4	\$536,315,038
HTN	2,259	33,597,767	6.7	\$11,793,320

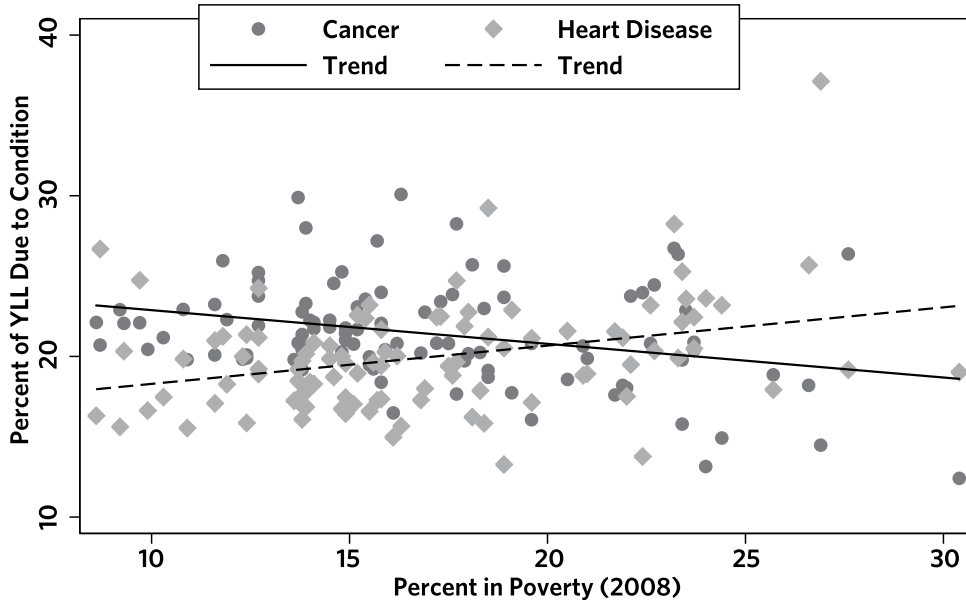
Source: 1995-1999 North Carolina Resident Inpatient Hospital Discharge Data files. State Center for Health Statistics, November 2009.

Sixty-eight percent of all North Carolina premature deaths are preventable, and the leading causes of premature deaths in the state involve modifiable behaviors. Among the leading causes of premature death are tobacco use, unhealthy diet/physical inactivity, alcohol misuse, falls, motor vehicle injuries, and illicit drug use.¹ The combination of physical inactivity and unhealthy eating is the second leading preventable cause of death in North Carolina. Physical inactivity and unhealthy eating increase the risk for chronic diseases (e.g., cardiovascular disease, diabetes, and cancer).

North Carolina's chronic disease burden is not distributed equally among its counties, making geography a correlate of disease burden as a marker for selected health determinants (e.g., socioeconomics, personal behaviors, and environments). To characterize the burden of premature death, years of life lost (YLL)—the difference between the actual age of death and life expectancy—can be used to estimate the relative burden of disease on a population. The percentage of a population's YLLs caused by a specific condition can be used as a measure of the relative burden for a disease on a population. Counties with a

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Figure 1.
North Carolina Counties with Higher Poverty Rates are Disproportionately Affected by Heart Disease



Source: Authors' calculations using North Carolina Vital Statistics and Small Area Income Poverty Estimates, US Census Bureau.

larger percentage of the population living below the federal poverty level tend to have a disproportionate burden of heart disease, whereas more affluent counties have a higher mortality burden of cancer (see Figure 1). Metropolitan counties, which tend to be more affluent, have higher burdens of cancer, whereas counties with a lower socioeconomic status suffer disproportionately more YLLs because of heart disease. Improving prevention programs can help address the chronic disease burden throughout the state.

In our society, maintaining healthy behaviors can be difficult with the barrage of advertisements we experience for fast food, sugar-sweetened products, and tobacco products through television and print media. Creating environments that support healthy eating, physical activity, and smoke-free zones have been demonstrated to improve health. We should also invest in our children's future by promoting healthy eating and physical activity in schools as a way to reduce the health and economic burden of chronic diseases. Preventing chronic diseases and reducing the resulting economic burden can be enhanced by providing families, communities, and policymakers with the knowledge and skills to initiate health behavior changes.

Note: The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Contributed by Camillia Easley, MPH, public health prevention specialist for the Centers for Disease Control and Prevention, Chronic Disease and Injury Section, North Carolina Division of Public Health; Ruth Petersen, MD, MPH, chief, Chronic Disease and Injury Section, North Carolina Division of Public Health; and Mark Holmes, PhD, vice president, North Carolina Institute of Medicine.

Hospital, Heal Thyself: North Carolina Hospitals Make Prevention a Priority to Support Health of their Workforce, Patients, and Communities

Melva Fager Okun, DrPH; Anne Thornhill, MPH; Meg Molloy, DrPH, MPH, RD

Tobacco use and obesity are the leading causes of preventable illness and death in North Carolina. More than one in five adults still smoke in North Carolina, and two-thirds of adults are overweight or obese. This leads to earlier and more acute health effects and mortality, including thousands of premature deaths in the state. In fact, North Carolinians' life expectancy is two years less than the national average.

The cost of tobacco use and obesity-related illness is staggering—North Carolina employers can expect to spend at least \$5,700 more in health care costs per employee (see Figure 1).¹ While employers have clear financial reasons and are in a unique position to support healthy behaviors, only 7% of workplaces nationwide meet the Healthy People 2010 objective of establishing comprehensive, evidence-based wellness practices.²

North Carolina hospitals are at the forefront of supporting healthy behaviors by establishing evidence-based workplace prevention policies, environments, and systems through the Healthy NC Hospitals Initiative. The Initiative is a collaboration between NC Prevention Partners (NCP), the North Carolina Hospital Association, The Duke Endowment, and the leadership and boards of trustees of 125 acute care hospitals. Through the Initiative, North Carolina hospitals have become national leaders in an ambitious wellness effort to support tobacco-free and healthy weight employees, and then to extend prevention into patient care systems. The scale of this initiative is remarkable: North Carolina's 125 acute care hospitals are located in nearly every county, employ over 200,000 workers, welcome thousands of visitors each day, provide more than 15 million patient encounters each year, and are key community health leaders.

With support and guidance from NC Prevention Partners, a statewide nonprofit organization, all of North Carolina's hospitals established 100% tobacco-free campuses between July 2006 and July 2009, an accomplishment that attracted national attention. The Healthy Food Phase began in 2008 and is actively working statewide to support access

to healthy food and employ other strategies to encourage consumer behavior changes in the hospitals. In 2009, NCP began developing a comprehensive tobacco cessation model for hospital employees and patients.

This work would not be possible without the full support and generous funding of The Duke Endowment. At the onset of the project in 2006, with the involvement of The Duke Endowment, NCP project staff was able to start the conversation and attract the attention and interest of hospital leaders. Additionally, the partnership with the North Carolina Hospital Association was critical to the success of the project, providing leadership and endorsement of the Initiative and making their communication resources available.

Developing Comprehensive and Effective Tobacco and Obesity Prevention Strategies

NCP supports North Carolina hospitals in developing their capacity and leadership for evidence-based tobacco and obesity prevention systems. Each initiative has its own Centers of Excellence, hospitals that are clear leaders in the effort and are willing to publicly share their story and assist others. They are diverse in geographic location and size. Developing the evidence-based and practice-tested models involves literature reviews, applied theory, national and state expertise, and testing among the state's leading hospitals. Each phase comes with a comprehensive policy and environmental change model (see Table 1, page 98).

Using Dissemination Theory to Promote Statewide Adoption

NCP uses Oldenburg and Parcel's theory of diffusion of innovations³ to guide the statewide adoption of wellness policy, including gaining executive commitment and guiding hospitals through stages of implementation. There are several core elements throughout the implementation process:

- Strategic partnerships include NCP's critical relationship with the North Carolina Hospital Association, The Duke

Melva Fager Okun, DrPH, is a senior health promotion manager at NC Prevention Partners. She can be reached at melva (at) ncpreventionpartners.org.

Anne Thornhill, MPH, is a senior health promotion manager at NC Prevention Partners.

Meg Molloy, DrPH, MPH, RD, is the executive director of NC Prevention Partners.

Endowment, national tobacco and obesity prevention experts, food industry partners, hospital CEOs, and health care providers.

- Detailed and tailored technical assistance, including site visits, webinars, trainings, action planning, and case studies.
- The innovative and comprehensive WorkHealthy America, including an assessment tool, a 90-question survey on tobacco, nutrition, and physical activity wellness policies; generating a grade per section; tailored benchmarks for improvement; and access to tools and resources.
- Map of implementation progress helps hospitals fuel efforts based on friendly competition and a desire to be part of a statewide movement (see Figure 2, page 99).
- Statewide and public celebration, including annual awards ceremony, media assistance, and letters sent directly to executives to applaud leadership.

Ensuring Hospital Commitment to Wellness

In making the case that the proposed policy is better than the current one, NCPP highlights health care savings of prevention, makes the connection to the health care mission of the hospital, and shows executive and statewide endorsement.

Every administrator must be able to see how the proposed policy would work on their unique campus. Using the assessment to capture current status, NCPP builds an action plan for policy implementation that is tailored to the hospital’s current state, providing simple short- and long-term steps towards full implementation. Additionally, NCPP regularly convenes stakeholders, such as the Hospital Advisory Team, Preventive Benefits Roundtable, or Food Industry Roundtable, to identify ways to ease implementation and reduce large-scale barriers.

Hospitals need to know that the policies NCPP is proposing are attainable and observable in other hospitals. The Centers of Excellence and other leading hospitals provide first-person accounts of success. In addition, NCPP hosts online and in-person training events where hospitals can hear directly from each other about implementation success and have access to the dozens of detailed technical assistance tools.

Assisting Hospitals through Stages of Implementation

There are four basic stages of implementation: planning and persuasion, commitment to initiate, implementation,

and maintenance and compliance. NCPP works with our key partners and hospitals to encourage momentum and success at each stage.

Planning and persuasion involves tailored messaging to multiple stakeholders in each hospital—from the executive suite to the wellness, security, clinical, and food service staff who do the day-to-day work the policy requires. Tailored pitches motivate hospital staff and address their barriers and concerns. Key partnerships with The Duke Endowment, the North Carolina Hospital Association, regional hospital associations, food management companies, and other critical partners allow NCPP to gain entrée and trust with hospital leaders. NCPP also fosters friendly competition

Figure 1.
The Cost of Doing Nothing in North Carolina¹

**Tobacco Use, Physical Inactivity and Poor Nutrition
Cost North Carolina \$26 Billion Each Year**

	North Carolina	Per Employee	Per Resident
Tobacco Use	\$4.75 billion	\$1,051	\$536
Nutrition, Overweight and Obesity	\$12.1 billion	\$8,676	\$1,366
Physical Inactivity	\$8.970 billion	\$1,984	\$1,013
Total	\$25.82 billion	\$5,711	\$2,915

among hospitals and systems by tracking statewide progress on maps and by acknowledging and celebrating success through a statewide prevention newsletter, annual awards ceremony, hospital to hospital competitions, and media support.

Getting hospitals to ‘sign on’ to the tobacco-free or healthy food initiatives can take different forms of persuasion, depending on the culture of each hospital. The CEO Commitment is a simple form that CEOs sign to show their support for wellness. Wellness and human resource directors complete the NCPP WorkHealthy America Assessment to see where their organization has opportunities to strengthen prevention policies, benefits and, programs, and then they attend a training event to initiate implementation.

Implementing the action plan can take time—sometimes more than one year—and maintenance of these changes requires ongoing diligence. Therefore the commitment to wellness needs to be from the executive level, and the action plan should be developed with a cross-cutting wellness team to guide its development and execution. NCPP provides

technical assistance through site visits, webinars, online tools, and other resources throughout the process.

Barriers to Implementation

Many barriers to implementation at the start of the Initiative were typical, including a lack of prevention focus

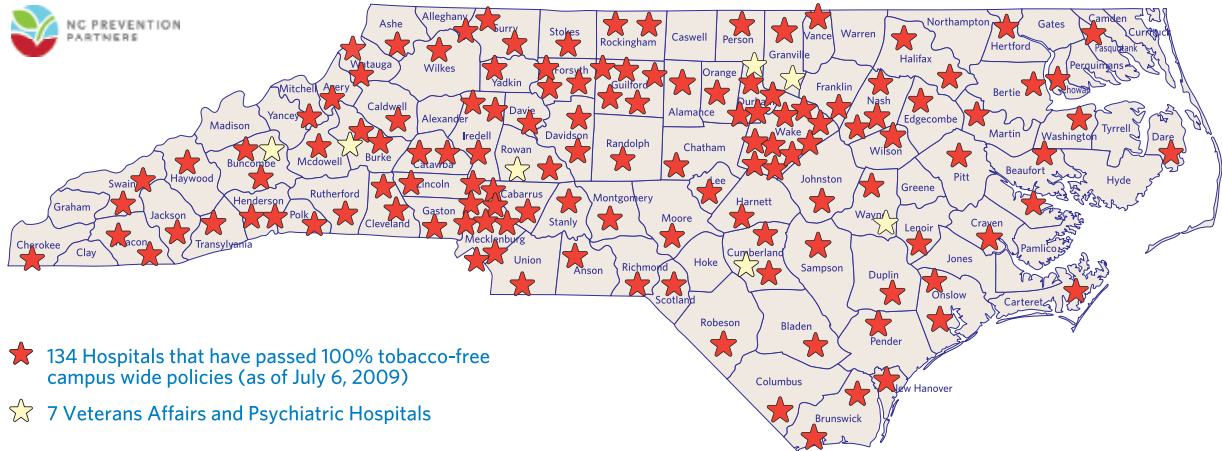
in the organization’s strategic plan, lack of strong leadership within wellness teams, insufficient budgeting for wellness, and lack of awareness about effective obesity prevention and tobacco-free system models. Perhaps the strongest barrier is cultural—North Carolina’s ties to tobacco and Southern style foods clearly shape attitudes and behaviors.

Table 1.
Policy Change Models for the Healthy NC Hospital Initiative

Phase	Phase 1: Tobacco-Free Campus	Phase 2: Healthy Food Environment	Phase 3: Quit Tobacco Systems for Employees and Patients
Evidence-based policy and environmental change	<ul style="list-style-type: none"> ■ Written policy to prohibit use of all tobacco products on hospital campus ■ Clear signage informing staff and visitors of tobacco-free campus policy ■ Enhancement of cessation benefits available for employees, patients, and visitors ■ Development and implementation of compliance plan ■ Preparation and training for staff 	<ul style="list-style-type: none"> ■ Provide access to healthy food using NCPP’s standard definitions of healthy, working through vendors to bring in healthy items, staff training on recipe preparation and portion sizes, and a commitment to provide healthy foods whenever any food is provided ■ Use pricing strategies to incentivize healthy options ■ Use marketing strategies, including icons to identify healthy options, nutrition information at the point of selection, and strategic placement of healthy options ■ Promote benefits and incentives that encourage lifelong healthy nutrition ■ Educate staff and visitors about healthy options and good nutrition 	<ul style="list-style-type: none"> ■ Provide a systems approach, identify all tobacco-using employees and patients, educate and advise to quit, refer to medications and counseling, follow-up ■ Offer and promote cessation benefits at no-cost or low-cost, include counseling, and access to prescription and over-the-counter medications ■ Provide and promote incentives to motivate joining quit programs and successful quitting for employees ■ Establish tobacco use as a vital sign or required field for patient medical records ■ Provide health care team counseling approach ■ Offer cessation medications, both prescription and nicotine replacement therapies (NRTs), counseling, and community follow-up, use fax referral to the NC Quitline ■ File reimbursements for quit coaching for patients
Centers of Excellence	<ul style="list-style-type: none"> ■ Chowan Hospital ■ FirstHealth of the Carolinas, Moore Regional Campus ■ Mission Hospital 	<ul style="list-style-type: none"> ■ Carolinas Medical Center ■ FirstHealth of the Carolinas, Moore Regional Campus ■ Mission Hospital ■ Pitt County Memorial Hospital ■ Wake Forest University Baptist Medical Center 	<ul style="list-style-type: none"> ■ Chowan Hospital ■ FirstHealth of the Carolinas, Moore Regional Campus ■ Mission Hospital ■ Wake Forest University Baptist Medical Center

For more information, please go to: www.ncpreventionpartners.org/hospitals.

Figure 2.
NC Prevention Partners Helps Hospitals Establish 100% Tobacco-Free Campuses, Provides Comprehensive Cessation Support, and Builds Tobacco-Free Communities



This map includes all acute care hospitals as defined by the NC Hospital Association, and other participating hospitals. Healthy NC Hospitals is managed by NC Prevention Partners (www.ncpreventionpartners.org) and is funded by The Duke Endowment in partnership with the NC Hospital Foundation. For more information, contact Melva Fager Okun, DrPH, at [melva \(at\) ncpreventionpartners.org](mailto:melva@ncpreventionpartners.org) or 919.969.7022 ext. 202; NC Prevention Partners, 88 Vilcom Circle, Suite 110, Chapel Hill, NC 27514.

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The key to overcoming these barriers is establishing a new culture—one where wellness is prioritized and supported at all levels of the hospital. A clear catalyst for this change began with The Duke Endowment and the North Carolina Hospital Association. They have provided critical leadership that prioritizes wellness. Funding to NCPP allowed for the creation of a statewide leadership movement to share successful wellness change models between hospitals. Additionally, the formation of a Hospital Advisory Team and the Centers of Excellence allowed policy models to be firmly based in science and practice-tested before they were offered to hospital leadership teams.

NCPP staff created unique tools that distilled the science into feasible, ready-to-implement models, and then provided training and technical assistance to support the goals to be accomplished in an efficient and effective manner. Joining with innovative and progressive corporate leadership in the state's hospitals, the NCPP staff acted as agents of change, constantly pointing a positive, bright, shining spotlight on the hospitals that were setting the highest mark. The biggest and the smallest hospitals all caught the attention of the NCPP staff.

Cultural changes are slower to make but are more significant. At the onset of the Initiative, many were doubtful of the chances for success in creating tobacco-free zones at every acute care hospital in the state. William Pully, president of the North Carolina Hospital Association, stated, "If I were a betting man, I would have bet against this project being

successful and lost a lot of money." He was not alone in this feeling. Even now, after the last hospital in North Carolina went tobacco-free campus-wide on July 6, 2009, many state and national leaders are impressed that North Carolina is the first state in the nation to meet this milestone. The same is true for making healthy food the easy and affordable choice. Food behaviors will change slowly, but it will happen by making healthy options accessible, affordable, and by using effective marketing techniques.

Hospitals: Community Leaders in Prevention and Wellness

To date, the Healthy NC Hospital Initiative has reached millions of North Carolinians through effective policies that promote healthy eating and reduce exposure and use of tobacco products (see Table 2, page 100). As the Initiative matures, longer term outcomes will be assessed.

NCPP has just released a new comprehensive approach to promoting physical activity in worksites. We anticipate hospitals will take a lead in establishing new norms for supporting employees to increase their physical activity, just as they have in quitting tobacco and improving nutrition.

Hospitals have responded to NCPP's call to action to take the lead in promoting worksite wellness, tobacco-free behaviors, and access to healthy and affordable foods. Many hospitals have already begun transferring this worksite commitment to a community commitment, serving as role-models and resources for other businesses in the community

seeking to promote prevention. Examples of the specific role hospitals can play in communities include: serving as mentors for schools in promoting affordable and delicious healthy foods, promoting tobacco cessation services among private businesses, and convening community leaders to take a broader approach to prevention.

Because hospitals are huge employers and have a community-based commitment to health, they are clear leaders and innovators in promoting employee and community wellness. Often the hospital is able to establish a new community norm that other institutions are able to follow. For example, in some communities, the local hospital's tobacco-free policy allowed other community businesses and organizations to follow suit. NC Prevention Partners is proud to work alongside North Carolina's hospital leaders, setting the pace and celebrating their significant accomplishments. Other workforce and community

sectors, such as schools, churches, and small businesses, can look to hospitals for their example and resources in implementing those same healthy workplace policies in their environments. **NCMJ**

Table 2.
Impact of the Healthy NC Hospital Initiative,
July 2006-December 2009

Key Process Measures	<ul style="list-style-type: none"> ▪ 134 hospitals have implemented 100% tobacco-free environments on campus ▪ 23 hospital clinical services now fax-refer patients to QuitlineNC ▪ 48 hospitals have implemented healthy food environments on campus ▪ 52 hospitals have action plans for healthy food environment implementation in 2010
Health Impacts	<ul style="list-style-type: none"> ▪ 210,000 hospital employees are protected from exposure to secondhand smoke while at work ▪ 900 hospital patients and employees who use tobacco were given access to the NC Quitline ▪ 15 million patient visits to North Carolina hospitals are secondhand smoke-free ▪ 80,000 hospital employees have daily access to affordable healthy food

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Readers' Forum

To the editor:

The title of the article "Health Reform in North Carolina: Market Hazard, Moral Imperative: Why We Need Health Reform" (Fitzsimon C. *NC Med J*. 2009;70(5):404-405) seemed to promise a serious consideration of how market forces could be used to address health care reform. Instead, the article dismissed market-based solutions as "...based on the assumption that a significant factor in health costs is that individuals with insurance are unaware of the total cost of their care..." Market-based solutions, like health savings accounts, are powerful, and based on basic economic concepts of incentives, supply, and demand. The problem with our current health care system is not simply that patients are unaware of their health care costs; the problem is that when patients make decisions regarding health care consumption, they largely don't care what the cost of the care is because someone else is paying the bill.

When a third party pays for medical care, patients have virtually no incentive to conserve on their cost of care. When offered a \$4 generic or an \$800 brand name medication that provides only a marginally greater benefit, but which is fully paid for by an insurer, the patient will choose the \$800 medication because it is marginally better. The physician will rightly offer that medication to the patient because it is the physician's role to offer the patient the best possible care; the physician's role is not to ration health care based on price.

If an insurer is paying for health care, the patient has no economic incentive to shop around for the lowest cost provider for an expensive radiologic test or to choose a lower cost office-based procedure over a much higher cost, perhaps marginally better hospital-based procedure. Even if a test or procedure covered by the third party is only marginally valuable, physicians must still offer the test and the patient will likely accept having the test, even if it isn't cost-effective by any standard.

When someone else is paying the bill for medical care, health care prices skyrocket, as they would for any consumer good that would be paid for by a third party. The resulting bloated health care prices prevent uninsured patients from affording even basic health care.

We have several choices:

1. Continue to have a third party payment system with continued high and escalating health care costs, living with a significant uninsured population or further exacerbating the cost problem by insuring that population.
2. Have a third party payment system in which the third party institutes serious controls over the availability, use, and price of care—in other, somewhat less appealing words, rationing care.
3. Return the responsibility for health care cost decision making to the consumer.



Each of these solutions has advantages and disadvantages. The primary advantage of returning the responsibility of paying for care to patients is that they will shop around, creating incentives to reduce health care prices. Most patients would choose lower cost treatment options over high cost options that do not offer substantial value. Medications would no longer be priced at ridiculous levels, as patients would not purchase them. Demand for marginally beneficial, expensive laboratory and radiologic testing would drop, while much needed incentives would be in place to encourage development of technologies that reduce the cost of care. The high costs of health care would be dramatically reduced, so even the uninsured could afford care.

On a daily basis we see the power of market forces to affect patients' decisions. The suddenly ubiquitous "copayment assistance" offered by pharmaceutical companies removes what little disincentive patients have for choosing overpriced medications. Without any responsibility for cost, patients (at least the well-insured ones) get great access to wonderful treatment, but this comes at an enormous cost to society.

A disadvantage of making patients responsible for paying for their own care is that patients may make some decisions that others might consider unwise. Fitzsimon's article gives the example of foregoing treatment for high blood pressure. However, in a world in which patients paid from their own pocket for medical care, all medical care would be far less expensive, such that treating high blood pressure would become far more affordable. Nevertheless, patients who choose to forego some care because they have

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other priorities is not a deal breaker. People make reasoned choices among more and less safe cars, better and worse diets, and more and less risky behaviors, weighing the costs against benefits and alternatives they might otherwise choose.

Such decisions are critically important in end-of-life care. Much of the cost of health care is spent in the last year of life. Having a third party (or worse, the physician) make decisions to restrict end-of-life care because of cost is repugnant. Putting patients and their families in charge of these difficult decisions may be a more reasonable way to deal with this problem.

The combination of health care savings accounts, catastrophic coverage, and significant copayments tied to

patients' income/wealth offers an economically rational approach to addressing the health care cost crisis. A "public option" based on such a system could immediately improve access for the uninsured while bending down the health care cost curve. Eliminating tax breaks for indemnity health insurance plans and providing tax breaks for high deductible, catastrophic plans would encourage rapid transition to patient-centered coverage that would encourage more appropriate use and pricing of medical resources.

*Steven R. Feldman, MD, PhD
Professor of Dermatology, Pathology,
and Public Health Sciences
Wake Forest University*

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Health Reform: An Invitation to Contribute to the Discussion

The run up to the November election brought a lot of attention to health reform. Both major candidates presented relatively complete plans for major changes in the way we pay for health care and how we structure our health care delivery system. The appointments by President Obama point to a sustained effort to implement real change. This has prompted many experts and representatives of patients, providers, and payers to propose their own plans for reform. The *North Carolina Medical Journal* will be taking a part in this discussion with a section of the *Journal* devoted to articles and analyses that focus on reform. We would like to invite submissions that help the readership of the *Journal* understand why reform may be necessary, how the system should be changed, and how national reform will affect North Carolina. We invite scholarly discussions and analyses as well as commentaries that help illustrate the benefits as well as the problems that comprehensive change will bring to the costs, quality, and outcomes of health care and to the health of the people of North Carolina. The seventh installment of this series starts on page 26 of this issue of the *Journal*.

North Carolina
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Don't Miss the Opportunity of Two Lifetimes

The average woman of childbearing age has 3.8 medical visits each year. Unfortunately many of these women do not receive preventive health information on topics such as exercise, nutrition, smoking, sexually transmitted infections, stress management, intimate partner violence, folic acid, or pregnancy planning. This information is important not only for women but for the health of babies they may have in the future. Regardless of specialty, health care providers can impact the health of two generations when they offer preventive care to North Carolina's young women.

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