

NCMJ

NORTH CAROLINA MEDICAL JOURNAL

a journal of health policy analysis and debate

Promoting Healthy and Sustainable Communities



*to control and direct the
written, where the employe
w the work is to be perfo*
**Employment
Opportunities**
*ymment is a contract b
in the service of a*

Also in this issue

- Evaluation of the NC Violent Death Reporting System
- Cost of Medicaid coverage for the uninsured: Evidence from Buncombe County
- Farewell and welcome to NCMJ editors in chief
- Caring for strangers: The challenge for health policy



Before.



After.



Comprehensive Hand & Wrist Care

If simple activities — like opening a jar of peanut butter — are painful or impossible for your patients, put their hands in ours. At Carolinas HealthCare System, our hand and wrist experts can help patients overcome discomfort caused by carpal tunnel, or by fractures, sprains and injuries of the fingers, hand, wrist and lower arm.

Learn more at www.carolinashealthcare.org/hand.



Carolinas HealthCare System



VIDANT HEALTH™

VidantHealth.com

Can taking care of
diabetes now mean
more days like this later?

Yes.

At Vidant Health, our mission is to not just treat disease, but to prevent it in the first place. In eastern North Carolina, diabetes is a serious problem, but one that we're attacking through education at a personal and community level. We're reaching out to communities and patients, and helping people understand more about diabetes and how to manage it through modification to diet, exercise and other lifestyle changes.

For tools and resources to help detect and manage diabetes, visit VidantHealth.com/diabetes.

WalkBikeNC

NORTH CAROLINA STATEWIDE PEDESTRIAN AND BICYCLE PLAN

*Help us create a more walkable,
bikeable North Carolina.*

Join the conversation at walkbikenc.com.

Publishers of the *North Carolina Medical Journal*

The North Carolina Institute of Medicine

In 1983 the North Carolina General Assembly chartered the North Carolina Institute of Medicine as an independent, quasi-state agency to serve as a nonpolitical source of analysis and advice on issues of relevance to the health of North Carolina's population. The Institute is a convenor of persons and organizations with health-relevant expertise, a provider of carefully conducted studies of complex and often controversial health and health care issues, and a source of advice regarding available options for problem solution. The principal mode of addressing such issues is through the convening of task forces consisting of some of the state's leading professionals, policymakers, and interest group representatives to undertake detailed analyses of the various dimensions of such issues and to identify a range of possible options for addressing them.



The Duke Endowment

The Duke Endowment, headquartered in Charlotte, NC, is one of the nation's largest private foundations. Established in 1924 by industrialist James B. Duke, its mission is to serve the people of North Carolina and South Carolina by supporting programs of higher education, health care, children's welfare and spiritual life. The Endowment's health care grants provide assistance to not-for-profit hospitals and other related health care organizations in the Carolinas. Major focus areas include improving access to health care for all individuals, improving the quality and safety of the delivery of health care, and expanding preventative and early intervention programs. Since its inception, the Endowment has awarded \$2.9 billion to organizations in North Carolina and South Carolina, including more than \$1 billion in the area of health care.

THE DUKE ENDOWMENT

North Carolina Medical Journal
Founded by the North Carolina
Medical Society in 1849

Publisher

Pam C. Silberman, JD, DrPH
NC Institute of Medicine
Morrisville

Publisher

Eugene W. Cochrane Jr
The Duke Endowment
Charlotte

Editor in Chief

Peter J. Morris, MD, MPH, MDiv
Wake County Human Services
Raleigh

Scientific Editor

John W. Williams Jr, MD, MHS
Duke University Medical Center
Durham

Assistant Scientific Editor

George L. Jackson, PhD, MHA
Duke University Medical Center
Durham

Editor Emeritus

Gordon H. DeFries, PhD
University of North Carolina
Chapel Hill

Editor Emeritus

Francis A. Neelon, MD
Duke University
Durham

Associate Editor

Dana D. Copeland, MD, PhD
WakeMed
Raleigh

Associate Editor

Mark Holmes, PhD
University of North Carolina
Chapel Hill

Associate Editor

Mary L. Piepenbring
The Duke Endowment
Charlotte

Associate Editor

Charles F. Willson, MD
East Carolina University
Greenville

Section Editor, Running the Numbers

Robert E. Meyer, PhD
NC DHHS
Raleigh

Interim Managing Editor

Jennifer R. Hastings, MS, MPH
NC Institute of Medicine
Morrisville

Assistant Managing Editor

Phyllis A. Blackwell
NC Institute of Medicine
Morrisville

Business Manager

Adrienne R. Parker
NC Institute of Medicine
Morrisville

NCMJ

a journal of health policy analysis and debate

NORTH CAROLINA MEDICAL JOURNAL

Editorial Board

William K. Atkinson II, PhD, MPH, MPA / WakeMed Health & Hospitals, Raleigh
Ronny A. Bell, PhD, MS / Wake Forest School of Medicine, Winston-Salem
Steve Cline, DDS, MPH / Office of Health Information Technology, NC DHHS, Raleigh
Paul R. Cunningham, MD, FACS / East Carolina University, Greenville
Megan Davies, MD / Division of Public Health, NC DHHS, Raleigh
Fred M. Eckel, MS / NC Association of Pharmacists, Chapel Hill
Charles T. Frock / FirstHealth, Pinehurst
Elizabeth R. Gamble, MD, MSPH / Wake Forest University, Winston-Salem
Ted W. Goins Jr / Lutheran Services for the Aging, Salisbury
Lorna Harris, PhD, RN, FAAN / National Black Nurses Association, Chapel Hill
Timothy J. Ives, PharmD, MPH, BCPS, FCCP, CPP / UNC-Chapel Hill, Chapel Hill
Michelle Jones, MD, FAAFP / Wilmington Health Associates, Wilmington
Delma H. Kinlaw, DDS / NC Dental Society, Cary
Earl Mabry, MD / Mecklenburg County Health Department, Charlotte
Mark Massing, MD, PhD, MPH / The Carolinas Center for Medical Excellence, Cary
Perri Morgan, PhD, PA-C / Duke University, Durham
M. Alec Parker, DMD / NC Dental Society, Cary
William R. Purcell, MD / NC General Assembly, Raleigh
Suzanne Reich, MPAS, PA-C / Wake Forest University, Winston-Salem
Devdutta Sangval, MD, MBA / Duke University, Durham
Stephen W. Thomas, EdD / East Carolina University, Greenville
Polly Godwin Welsh, RN-C / NC Health Care Facilities Association, Raleigh

The *North Carolina Medical Journal* (ISSN 0029-2559) is published by the North Carolina Institute of Medicine and The Duke Endowment under the direction of the Editorial Board. Copyright 2012 © North Carolina Institute of Medicine. Address manuscripts and communications regarding editorial matters to the managing editor. Address communications regarding advertising and reader services to the assistant managing editor. Opinions expressed in the *North Carolina Medical Journal* represent only the opinions of the authors and do not necessarily reflect the official policy of the *North Carolina Medical Journal* or the North Carolina Institute of Medicine. All advertisements are accepted subject to the approval of the editorial board. The appearance of an advertisement in the *North Carolina Medical Journal* does not constitute any endorsement of the subject or claims of the advertisement. This publication is listed in PubMed.

Interim Managing Editor: Jennifer R. Hastings, MS, MPH, 919.401.6599, ext. 22, or jennifer_hastings@nciom.org. **Assistant Managing Editor:** Phyllis A. Blackwell, 919.401.6599, ext. 27, or phyllis_blackwell@nciom.org. **Graphic Designer:** Angie Dickinson, angiedesign@windstream.net. **Contract copy editors:** Flora Taylor, Christine Seed. **Printer:** The Ovid Bell Press, 1201-05 Bluff Street, Fulton, MO 65251, 800.835.8919. **Annual Subscriptions (6 issues):** Individual, \$42.80 (\$40 plus 7% NC tax); Institutional, \$64.20 (\$60 plus 7% NC tax).

The *North Carolina Medical Journal* is published in January/February, March/April, May/June, July/August, September/October, and November/December. Periodicals postage paid at Morrisville, NC 27560 and at additional mailing offices. **POSTMASTER:** Send address changes to the *North Carolina Medical Journal*, 630 Davis Drive, Suite 100, Morrisville, NC 27560. **Canada Agreement Number:** PM40063731. Return undeliverable Canadian addresses to: Station A, PO Box 54, Windsor, ON N9A 6J5, e-mail: returnsil@imex.pb.com.

Cosponsors of the North Carolina Medical Journal are The Carolinas Center for Medical Excellence / North Carolina Association of Pharmacists / North Carolina Dental Society / North Carolina Health Care Facilities Association / North Carolina Hospital Association / North Carolina Medical Society
Members of these organizations receive the *North Carolina Medical Journal* as part of their membership fees. Additional major funding support comes from **The Duke Endowment**.

North Carolina Institute of Medicine 630 Davis Drive, Suite 100, Morrisville, North Carolina 27560
Phone: 919.401.6599; Fax: 919.401.6899; e-mail: ncmedj@nciom.org; <http://www.ncmedicaljournal.com>

Published by the North Carolina Institute of Medicine and The Duke Endowment



Brier Creek
MEDICAL PAVILION



*Class A Medical Space in the
Heart of Brier Creek*

Full Floors Available
2,000 - 17,923 SF
Up to 43,611 SF

10207 Cerny Street
Raleigh, NC

- Last large block of medical space available in the submarket
- Parking: 5 spaces per 1,000 SF
- Building signage available
- Close proximity to restaurants, shops, hotels, Brier Creek Country Club, and Brier Creek Elementary School
- Excellent location with easy access to all major area hospitals and I-40, I-540, US-70 and RDU



Scan QR code with your mobile device to view property video

For more information:

Hillman Duncan, CCIM, SIOR
Hillman.Duncan@cassidyurley.com

919.789.4255

**Cassidy/
Turley** Commercial
Real Estate Services



Moving is the best medicine.

Keeping active and losing weight are just two of the ways that you can fight osteoarthritis pain. In fact, for every pound you lose, that's four pounds less pressure on each knee. For information on managing pain, go to fightarthritispain.org.





Include the
NCMJ in
your social
network.

Visit the NCMJ Web

site to access the
journal's Twitter
feed and Facebook
page and to

register for a free
subscription to the
journal's electronic
edition.



Original Articles

- 257** Evaluation of the North Carolina Violent Death Reporting System, 2009
Natalie J.M. Dailey, Tammy Norwood, Zack S. Moore, Aaron T. Fleischauer, Scott Proescholdbell
- 263** The Cost of Medicaid Coverage for the Uninsured: Evidence From Buncombe County, North Carolina
Wenke Hwang, Leah Griffin, Kimberly Liao, Mark Hall

Policy Forum

Promoting Healthy and Sustainable Communities

INTRODUCTION

- 269** Promoting Healthy and Sustainable Communities
Peter J. Morris

ISSUE BRIEF

- 270** Forging New Partnerships to Build Healthier Communities for a Healthier State
Ruth Petersen, Julie A. Hunkins, Lisa Diaz Riegel, Libby Smith

INVITED COMMENTARIES AND SIDEBARS

- 274** The North Carolina Department of Transportation's Vision for Healthy Communities Through Sustainable Transportation
Eugene A. Conti Jr, Paul F. Morris, Julie A. Hunkins
- 278** The North Carolina Department of Commerce: A Healthy Workforce Promotes Economic Security
Libby Smith, John Morck
- 281** The North Carolina Department of Environment and Natural Resources: Clean Land, Water, and Air for Healthy People and Communities
Lisa Diaz Riegel, Charles Wakild, Laura Boothe, Heather J. Hildebrandt, Bruce Nicholson
- 286** The North Carolina Division of Public Health's Vision for Healthy and Sustainable Communities
Cathy Thomas, Lori K. Rhew, Ruth Petersen
- 287** Tobacco-Free Parks: Maximizing Health Impact in Built Environment Planning [sidebar]
Erin Shoe
- 289** Shape Your World [sidebar]
Cathy Thomas, Lori K. Rhew, Ruth Petersen
- 290** Planners and Public Health Professionals Need to Partner...Again
Mitchell Silver
- 291** The Blue Ridge Corridor Experience [sidebar]
Stuart Levin

- 293** Economics, Physical Activity, and Community Design [sidebar]
David Chenoweth

- 297** Health Impact Assessments in North Carolina: Promoting Public Health Through Informed Decisions
Katherine A. Hebert

- 301** North Carolina Tomorrow: Building Communities for Tomorrow's Jobs
Joe McKinney, Betty R. Huskins

- 304** Two North Carolina Public Health Departments Taking Steps Toward Sustainable Communities
John H. Morrow, Beth G. Lovette

- 305** Active Living By Design: Collaborating to Build Healthy Communities in North Carolina [sidebar]
Philip Bors, Joanne Lee

- 310** Local Food Systems for a Healthy Population
Nancy G. Creamer, Rebecca D. Dunning

- 312** Appalachian Sustainable Agriculture Project: Growing Minds and Healthy Communities [sidebar]
Maggie Cramer

DEPARTMENTS

- 315** Running the Numbers
North Carolina Pedestrian Crash Facts
Lauren Blackburn, Helen Chaney, Cliff Braam
- 321** Philanthropy Profile
Building Healthier Communities to Support Healthier Individuals
Kathy Higgins, Jennifer MacDougall
- 325** Tar Heel Footprints in Health Care
Jo Morgan
Anne M. Williams

From the NCIOM

- 254** Farewell and Welcome to NCMJ Editors in Chief
Pam Silberman

Perspectives

- 255** Caring for Strangers: The Challenge for Health Policy
Thomas C. Ricketts III

Correspondence

- 326** Choose Your Words Carefully, Please
S. Dean Stacy

Reader Services

- 327** Classified Advertisements
328 Advertiser Index

Farewell and Welcome to NCMJ Editors in Chief

Pam Silberman, JD, DrPH

Dear Readers—With this issue, we bid adieu to our editor in chief since 2006, Thomas C. Ricketts III, PhD, MPH. Dr. Ricketts has been a great leader of the NCMJ. He has extensive knowledge of the health care system, health professional workforce, and public health at the state, national, and international levels. His knowledge of health and health care in North Carolina combined with his experience in journalism has been a great asset to the journal. We will miss his counsel and guidance.



Dr. Ricketts helped shepherd in several changes to the journal. During his tenure, we changed our name from the North Carolina Medical Journal to the NCMJ, signifying that many of the health issues covered in the NCMJ are not purely medical in nature. Dr. Ricketts also helped increase the NCMJ's online presence, and suggested a number of special articles

on topics of particular interest to our readers.

We wish him the best as he continues in his positions of professor of health policy and management at the Gillings School of Global Public Health, University of North Carolina at Chapel Hill (UNC-Chapel Hill), professor of social medicine at the School of Medicine, UNC-Chapel Hill, deputy director of the Cecil G. Sheps Center for Health Services Research, UNC-Chapel Hill, and visiting professor with École des Hautes Études en Santé Publique (School for Advanced Studies in Public Health) in Paris and Rennes, France.

At this time, we would also like to welcome Peter J. Morris, MD, MPH, MDiv, as the NCMJ's new editor in chief. He brings a wealth and breadth of experience to this role, as well as enthusiasm and vision. Dr. Morris practices pediatrics, epidemiology, and preventive medicine at Wake County Human Services. He currently serves as the organization's medical director where he oversees all aspects of clinical

care, and also serves as the compliance officer leading quality assurance and quality improvement accreditation efforts. In addition, Dr. Morris is a clinical associate professor in the Department of Pediatrics at UNC-Chapel Hill. He is past president of the North Carolina Pediatric Society and the Wake County Medical Society, and currently serves as the president of the



North Carolina Pediatric Society Foundation. In addition, he is a hospitalist at WakeMed Health and Hospitals where he teaches and mentors students and residents practicing pediatrics. He also serves on the board of the North Carolina Partnership for Children, chairs the board of Action for Children North Carolina, and co-chairs the North Carolina Child Fatality Task Force.

Although Dr. Morris is formally trained as a pediatrician, he has experience in providing and managing public health, mental health, and social services. He has served as Wake County Human Services' liaison to the North Carolina Association of Directors of Social Services, the North Carolina Association of Local Health Directors, and the North Carolina Council of Community Programs. In addition to all of these roles, he has practiced pediatric medicine in a small rural community in Kentucky, as well as in Wake County.

Dr. Morris received both his medical degree and master's in public health in epidemiology from UNC-Chapel Hill, and his master's degree in divinity from Duke University. He is board certified in both pediatrics and preventive medicine.

We enthusiastically welcome our new editor in chief to the NCMJ, and we look forward to his leadership and the new ideas he brings. NCMJ

Pam Silberman, JD, DrPH
Co-Publisher, NCMJ

Caring for Strangers: The Challenge for Health Policy

Thomas C. Ricketts III, PhD, MPH

As I step down as editor in chief of the NCMJ, I wanted to take a little time to reflect on the goals of such a journal and to assess how well we were meeting those goals. Our primary goals have always been to help North Carolinians be as healthy as they can be and to assist those professionals and lay people whose job it is to take care of others. The NCMJ is intended to help the broadest possible audience understand some of the most complex aspects of the human condition, as well as the most complicated interactions between people, health, and health care.

Taking care of others, call it meeting the “needs of strangers,” is a very human response to illness and injury but also a choice that becomes political when we bring our collective resources to the task. The Needs of Strangers is the title of a book by Michael Ignatieff, a philosopher and failed politician. Ignatieff wrote of how the measure of a society could be taken by observing how it cared for strangers, those people we don’t know but with whom we share the bond of citizenship or common residency in our nation, state, or community. We care for strangers in many ways, for example, by using tax money to provide clean water or to support health insurance systems like Medicare or Medicaid. We, perhaps unknowingly, pay for the care of strangers in private insurance systems, as uncompensated care is paid for with private payments.

This care of strangers is often done grudgingly and within a system that reminds the recipient that they are lucky to enjoy this attention. “Public assistance,” for example, has become a synonym for dependency and weakness in our public discourse. At times, however, we rise to the challenge of seeing others not as strangers but as fellow citizens, deserving a chance to succeed in life because we see the value of their contributions to society. Their worth to the economy is also a justification. In either view, we all benefit.

These strangers, as the NCMJ has pointed out over the years, can draw on this shared responsibility for many problems and needs: physical, mental, behavioral, and environmental. To capture this panoply of problems, we’ve taken the approach of producing theme issues of the NCMJ, with each focusing on a single set of problems or solutions. To that end, we have tried to bring the reader closer to the strangers in our midst by focusing on those topics where there are recognizable problems and feasible solutions. That focus has been both a strength and a weakness of the NCMJ. Focus gives strength because there are usually clear problems to

describe and equally clear links to the solutions—the policies that can help eliminate the problems are often obvious. For example, children need more dental care and attention to oral health; changing the rules about who cares for children’s teeth can help change that.

But children’s oral health lives within a very large world of other competing problems, and the people who can care for those specific problems often have alternative pathways for their professional lives and competing pressures to satisfy their desires to care for others. For example, the money that is needed to expand access to oral care competes with the needs of those with diabetes, newborns who need screening, and the obligation to clean our wastewater. The competition for funding, attention, and efforts of skilled professionals in the broad field of health is immense, but the consideration we give to strangers also includes giving them roads to travel on, schools to learn in, and protection from harms and misadventure.

In the policy arena, this kind of broad view is indeed the challenge of the elected officials and those who work for them. Legislators and public servants have to balance all these public needs—more often presented as demands—but they do so without a very clear idea of what the overall goal is. To say we want a healthy society and a healthy economy immediately presents a contrast between the two. To place one before the other reveals a choice driven by values and beliefs. To further divide the set goal, say, to give priority to children or to seniors, again, reveals difficult and value-laden choices. Unfortunately, we must make these choices from time to time, as we live in a specialized and focused world.

Were the NCMJ to completely fulfill its mission, it would help us understand this entire system of interactions and dependencies that make society work, for better or for worse. That’s a very hard task, but one I feel we must at least recognize if not try to address in concrete terms. We really must ask ourselves: what is the kind of healthy life we want to give ourselves as well as provide for strangers? We may change our priorities a bit if we were to think and ask this.

I hope that future authors for the NCMJ will extend their view to these broader implications of their often tightly-focused work. I would also like to see our academic institutions in health and health care take up this conceptually global challenge to help them generate citizens as well as professionals.

To many strangers with whom we share space in North Carolina, we are all equally strangers. We do not know their individual conditions of life, but we know they die more often than they should of illnesses that are preventable and treatable and they suffer pain that can be relieved. We know they can change that for themselves if we give them the means to do so, and we know others can heal, care, and assist if they are allowed to do so. The NCMJ will hopefully assist in mak-

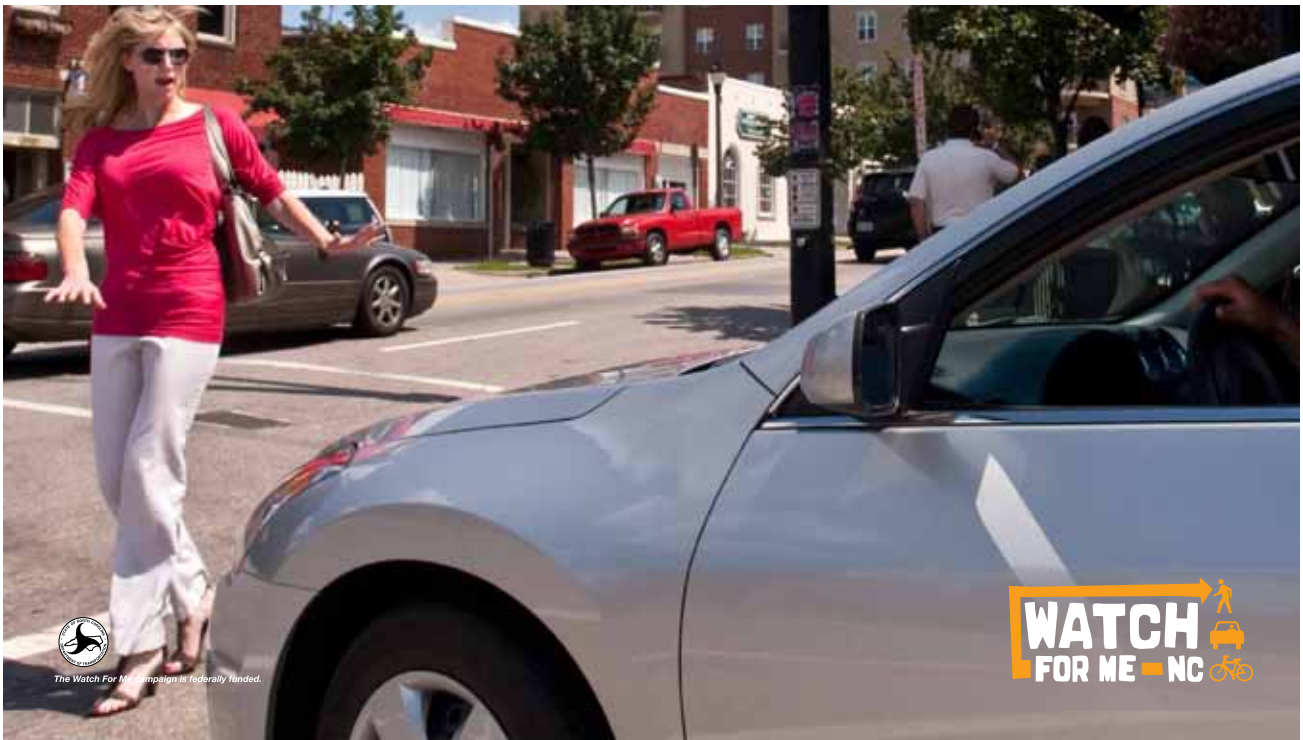
ing that happen for you, the stranger, by providing you with thought-provoking research and opinions from health care leaders across the state. I contend we can do that better if we think about the full conditions of life and use the broadest interpretation of health to guide us. NCMJ

*Thomas C. Ricketts III, PhD, MPH
Former NCMJ Editor in Chief*

Yield to people in crosswalks.

FOLLOW THE LAW.

WatchForMeNC.org



Evaluation of the North Carolina Violent Death Reporting System, 2009

Natalie J.M. Dailey, Tammy Norwood, Zack S. Moore, Aaron T. Fleischauer, Scott Proescholdbell

BACKGROUND Violence is a leading cause of death in North Carolina. The North Carolina Violent Death Reporting System (NC-VDRS) is part of the National Violent Death Reporting System (NVDRS), which monitors violent deaths and collects information about injuries and psychosocial contributors. Our objective was to describe and evaluate the quality, timeliness, and usefulness of the system.

METHODS We used the Centers for Disease Control and Prevention's guidelines for evaluating public health surveillance systems to assess the system. We performed subjective assessment of system attributes by reviewing system documents and interviewing stakeholders. We estimated NC-VDRS's reporting completeness using a capture-recapture method.

RESULTS Stakeholders considered data provided by NC-VDRS to be of high quality. Reporting to the national system has taken place before the specified 6-month and 18-month deadlines, but local stakeholder reports have been delayed up to 36 months. Stakeholders reported using NC-VDRS data for program planning and community education. The system is estimated to capture all NVDRS-defined cases, but law enforcement officers report only 61% of suicides.

LIMITATIONS The law enforcement agencies we interviewed may not be representative of all participating agencies in the state. Data sources used to assess completeness were not independent.

CONCLUSION NC-VDRS is useful and well-accepted. However, completeness of suicide reporting is limited, and reporting to local stakeholders has been delayed. Improving these limitations might improve the usefulness of the system for planning and appropriately targeting violence prevention interventions.

Violence-related injuries are among the leading causes of death in the United States, resulting in approximately 50,000 deaths annually [1]. Homicide and suicide are the second leading causes of death among persons aged 15-24 years and 25-34 years, respectively [1]. During the period from 1999 through 2009, homicides and suicides were the second and third most common causes of death among North Carolinians aged 15-34 years [1].

The Centers for Disease Control and Prevention (CDC) began operating the National Violent Death Reporting System (NVDRS) in 2003 to provide public health and law enforcement officials, policymakers, and violence prevention groups with accurate, timely information for prevention planning [2]. NVDRS is a federally funded cooperative agreement between 18 state health departments and the CDC National Center for Injury Prevention and Control, Division of Violence Prevention. The North Carolina Violent Death Reporting System (NC-VDRS) began collecting and reporting data in 2004 and has operated continuously since then. From 2004 through 2009, it collected information on 10,751 deaths.

NVDRS defines violent death as death resulting from intentional use of physical force or power against oneself, another person, or a group or community [2]. Case definitions include codes specified by the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) [2]. The linkage of NVDRS data sources, including death certificates, coroner or medical examiner records, and law enforcement reports, is unique among

injury surveillance systems. NVDRS can therefore provide detailed information on circumstances surrounding multiple-death incidents (eg, murder-suicide, multiple homicides, multiple suicides, or homicide-legal intervention) by linking related deaths when fatal injuries occur within 24 hours of each other. Variables captured in NVDRS include but are not limited to injury location, weapon used, history of mental illness, toxicology, and other psychosocial factors.

System Description

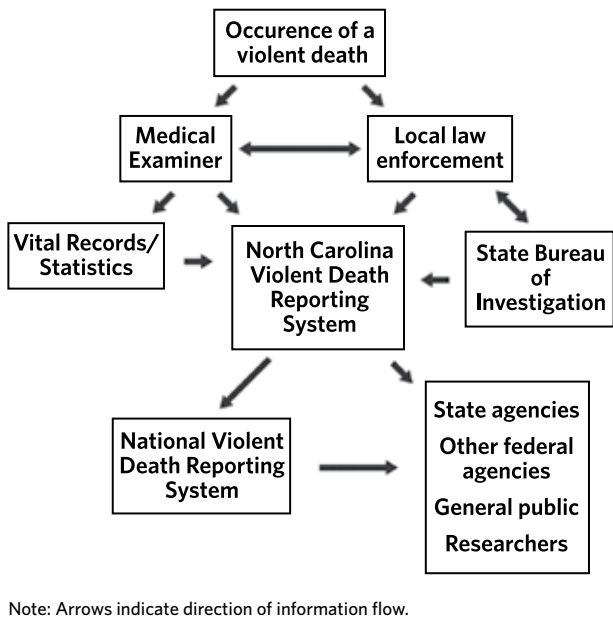
NC-VDRS links information from death certificates, medical examiner's reports, and law enforcement reports (Figure 1). The NC-VDRS program manager downloads electronic death certificate data weekly and creates an electronic record for all certificates to which the state nosologist has assigned 1 of the ICD-10 codes for violent death. Death certificates are matched with data from the Office of the Chief Medical Examiner (OCME). Data regarding the victim's occupation, educational status, any history of substance use or homelessness, injury type, and injury intent are collected manually by NC-VDRS abstractors from OCME records, including autopsy and toxicology reports. The abstractors are employed by the North Carolina Department of Health

Electronically published August 10, 2012.

Address correspondence to Dr. Natalie Dailey Garnes, 1102 Bates St, Feign Center, Suite 1120, Houston, TX 77030 (dailey@bcm.edu).

NC Med J. 2012;73(4):257-262. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73401

FIGURE 1.
Flow of Information in the North Carolina Violent Death Reporting System



and Human Services and undergo 4 weeks of intensive training to learn how to understand OCME reports, interpret ICD-10 coding, and generate narrative descriptions of violent events. This intensive phase is followed by a year of training with weekly quality assurance checks and annual continuing education. After OCME records are abstracted, a request for information is sent to the law enforcement agency with jurisdiction over the case, which provides a paper or electronic report. NC-VDRS program staff members enter this information manually. Updated de-identified records are uploaded to NVDRS nightly.

The CDC requests information on 2 timelines. Demographic variables from the death certificate are due within 6 months of the death date. Other variables from OCME and law enforcement reports, including toxicology results, wound descriptions, mental illness history, and injury context and mechanism, are due within 18 months of the death date. Depending on the type of death, abstractors collect and enter different information from these reports about the circumstances associated with infliction of the fatal injury. Each calendar year is finalized for preparation of the published report approximately 18 months after the last day of that year; however, records are continuously updated as new information is received. NC-VDRS annual reports for 2005 through 2007 have been printed and disseminated to stakeholders. The CDC combines data from all participating states and releases an annual report.

Previous evaluations focused on the data collection process. The goal of this evaluation was to assess the quality, timeliness, and usefulness of NC-VDRS data and make recommendations to improve system function.

Methods

The system was assessed according to standard CDC guidelines for evaluating public health surveillance systems [3]. These guidelines outline the tasks that should be carried out as part of the evaluation, such as engaging stakeholders, describing the surveillance system, focusing the evaluation design, gathering credible evidence about the performance of the system, justifying and stating conclusions, making recommendations, and ensuring that evaluation findings are used and that lessons learned are shared [3]. The authors of the guidelines define attributes by which surveillance system performance should be judged and discuss ways in which these attributes might be assessed [3]. Our evaluation focused on data quality, acceptability, and timeliness and consisted of a review of system records, stakeholder interviews, and quantitative comparisons of data. We performed less extensive evaluation of the system's usefulness, simplicity, flexibility, representativeness, and stability.

Records Review

We reviewed system documents, including communications between NVDRS and NC-VDRS, surveillance reports, other NC-VDRS publications, and publications citing NC-VDRS data.

Stakeholder Interviews

We interviewed informants from all identified stakeholder groups, including all past and present NC-VDRS program staff members and representatives from the State Center for Health Statistics (SCHS), the OCME, the State Bureau of Investigation (SBI), and local law enforcement agencies. We also interviewed NC-VDRS advisory board chairs and researchers and community leaders who have used NC-VDRS data. Interview questions were developed through consensus among the coauthors and consisted of open-ended questions regarding familiarity with the system, difficulties faced in collecting or using system data, impression of the system's effectiveness, its best qualities, and areas needing improvement. Interview tools were tailored to each group. NC-VDRS program staff interview tools were further tailored based upon role of the interviewee (eg, primary investigator, program manager, data abstractor, and budget manager). For example, program staff members were asked, "Please walk me through the steps of gathering and entering data into the system," and "How is quality control of the data performed?" Data providers were asked, "What resources from your department are required to participate in the system?" Potential data users were asked, "How have you used NC-VDRS data?" Interviews were administered from September 2009 through January 2010 by the lead author either in person or by telephone. We assured all respondents that responses would remain anonymous. Notes from the interviews were maintained in a locked cabinet to which only the lead author had access. This study underwent CDC

human subjects review and, as a public health surveillance system evaluation, was determined to be nonresearch.

In an attempt to assess the perspectives of local law enforcement agencies, we selected 16 agencies from 453 departments statewide. These agencies were eligible for participation in NC-VDRS (that is, they represented a jurisdiction in which 1 or more deaths meeting NC-VDRS criteria had occurred since system inception) and included police (city) and sheriff (county) departments, rural and metropolitan jurisdictions, and large and small agencies. In an effort to have equal representation from 1 or more of each of these types, we contacted 10 of the selected agencies. We attempted to interview the agency personnel who provided data to NC-VDRS. If another agency data user was identified during the interview, we also attempted to interview that person. We attempted to contact each interviewee at least twice, either by e-mail or telephone.

Quantitative Data Comparison

For quantitative evaluation, we used NC-VDRS data from 2007, the most recent year for which complete data were available. Quantitative evaluation of data quality commonly includes calculation of sensitivity and positive predictive value. However, such calculation necessitates an external independent dataset containing the same information for comparison. Because NC-VDRS uses law enforcement reports, which are the only comprehensive source of data on suicides and homicides in the state, no independent data source for comparison exists. As a result, we did not calculate sensitivity and positive predictive value directly; instead, we estimated the true number of cases likely to have occurred by using a capture-recapture technique [4]. We compared 2007 NC-VDRS homicide data from

Forsyth County, North Carolina, with 2007 homicide data that Winston-Salem State University (WSSU) researchers obtained independently from law enforcement agencies whose jurisdictions include Forsyth County. We also evaluated data completeness for each of 8 demographic variables (age, gender, race, Hispanic ethnicity, county of residence, date of injury, county of injury, and location type) in each type of data source (death certificates, medical examiner's reports, and law enforcement reports) by determining the proportion of deaths in NC-VDRS for which the source had reported information about the variable. For law enforcement reports, we assessed data completeness separately for homicides and suicides. We used SAS 9.1.3 software (SAS Institute, Cary, North Carolina) to conduct the analysis and used Fisher's exact test to test for significance of the difference between proportions, using death certificate data as the referent.

Results

Records Review and Stakeholder Interviews

We interviewed 23 stakeholders, including 12 current or former NC-VDRS program staff members, 8 data providers (1 from SCHS, 1 from OCME, 1 from SBI, and 5 from local law enforcement agencies), and 3 data users (1 researcher and 2 community leaders). With the exception of law enforcement participants, all stakeholders who were approached agreed to be interviewed. Table 1 summarizes responses concerning NC-VDRS performance with regard to all 8 attributes assessed. Results for usefulness, data quality, acceptability, and timeliness are described in detail below, while results for simplicity, flexibility, representativeness, and stability can be found in Table 1.

Usefulness. A public health surveillance system is consid-

TABLE 1.
Effectiveness of the North Carolina Violent Death Reporting System (NC-VDRS)

Surveillance System Attribute	Evidence That NC-VDRS Has the Attribute	Challenges or Limits to System Effectiveness
Usefulness	The data are being used in program planning, grant applications, and allocation of law enforcement resources, and for source quality control	The data were not being used to shape policy at the time of our evaluation
Simplicity	None; the system is not simple	Multiple variables are collected about hundreds of events; sources provide data in different formats
Flexibility	The software provided by the National Violent Death Reporting System can be customized by each state	Uniform software is used by all states, and memoranda of agreement are required to obtain data in additional categories
Data quality	All events are audited; data quality is considered to be high by stakeholders; reporting is 100% complete ^a	Data quality is dependent on quality of source data
Acceptability	Participation is high among compilers of vital statistics and staff of medical examiner's offices	Lower participation among law enforcement is likely due to barriers to participation
Representativeness	Data are based on death certificate data, which are considered to be representative	Populations for which no death certificate is filed (missing body or fetal death) are not represented
Timeliness	The system consistently meets deadlines for national reporting	In the past it has taken up to 36 months to disseminate reports to local stakeholders, but the time this takes is steadily decreasing
Stability	The system has functioned without interruption since initiation of reporting	There has been staff turnover, funding has been insufficient, and the system's budget has been cut

^aCompleteness of reporting was calculated using a capture-recapture method.

ered useful if it contributes to the prevention and control of adverse health-related events or improves understanding of the implications of these events [3]. Overall, stakeholders reported that NC-VDRS was useful and acknowledged using the data in a variety of ways. Community organizations described citing data in grant applications and using data to plan programming. One community organization reported having shifted their programming focus to suicide instead of homicide prevention because of NC-VDRS data. A representative from another community organization stated that the information provided by NC-VDRS is "crucial to evaluation of work and allocation of funding and human resources." Additionally, a law enforcement agency engaged in preventive policing reported using NC-VDRS data to "understand tactically the profile of an individual who will be a victim of homicide to address planning for prevention of violence." Other law enforcement agencies reported providing the annual report to community partners to assist with prevention strategies.

Data quality (completeness and validity). Data quality reflects the completeness and validity of the data recorded in the surveillance system [3]. Program staff reviews 100% of system events for internal data consistency among 3 sources: death certificates, medical examiner reports, and law enforcement reports. Ten of the 23 stakeholders interviewed explicitly stated that NC-VDRS provides high-quality, trustworthy data. One interviewee stated that NC-VDRS provides "the most up-to-date data, is the easiest to access, and is the only statewide data available in North Carolina." Data providers consider the quality of NC-VDRS data adequate to use for quality control purposes for their own data. SCHS and OCME staff reported having noted incongruities between their records and NC-VDRS records (eg, coding of intent or manner of death), which led to corrections in the source data. SBI reported using NC-VDRS data to assess completeness of local law enforcement agency reporting. The only concern about data quality, raised by only 1 stakeholder, was that data about the circumstances of suicides are less complete than data about the circumstances of homicides.

Acceptability. Acceptability reflects the willingness of persons and organizations "to provide accurate, consistent, complete, and timely data" and depends on additional factors, including statutory requirements and ease of participation [3]. All stakeholders stated that violent death is of public health importance, and most reported believing that NC-VDRS has potential to effect change in the community. Stakeholders reported that the system responded positively to suggestions and comments about making data more accessible or understandable. State statute does not mandate NC-VDRS reporting; however, deaths "resulting from violence, poisoning, accident, suicide or homicide" must be reported to the medical examiner [5]. Although OCME and SCHS staff indicated that the time burden required for participation in the system was minimal, law enforcement cited

a time burden ranging from 1-20 hours per year. Data reporting costs also varied among data providers. The OCME and the SCHS receive funding to support their participation, which is further facilitated by automated reporting mechanisms. In contrast, law enforcement agencies do not receive funding for participation. Reporting ease and time burden depend on the number of deaths investigated within the jurisdiction and on data organization. For example, few law enforcement agencies can search and provide data electronically; most perform these duties by hand.

Data providers specifically mentioned factors that could adversely affect acceptability. One reported doubting the system's ability to effect change in the community, citing a lack of visible contribution to public policy changes; others brought up delayed surveillance report dissemination. Among data providers, only law enforcement reported knowledge of system data use in the community.

Timeliness. Timeliness reflects the speed between steps in a public health surveillance system [3]. NC-VDRS has consistently reported data to the CDC well before the established 6-month and 18-month deadlines. However, the first local stakeholder annual report was not released until 36 months after the reporting year's end. Local stakeholder report timeliness has steadily improved; a 2007 provisional report was released in November 2009 and finalized June 2010, 30 months after the year's end. And a 2008 provisional report was sent to stakeholders in September 2010.

Quantitative Evaluation

Data quality (completeness and validity). All homicides identified by WSSU were present in NC-VDRS. Two additional homicides that occurred in Forsyth County were present in NC-VDRS and not present in the data received from WSSU. Based on this information, NC-VDRS, by death certificate initiation, is estimated to have identified 100% of the homicides that took place in Forsyth County in 2007.

Overall, medical examiner data most reliably provided demographic information, and law enforcement report data did so least reliably (Table 2). Among NC-VDRS deaths in 2007, for the 8 demographic variables examined, death certificate data contributed information a minimum of 69% of the time for date of injury to 100% of the time for gender; medical examiner reports provided information on these 8 variables 97% (race) to 100% (gender) of the time. In contrast, law enforcement reports provided information on these 8 demographic variables only 71% to 72% of the time. Inclusion of law enforcement report data differed by manner of death: 89% to 91% of NC-VDRS homicides included law enforcement report data for all 8 demographic variables, whereas only 61% of suicides included law enforcement report data for all 8 variables.

Discussion

NC-VDRS brings together data sources that have not traditionally been linked to provide comprehensive information

TABLE 2.
Completeness of Data Sources Used by the North Carolina Violent Death Reporting System

Variable	Records With Data About That Variable, by Source No. (%)		
	Death certificate (N = 1,891)	Medical examiner's report	Law enforcement report ^a
Age	1,888 (99.8)	1,890 (99.9)	1,352 (71.5) ^b
Gender	1,891 (100)	1,891 (100)	1,355 (71.7) ^b
Race	1,888 (99.8)	1,841 (97.4) ^b	1,344 (71.1) ^b
Hispanic ethnicity	1,889 (99.9)	1,889 (99.9)	1,354 (71.6) ^b
County of residence	1,883 (99.6)	1,876 (99.2)	1,345 (71.1) ^b
Date of injury	1,300 (68.7)	1,877 (99.3) ^b	1,358 (71.8) ^b
County of injury	1,727 (91.3)	1,882 (99.5) ^b	1,360 (71.9) ^b
Location type	1,665 (88.0)	1,847 (97.7) ^b	1,357 (71.8) ^b

Note. Data from 2007 were used for analysis. Significance of difference between proportions of records containing data about the variable was determined using 2-sided Fisher's exact test with death certificate data as the referent.

^aLaw enforcement reports are not required for all deaths in the North Carolina Violent Death Reporting System.

^bP < 0.05.

regarding demographic characteristics, types of injuries, toxicology, weapon types, and circumstances surrounding violent deaths. This information is otherwise unavailable in North Carolina and contributes to national surveillance efforts. This evaluation of NC-VDRS suggests that the system is useful, is accepted widely, provides high-quality data reliably, and reports data to the national system in a timely manner. Surveillance systems with these qualities are considered useful for public health action [3].

The evaluation also revealed ways that NC-VDRS could improve (eg, by decreasing the time required for local stakeholder data dissemination and by improving the completeness of law enforcement suicide reports). Posting preliminary electronic reports within 18 months of the calendar year end might allow for wider dissemination and more efficient use of limited resources by avoiding printing costs. Funding to support data dissemination could also increase NC-VDRS impact on violence prevention.

In our evaluation, law enforcement data, particularly suicide reports, were less complete, which may be a quantitative clue to system acceptability. To decrease barriers to law enforcement participation, NC-VDRS staff members actively contact law enforcement agencies in whose jurisdiction a violent death has occurred and have made educational presentations about NC-VDRS at law enforcement meetings. More law enforcement agencies have participated every year since 2004. Because suicide has consistently been the most common manner of violent death in North Carolina, complete suicide data is vital to improving system usefulness [6-9]. To improve completeness, NC-VDRS created a suicide and homicide investigation pocket card for law enforcement investigators, which lists the circumstances of interest.

Certain limitations should be considered when interpreting our findings. First, because each NVDRS participant

state has its own unique infrastructure, our findings are unlikely to generalize to other states. Additionally, although we attempted to contact all groups of involved stakeholders, our overall numbers were low. We interviewed all stakeholders currently involved with NC-VDRS from OCME and SCHS, as well as all current and past program staff members. However, our sample of law enforcement stakeholders was small and was not chosen randomly; also, we were unable to interview anyone at several of the agencies we attempted to contact. Because this was the first attempt to obtain systematic feedback from local law enforcement agencies, we chose an open-ended interview format. This format allows for gathering detailed information but limits the number of persons from whom that information may be gathered. As a result, the information obtained from these interviews may not be representative of all law enforcement agencies in the state or even of those participating in NC-VDRS. The difficulty we had in interviewing even those agencies that we approached is indicative of the challenge NC-VDRS continues to face in engaging law enforcement. Future evaluations may gather more representative data from law enforcement by making use of improving connections and by using a survey format designed to encourage broader participation.

Additionally, only a few data users were interviewed. This paucity reflects the fact that, prior to the time of our evaluation, NC-VDRS data had not been widely used. However, these data are being used increasingly. The North Carolina Institute of Medicine (NCIOM) [10] has used NC-VDRS data in developing the Healthy North Carolina 2020 injury goals and objectives, and a number of publications have utilized NC-VDRS data to educate academic and medical communities on the nature of violence in the state [11-14]. As the number of NC-VDRS data users increases, future evaluations might benefit from using a survey format to gather

information from these stakeholders as well.

Finally, we did not account for cases that do not result in law enforcement report filing, such as a death resulting from an injury sustained several years earlier, which could have resulted in underestimation of the completeness of law enforcement reporting. Furthermore, the method we used to estimate reporting completeness was designed for use with independent data sources. NC-VDRS data and WSSU data were not completely independent, because both were obtained from the same law enforcement agencies, albeit at different times. Our results could overestimate reporting completeness.

Overall, our evaluation determined that NC-VDRS provides stakeholders with useful, high-quality data. NC-VDRS and NVDRS offer an opportunity to more completely define factors associated with violence. By combining information from death certificates with medical examiner and law enforcement reports and by linking information from related deaths, it may be possible to gain new information about demographic groups most affected by violent death, types of injuries sustained, and social factors surrounding such deaths. With increased resources for rapid data dissemination and improved suicide report completeness, NC-VDRS can supply information vital to developing new, more effective strategies for preventing violent death. **NCMJ**

Natalie J. M. Dailey, MD epidemic intelligence service officer, Centers for Disease Control and Prevention, Atlanta, Georgia; North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Tammy Norwood program manager, North Carolina Violent Death Reporting System, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Zack S. Moore, MD medical epidemiologist, Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Aaron T. Fleischauer, PhD career epidemiology field officer, Office of Public Health Preparedness and Response, Centers for Disease Control and Prevention, Atlanta, Georgia; North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Scott Proescholdbell, MPH head, Injury Epidemiology and Surveillance Unit, Injury and Violence Prevention Branch, Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Acknowledgments

Financial support. This work was supported through funding by the Centers for Disease Control and Prevention.

Disclaimer. The findings and conclusions of this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. Injury Prevention and Control Data and Statistics. Web-based Injury Statistics Query and Reporting System (WISQARS). Centers for Disease Control and Prevention Web site. <http://www.cdc.gov/injury/wisqars/index.html>. Accessed July 13, 2012.
2. Karch DL, Dahlberg LL, Patel N. Surveillance for violent deaths—National Violent Death Reporting System, 16 states, 2007. *MMWR Surveill Summ*. 2010;59(4):1-50.
3. German RR, Lee LM, Horan JM, Milstein RL, Pertowski CA, Waller MN. Updated guidelines for evaluating public health surveillance systems: recommendations from the guidelines working group. *MMWR Recomm Rep*. 2001;50(RR-13):1-35.
4. Ackman DM, Birkhead G, Flynn M. Assessment of surveillance for meningococcal disease in New York State, 1991. *Am J Epidemiol*. 1996;144(1):78-82.
5. Medical Examiner Jurisdiction, NCGS §130A-383 (1955).
6. The North Carolina Violent Death Reporting System: Provisional Data Release for January to June, 2004. Technical Report 1.0. Raleigh, NC: Injury and Violence Prevention Branch, North Carolina Department of Health and Human Services; 2005. <http://www.injuryfreenc.ncdhhs.gov/About/NC-VDRSJanJuneProvisional2004.pdf>. Accessed May 31, 2012.
7. North Carolina Violent Death Reporting System: Annual Report 2005. Raleigh, NC: Injury and Violence Prevention Branch, Division of Public Health, North Carolina Department of Health and Human Services; 2008. <http://www.injuryfreenc.ncdhhs.gov/About/2005NVDRSReport.pdf>. Accessed May 31, 2012.
8. North Carolina Violent Death Reporting System: Annual Report 2006. Raleigh, NC: Injury and Violence Prevention Branch, Division of Public Health, North Carolina Department of Health and Human Services; 2009. <http://www.injuryfreenc.ncdhhs.gov/About/2006NVDRSReport.pdf>. Accessed May 31, 2012.
9. North Carolina Violent Death Reporting System November 2009: Provisional Report 2007. Raleigh, NC: Injury and Violence Prevention Branch, Division of Public Health, North Carolina Department of Health and Human Services; 2009. <http://www.injuryfreenc.ncdhhs.gov/DataSurveillance/NVDRSProvisionalReport2007.pdf>. Accessed May 31, 2012.
10. North Carolina Institute of Medicine (NCIOM). Healthy North Carolina 2020: A Better State of Health. Morrisville, NC: NCIOM; 2011. http://www.nciom.org/wp-content/uploads/2011/01/HNC20_20_FINAL-March-revised.pdf. Accessed May 31, 2012.
11. Samandari G, Martin SL, Kupper LL, Schiro S, Norwood T, Avery M. Are pregnant and postpartum women: at increased risk for violent death? Suicide and homicide findings from North Carolina. *Matern Child Health J*. 2011;15(5):660-669.
12. Samandari G, Martin SL, Schiro S. Homicide among pregnant and postpartum women in the United States: a review of the literature. *Trauma Violence Abuse*. 2010;11(1):42-54.
13. Madkour AS, Martin SL, Halpern CT, Schoenbach VJ. Area disadvantage and intimate partner homicide: an ecological analysis of North Carolina counties, 2004-2006. *Violence Vict*. 2010;25(3):363-377.
14. Coyne-Beasley T, Lees AC. Fatal and nonfatal firearm injuries in North Carolina. *N C Med J*. 2010;71(6):565-568.

The Cost of Medicaid Coverage for the Uninsured: Evidence From Buncombe County, North Carolina

Wenke Hwang, Leah Griffin, Kimberly Liao, Mark Hall

BACKGROUND The Affordable Care Act gives states the option to expand state Medicaid programs to cover many who are currently uninsured. The potential financial impact has not been thoroughly examined. We characterized the health risk of uninsured adults in Buncombe County, North Carolina, relative to that of local Medicaid recipients, to estimate the cost of expanding Medicaid coverage to include the uninsured.

METHODS We obtained de-identified patient enrollment and claims data for 2008 from the Division of Medical Assistance, North Carolina Department of Health and Human Services and from the 3 safety-net providers who care for most of the county's low-income uninsured adults. We used the Chronic Illness and Disability Payment System (CDPS) risk-adjustment tool to measure the relative health risk of the two populations. Based on actual spending in the Medicaid group and its health risk relative to that of the uninsured, we then projected how much it would have cost to provide Medicaid coverage for these uninsured in 2008.

RESULTS We estimated, based on CDPS adjustment for demographics and diagnoses, that these uninsured adults would have incurred costs 13% greater than those of the actual nondisabled adult Medicaid population. The projected cost of providing Medicaid coverage to these uninsured would have been \$4,320 per person.

LIMITATIONS Data were drawn from only the 3 major safety-net organizations and therefore excluded care obtained from other safety-net providers. Also, this sample of uninsured people included some who are ineligible for Medicaid because of their citizenship status. Furthermore, Medicaid enrollment might lead to increased utilization, revealing a greater burden of illness than we detected.

CONCLUSION In Buncombe County, uninsured adults who enroll in expanded Medicaid are likely to have somewhat more costly health problems than do currently enrolled nondisabled adults.

The Patient Protection and Affordable Care Act of 2010 (Affordable Care Act) gives states the option to expand Medicaid, beginning in 2014, to cover an estimated 18 million currently uninsured individuals [1]. Although the reduction in the number of uninsured would certainly be an achievement, the potential financial impact of this reform on Medicaid programs has not been thoroughly examined. This is partly due to the lack of good data on the uninsured population and their health care needs. Leslie and colleagues [2] used a diagnosis-based risk adjustment model to estimate Medicaid costs for indigent care in a Texas community. However, their estimate was based on the per-capita Texas Medicaid expenditure, which reflects all categories of eligibility, including the disabled. Because the majority of the uninsured population is made up of nondisabled adults, it is necessary to select a comparable Medicaid population for the most accurate cost comparisons.

In 2008-2009, there were 1,326,000 nonelderly uninsured people 19-64 years old in North Carolina, 30,324 of whom were living in Buncombe County [3]. With Asheville as its largest city, Buncombe County has a demographic and socioeconomic profile broadly resembling that of the state: its median household income from 2006-2010 was \$44,190, which was close to the figure for the state as a whole, as was the county's poverty rate for that period, 14.7% [4, 5]. The county's unemployment rate typically is lower than that of

the state (in April 2011, it was 7.8%, versus 9.6% statewide) [6]. In 2009, 21.1% of the adult nonelderly population in the county lacked health insurance, a slightly lower percentage than in the state as a whole (23.2%). If uninsured children are also counted, 18.3% of Buncombe County residents who were under 65 years of age had no health insurance, compared with 19.7% of residents under age 65 in the state overall [3].

Many of the county's uninsured depend on safety-net providers for their health care needs. Until 2010, the Buncombe County Health Department operated primary care clinics serving more than 10,000 people a year. In 2008, for people earning less than 200% of the Federal Poverty Guidelines (FPG), the fees at county clinics for primary care services, including prescription drugs, were determined by a sliding scale and ranged from \$3 per visit to 80% of charges. (In 2010, the county began to contract out the majority of adult services to a local community health center.) Buncombe County is also served by Project

Electronically published August 10, 2012.

Address correspondence to Dr. Wenke Hwang, Department of Public Health Sciences, Division of Health Services Research, Penn State University College of Medicine, 600 Centerview Dr, Ste 2200, Hershey, PA 17033 (whwang@psu.edu).

N C Med J. 2012;73(4):263-268. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73402

Access, a volunteer physician referral network organized to care for the low-income uninsured. Although the program primarily focuses on coordinating referrals to office-based specialists, it is also well coordinated with local community health centers and with hospital charity care [7]. The county funds primary care clinics to provide low-income uninsured county residents a medical home and prescription drugs. Project Access arranges, as needed, referrals for these patients to more than 600 local specialists who volunteer to see Project Access patients in their practices or at a safety-net clinic [8]. Project Access also enrolls patients in prescription-access programs at major pharmaceutical companies. Additionally, Mission Hospital, the county's only private hospital, accepts under its charity care policy anyone who is enrolled in Project Access or is a patient at one of the community health centers.

Buncombe County's community health centers, Project Access, and Mission Hospital all maintain patient enrollment and claims data. This provides a unique opportunity to assess the general health status and health needs of many of the county's low-income uninsured. We sought to compare the health needs and health-services utilization of the uninsured who are served by these safety-net providers with the health needs and health-services utilization of nondisabled adult Medicaid recipients living in the same county, in order to help project the potential financial impact of enrolling uninsured people in Medicaid.

Methods

With approval from the Wake Forest Health Sciences and Mission Hospital institutional review boards, we obtained data from Buncombe County's clinics, Mission Hospital, and Project Access through the Buncombe County Medical Society to measure the demographics and health care needs of the uninsured enrolled in safety net access programs. The study population included all 3,603 uninsured adults with incomes below 175% of the FPG who were enrolled in county clinics during 2008. County clinics reviewed each uninsured patient's income to determine eligibility for its sliding scale discounts. This determination expired every 6 months unless renewed. We considered the income-determination period to be each patient's period of enrollment, plus any additional enrollment period reported by Project Access or any subsequent date of service reported by Mission Hospital. For our purposes, the enrollment status was considered continuous from the earliest to the last date among these various indicators.

To produce information relevant to the future Medicaid expansion, we focused on low-income uninsured people 18-64 years of age who were enrolled with the county's clinics in 2008. We selected uninsured adults who enrolled in family planning with incomes less than or equal to 138% of the FPG, and those enrolled in adult clinics with incomes less than or equal to 150% of the FPG. This selection closely resembles the range over which states have the option to

extend Medicaid coverage, which is up to 138% of the FPG (calculated based on a nominal threshold of 133% of the FPG plus a 5% income disregard) [9]. An alternative selection that restricted adult clinic patients to those with incomes less than or equal to 125% of the FPG produced virtually the same findings.

To estimate the expected cost of care, we used claims data provided by the county for the primary care received by these patients, which we linked to claims data for any specialty care these same patients might have also received from Project Access. Most Project Access physicians file "shadow" claims forms with the Buncombe County Medical Society in order to document the services they provide and their economic value. Mission Hospital provided claims data for any hospital care provided to these county-clinic patients. These 3 sources of claims data for county-clinic patients were linked based on patient identifiers and then de-identified for analysis. Information on primary care provided to these patients was obtained from the county.

Claims data for the uninsured were not used to measure their actual costs of care. Instead, these data indicated their burden of illness, which was used to estimate the likely cost of care had they been enrolled in Medicaid. To account for differences in risk status between Buncombe County's Medicaid and uninsured populations, the Chronic Illness and Disability Payment System (CDPS) model was used to generate risk scores based on age, gender, and diagnoses. CDPS is well-validated and is widely used for these purposes. Briefly, CDPS is a methodology that many state Medicaid programs use to estimate expected burdens of illness and to set payment rates for Medicaid recipients [10]. This method requires data from both ambulatory care claims and inpatient claims, and it classifies diagnostic and other information into major categories that correspond to body systems or types of diagnosis. Most of these major categories are further divided into several subcategories and are assigned a weight according to the likelihood of increased expenditure associated with the diagnosis. Individual overall burden of illness is then expressed as a risk score, which represents an individual's disease burden relative to the average Medicaid recipient's disease burden. Therefore, a risk score of 1.05 indicates that the individual's expected medical costs are 5% higher than those of the average Medicaid recipient. Many state Medicaid programs use this risk score as the basis for making projections about health-based expenditures and setting capitated payment rates.

To project the cost of caring for these currently uninsured people under Medicaid, we selected a comparable population of nondisabled adults from participants in the Medicaid Temporary Assistance for Needy Families (TANF) program who lived in the same area. We generated risk scores for this group of Medicaid recipients the same way we obtained risk scores for the uninsured, using their claims data obtained from the state. We calculated the actual Medicaid health care expenditures per nondisabled adult Medicaid enrollee

living in Buncombe County during the year 2008. We then multiplied the actual health care expenditure by the risk ratio (the ratio of the two risk scores) to derive the expected health care expenditure if these uninsured people were to be covered by Medicaid.

Results

Table 1 shows the demographic and clinical characteristics of the adult uninsured clinic patients and Medicaid enrollees who lived in Buncombe County. In 2008, county clinics served 3,603 low-income uninsured adults who enrolled in family planning with incomes less than or equal to 138% of the FPG or enrolled in adult clinics with incomes less than or equal to 150% of the FPG. These county patients also were eligible to receive specialist referral to Project Access and charity care at Mission Hospital, if needed. Almost half (47.5%) of patients were in the 25-44 age range. Notably, Hispanics were overrepresented in county clinic enrollment; they comprised almost one quarter of patients, even though they make up only 6% of the total population of Buncombe County [4]. It appears that the county-clinic population had a high burden of illness: Half of patients had at least 1 chronic condition, and 20% had multiple chronic conditions.

Overall, uninsured county-clinic patients and Medicaid enrollees had very similar enrollment patterns (8.6 months versus 8.1 months) in 2008. However, uninsured county-clinic patients were much less likely than their Medicaid

counterparts to have visited an outpatient clinic (46% of the uninsured patients did so, compared with 85.2% of the Medicaid patients). The uninsured clinic patients were also less likely to have been admitted to the hospital (3.2% versus 4.2%) or to have visited an emergency department (19.2% versus 47.9%). (Data are not shown.) When the uninsured county-clinic patients did use health services, they used them less frequently than did Medicaid enrollees. Table 2 compares the 2 groups' frequency of use of health services. The average number of outpatient visits for all uninsured county-clinic patients was 1.4, and those with 1 or more visits averaged 3.0 outpatient visits. The average number of outpatient visits for Medicaid enrollees was much higher than for the uninsured: 19.1 for all enrollees, and 19.6 for those with 1 or more visits. Regarding hospital inpatient care, uninsured clinic patients had somewhat lower utilization (the average number of hospital admissions was 0.04 for the group as a whole and 1.3 for patients with 1 or more admissions) than did Medicaid enrollees (the averaged number of admissions for the group as a whole was 0.2, and for those with 1 or more admissions it was 1.3). Similarly, utilization of the emergency department by the uninsured clinic patients was also lower than utilization by Medicaid enrollees (0.3 visits for the uninsured group as a whole and 1.8 visits for uninsured patients with 1 or more visits, compared with 2.2 visits for the Medicaid group as a whole and 4.0 visits for Medicaid enrollees with 1 or more visits). These findings are reinforced by those of other studies that have

TABLE 1.
Demographic and Clinical Characteristics of Study Participants in 2008

Characteristic	Low-Income Uninsured Clinic Patients (N = 3,603) No. (%)	Medicaid Enrollees (N = 7,191) No. (%)
Age (in years)		
18-24	565 (15.7)	2,261 (31.4)
25-44	1,710 (47.5)	4,252 (59.1)
45-54	836 (23.2)	571 (7.9)
55-64	492 (13.7)	107 (1.5)
Gender		
Male	900 (25.0)	1,357 (18.9)
Female	2,703 (75.0)	5,834 (81.1)
Race		
Caucasian	1,416 (39.3)	5,080 (70.6)
African American	250 (6.9)	1,252 (17.4)
Hispanic	877 (24.3)	769 (10.7)
Other/Unknown	1,060 (29.4)	90 (1.2)
No. of chronic conditions		
0	1,784 (49.5)	3,488 (48.5)
1	1,113 (30.9)	2,508 (34.9)
2-3	627 (17.4)	1,043 (14.5)
4+	79 (2.2)	152 (2.1)

Note: The mean number of months in enrollment for the low-income uninsured clinic patients was 8.6 (SD, 3.6), and for Medicaid enrollees it was 8.1 (SD, 3.8).

TABLE 2.
Health Service Utilization of Study Participants in 2008

Type of Health Service Utilization	No. of Visits or Admissions per 12 Months of Enrollment	
	Low-income uninsured clinic patients Mean (SD)	Medicaid enrollees Mean (SD)
Outpatient visits		
All patients	1.4 (3.2)	19.1 (23.3)
Patients with at least 1 visit	3.0 (4.2)	19.6 (23.4)
Hospital admissions		
All patients	0.04 (0.3)	0.2 (0.5)
Patients with at least 1 admission	1.3 (0.6)	1.3 (0.8)
Emergency department visits		
All patients	0.3 (0.9)	2.2 (4.1)
Patients with at least 1 visit	1.8 (1.3)	4.0 (4.8)

looked at programs that are similar to Project Access in providing coordination of specialist volunteers. Those studies have also found reduced use of emergency departments and increased access to outpatient care at levels comparable with those of people who have insurance [11].

Table 3 provides the projected expenditure that would have been required to cover low-income uninsured Buncombe County clinic patients under Medicaid in 2008. The risk ratios we calculated (by taking the risk scores of uninsured clinic patients and dividing them by the risk scores of Medicaid enrollees) predicted that if the low-income uninsured adults had been covered by Medicaid, they would have incurred 13% greater costs than did the actual adult Medicaid population in 2008, based on age, gender, and chronic condition status. Accordingly, it is estimated that if Medicaid were to have covered this uninsured population in 2008, that coverage would have cost an average of \$4,320 per additional person. Also of note is the much greater projected expenditure on male uninsured county-clinic patients compared with male Medicaid recipients (\$6,023 versus \$3,886). However, because men comprise only 25% of the county clinic population (Table 1), women will remain the primary source of health care costs.

Discussion

The recent economic downturn has led to declines in state revenues and to an increase in the number of people seeking Medicaid coverage, thus straining the budget of many state Medicaid programs [12]. In response to this increased demand, the federal government provided states with additional Medicaid funding through June 2011 via the American Recovery and Reinvestment Act [13]. The Affordable Care Act gives states the option to expand Medicaid eligibility to many currently uninsured people. The federal government will cover 90% to 100% of costs for newly eligible enrollees, while states will continue to share about half the costs for currently eligible enrollees. The financial impact of Medicaid expansion has not been thoroughly examined. Increased

Medicaid enrollment could strain the existing capacity of safety-net providers [14]. An accurate estimate of the cost to provide Medicaid coverage to the currently uninsured is vitally important for policymakers at the state and federal levels.

We used the CDPS method to profile the relative health risk and potential care needs of comparable groups of Medicaid recipients and low-income uninsured county-clinic patients living in Buncombe County, North Carolina. Overall, based on CDPS adjustment for the burden of illness of uninsured patients, we projected that if the low-income uninsured adults enrolled at county clinics had been covered by Medicaid, they would have incurred 13% more costs on average than did local nonelderly, nondisabled Medicaid recipients in 2008. Much of the additional spending to provide coverage for these currently uninsured individuals would be borne by the federal government, under the law's "super match" provision, which covers 100% of Medicaid expansion costs for the first few years, declining to 90% by 2020. However, some increased Medicaid enrollment is also expected by people who are currently eligible, owing to a general "woodwork" effect of the law's implementation coupled with the individual mandate. For these new enrollees, the state will bear a larger portion of the expenses, under the conventional federal match percentage.

It is important to note that our cost estimate is based on health risk status and does not account for patterns of utilization of health services. Although low-income uninsured patients had poorer health risk statuses than did Medicaid recipients, they had a similar number of hospital admissions, and they visited outpatient clinics and emergency departments considerably less often than did Medicaid recipients [15]. This finding is consistent with previous literature, which suggests that the uninsured have lower levels of utilization than do the insured, despite having greater health care needs [16-19]. This is also consistent with the lower utilization noted for immigrants [20, 21], who undoubtedly make up part of this uninsured population. Finally, our cost

TABLE 3.
Actual and Projected Mean Costs of Providing Medicaid Coverage to Study Participants in 2008

Characteristic	Medicaid Enrollees	Low-Income Uninsured Clinic Patients	
	Mean Actual 2008 Expenditure (\$)	Risk Ratio ^a	Mean Projected 2008 Expenditure (\$)
Age			
18-24	2,805	1.15	3,226
25-44	3,873	1.00	3,873
45-54	6,471	1.12	7,248
55-64	9,254	1.08	9,994
Gender			
Male	3,886	1.55	6,023
Female	3,809	1.06	4,038
No. of chronic conditions			
0	653	1.09	712
1	2,059	1.28	2,636
2-3	3,188	1.26	4,017
4+	9,963	1.27	12,653
All patients	3,823	1.13	4,320

^aRisk ratios were calculated by dividing the risk score of the low-income uninsured clinic patients by the risk score of the Medicaid enrollees. Risk scores were calculated using the Chronic Illness and Disability Payment System method.

estimate does not account for participation rates of the low-income uninsured in Medicaid. Previous studies examining past and current enrollment data suggest that even with aggressive outreach, enrollment of newly eligible individuals into Medicaid will not reach 100%, thus resulting in costs below the projected maximum [22, 23]. Moreover, undocumented immigrants remain ineligible for Medicaid.

Limitations

The sample of uninsured patients we studied, although sizable, may not represent the general condition of uninsured adults in Buncombe County. Various estimates over the past decade suggest that only about 90% of the low-income uninsured residents of Buncombe County receive at least some primary care services each year [7, 24-26]. However, those who receive no care were necessarily excluded from this claims-based study, which gives our results a tendency to overstate the health risk of the uninsured. On the other hand, some of the care received by this study population may not be reflected in the claims information we obtained, since some volunteer physicians provided no treatment information, and those that did provide such information had less incentive to report all possible diagnoses. Also, once uninsured people obtain coverage, they may increase their demand for services, which could reveal illness burden that we were not able to detect. These factors give our results a tendency to understate this population's health risk.

Our cost analysis is limited by additional imperfections in the data sources and analysis. First, we have measured only care provided by Buncombe County's 3 major safety-net

organizations and not care provided by other local providers from whom this population may have also sought care. Second, as would be true of any risk-adjustment method used in profiling Medicaid risk and setting rates, the CDPS method is imprecise, and so it may fail to account for some unobserved risk or may overstate the degree of actual difference in risk. Although the CDPS risk adjustor is well validated and is widely used for these purposes, it was developed for use with Medicaid populations. Some dimensions of risk among the uninsured may differ from those in the Medicaid populations used to validate CDPS's adjustment methods. For instance, Buncombe County's uninsured population includes more noncitizens than does its group of Medicaid enrollees, and noncitizens tend to use fewer resources relative to their medical needs [20, 21]. CDPS does not account for race, citizenship, or nationality factors [10].

Nevertheless, Buncombe County's coordinated safety-net system provides an unusual opportunity to obtain a reasonably accurate profile of a large segment of its low-income uninsured population. Using the best data sources and analytical methods available should assist government and public policy official in planning for the changes that health reform could bring. **NCMJ**

Wenke Hwang, PhD associate professor, Department of Public Health Sciences, Division of Health Services Research, Penn State University College of Medicine, Hershey, Pennsylvania.

Leah Griffin, MS statistician, Department of Biostatistical Sciences, Division of Public Health Sciences, Wake Forest University School of Medicine, Winston-Salem, North Carolina.

Kimberly Liao, MPH research associate, Department of Public Health Sciences, Division of Health Services Research, Penn State University College of Medicine, Hershey, Pennsylvania.

Mark Hall, JD professor, Department of Social Sciences and Health Policy, Division of Public Health Sciences, Wake Forest University School of Medicine, Winston-Salem, North Carolina.

Acknowledgments

This research was funded by the Robert Wood Johnson Foundation. The following people provided very helpful data, information or analysis: George Carr, Lu Ann Delorenzo, Brad Griffith, Harry Herrick, Jim Holland, Jana Kellam, Robert C. Kundich, Suzanne Landis, Brian Moore, J. Nelson-Weaver, Tom Ricketts, Miriam Schwarz, and Mandy Stone. The presentation and conclusions are solely those of the authors.

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. Foster RS. Estimated financial effects of the "Patient Protection and Affordable Care Act," as amended. Centers for Medicare and Medicaid Services Web site. https://www.cms.gov/ActuarialStudies/Downloads/PPACA_2010-04-22.pdf. Accessed May 17, 2012.
2. Leslie RC, Shepherd MD, Simmons SC. Use of a diagnosis-based risk adjustment model to estimate costs of indigent care in a community at Medicaid reimbursement rates. *J Med Econ*. 2008;11(4):585-600.
3. North Carolina Institute of Medicine (NCIOM). North Carolina County-Level Estimates of Non-Elderly Uninsured, 2008-2009. Morrisville, NC: NCIOM; 2010. http://nciom.org/wp-content/uploads/2010/08/County-Level_Estimates_08-09.pdf. Accessed May 17, 2012.
4. US Census Bureau. North Carolina QuickFacts. US Census Bureau Web site. <http://quickfacts.census.gov/qfd/states/37000.html>. Accessed May 17, 2012.
5. US Census Bureau. Buncombe County QuickFacts. US Census Bureau Web site. <http://quickfacts.census.gov/qfd/states/37/37021.html>. Accessed May 17, 2012.
6. Local area unemployment statistics map. US Department of Labor Bureau of Labor Statistics Web site. <http://data.bls.gov/map/MapToolServlet?state=37&datatype=unemployment&year=2011&period=M04&survey=la&map=county&seasonal=u>. Accessed May 17, 2012.
7. Baker GK, McKenzie AT, Harrison PB. Local physicians caring for their communities: an innovative model to meeting the needs of the uninsured. *N C Med J*. 2005;66(2):130-133.
8. What is Project Access? Buncombe County Medical Society Foundation Web site. https://www.bcmsonline.org/pa/files/PA_1Pg_Overview.pdf. Accessed May 17, 2012.
9. Mann, C. Re: New option for coverage of individuals under Medicaid. Centers for Medicare and Medicaid Services Web site. <http://www.cms.gov/smdl/downloads/SMD10005.PDF>. Accessed May 17, 2012.
10. Kronick R, Gilmer T, Dreyfus T, Lee L. Improving health-based payment for Medicaid beneficiaries: CDPS. *Health Care Financ Rev*. 2000;21(3):29-64.
11. Kullgren JT, Taylor EF, McLaughlin CG. Donated care programs: a stopgap measure or a long-run alternative to health insurance? *J Health Care Poor Underserved*. 2005;16(3):421-430.
12. Rowland D. Health care and Medicaid—weathering the recession. *N Engl J Med*. 2009;360(13):1273-1276.
13. Budget of the United States government, fiscal year 2011, Department of Health and Human Services. US Government Printing Office Web site. <http://www.gpoaccess.gov/usbudget/fy11/pdf/budget/health.pdf>. Accessed May 17, 2013.
14. Snow Jones A, Sajid PS. A primer on health care safety nets. Robert Wood Johnson Foundation Web site. <http://www.rwjf.org/files/research/49869.pdf>. Accessed May 17, 2012.
15. Hall MA, Hwang W. The costs and adequacy of safety net access for the uninsured: Buncombe County (Asheville), North Carolina. Buncombe County Medical Society Web site. https://www.bcmsonline.org/main/files/2010_WFU_Study.pdf. Published June 2010. Accessed May 17, 2012.
16. Billings J, Parikh N, Mijanovich T. Emergency department use: the New York Story. *Issue Brief (Commonw Fund)*. 2000;(435):1-5.
17. Freeman JD, Kadiyala S, Bell JF, Martin DP. The causal effect of health insurance on utilization and outcomes in adults: a systematic review of US studies. *Med Care*. 2008;46(10):1023-1032.
18. Gulley SP, Rasch EK, Chan L. Ongoing coverage for ongoing care: access, utilization, and out-of-pocket spending among uninsured working-aged adults with chronic health care needs. *Am J Public Health*. 2011;101(2):368-375.
19. Glied S, Little SE. The uninsured and the benefits of medical progress. *Health Aff (Millwood)*. 2003;22(4):210-219.
20. Stimpson JP, Wilson FA, Eschbach K. Trends in health care spending for immigrants in the United States. *Health Aff (Millwood)*. 2010;29(3):544-550.
21. Ku L. Health insurance coverage and medical expenditures of immigrants and native-born citizens in the United States. *Am J Public Health*. 2009;99(7):1322-1328.
22. Holahan J, Headen I. The Kaiser Commission on Medicaid and the Uninsured. Medicaid coverage and spending in health reform: national and state-by-state results for adults at or below 133% FPL. Kaiser Family Foundation Web site. <http://www.kff.org/healthreform/upload/Medicaid-Coverage-and-Spending-in-Health-Reform-National-and-State-By-State-Results-for-Adults-at-or-Below-133-FPL.pdf>. Published May 2010. Accessed May 17, 2012.
23. Cable, DA. Demographics and Workforce Group, Weldon Cooper Center, University of Virginia. Virginia Medicaid now and under health reform: estimating Medicaid eligible and enrolled populations. http://www.lgava.org/sites/default/files/publications/Virginia%20Medicaid%20Numbers%20Count_Final.pdf. Published September 20, 2010. Accessed May 17, 2012.
24. North Carolina Institute of Medicine (NCIOM). North Carolina Healthcare Safety Net Task Force Report: April 2005. Morrisville, NC: NCIOM; 2005. http://www.ncmedicaljournal.com/wp-content/uploads/NCIOM/projects/SafetyNet/OLD%20FILES/Fullreport_6-17-09.pdf. Accessed May 17, 2012.
25. Landis SE. Buncombe County Medical Society Project Access: Expanding access to care at the local level. *N C Med J*. 2002;63(1):23-29.
26. West K. Buncombe County Medical Society Project Access. Buncombe County Medical Society Foundation Web site. https://www.bcmsonline.org/pa/pp/health_outcome_study.php. Published May 1999. Accessed May 17, 2012.

POLICY FORUM

Promoting Healthy and Sustainable Communities

Introduction

Often the NCMJ delves into particular health issues or areas of concern in health or health care. With this issue, however, we took a slightly different approach by deciding to examine collaborations happening at the state, regional, and local level that are aimed at making the communities we live in healthier.

The North Carolina Departments of Transportation, Commerce, Environment and Natural Resources, and the Division of Public Health in the Department of Health and Human Services are partnering on shared concerns to enhance health. Each of these agencies has, within its own mission, the goal of improving some aspect of quality of life in North Carolina. Effective transportation systems, robust local economies with plentiful jobs, open space and clean air and water, and a solid public health infrastructure shape the health of our communities, and thus ultimately shape our health, too.

At first glance, the work of these departments seems unrelated, but in fact, the work of each impacts the other in some way, the health of North Carolinians, and communities in our state. Communities come alive when the health of the community is viewed with a broader lens. In this issue brief, Petersen and colleagues expand the vision of public health to include variables such as health equity, clean water and air, safe and reliable transportation choices, and adequate housing, income, and education. These state agencies and many others groups like the Appalachian Sustainable Agriculture Project, the North Carolina Association of Regional Councils, the planning profession, and local governments are therefore invested in making our state a “good health state,” as Chenoweth puts it.

Enhancing our built environment is central to doing this. While some of the greatest advances in reducing the burden of disease and improving the quality of life in the 20th century were achieved by improved sanitation and housing, administration of vaccines, fluoridation of water, and the discovery of antibiotics among other things, some of the greatest advances in reducing the burden of disease in this 21st century will come from solutions to health problems stemming, at least in part, from suburbanization. Land use and the built environment are increasingly becoming important to the public’s health. In fact, the Community Preventive Services Task Force of the Centers for Disease Control and Prevention has evidence-based recommendations regarding urban design and land use policies. Silver eloquently explains how planners and public health professionals are coming together and “finding common ground” to make communities healthier. Making the built environment one that facilitates active living is one way to reduce the burden of obesity on our state. And this is a “win” for everyone. A state with healthier people is one that is attractive to businesses, which is clearly a boon to the state’s economy.

Health and health care professionals are leaders in their communities and should embrace, collaborate, and advocate for public policy solutions, systems, and built environment changes that support healthy and sustainable communities, and thus healthy North Carolinians. NCMJ

*Peter J. Morris, MD, MPH, MDiv
Editor in Chief*

Forging New Partnerships to Build Healthier Communities for a Healthier State

Ruth Petersen, Julie A. Hunkins, Lisa Diaz Riegel, Libby Smith

Building healthy communities is critical to reducing the rates of chronic diseases impacting millions of North Carolinians. In 2011, North Carolina's overall health status ranking was 32nd in the nation (with 1 being the best). It is well recognized that health is impacted by a variety of individual, social, environmental, and economic factors, which are complex, interrelated, and influenced by a variety of other factors. Creating healthy communities provides options for people to make health-promoting choices. Such communities include transportation alternatives, access to healthy foods and places to be active, opportunities for economic growth and education, and clean air and water. Creating communities that provide these types of options requires the work of different sectors, many of which may not have health as their main mission, such as those that focus on commerce, planning, transportation, and environmental and natural resources. This article outlines the need for healthier communities and highlights the innovative partnerships and work being done by individuals and agencies at the state, local, and national levels to build healthier communities across North Carolina.

Despite universal support for healthier communities in North Carolina, individuals, agencies, and groups may all have different ideas about what it means to be a healthy community and what it will take to achieve this vision. This issue of the NCMJ describes multiple roles and responsibilities that different partners may have as we all strive to make communities healthier. The desire for healthy communities and healthy North Carolinians is of paramount importance to many state agencies and other partners—and not just those that typically come to mind. Many of the commentaries in this issue describe ongoing collaborations between the North Carolina Division of Public Health (DPH) of the North Carolina Department of Health and Human Services, the North Carolina Department of Transportation (DOT), the North Carolina Department of Environment and Natural Resources (DENR), and the North Carolina Department of Commerce. Other commentaries and sidebars highlight what additional partners are doing to shape healthy communities, including the North Carolina Association of Regional Councils, the Appalachian Sustainable Agriculture Project, the Active Living By Design program, local and regional plan-

ners, universities, counties and municipalities. The overall message of this issue is that it will take all of these players—and many more—to affect change in our communities so that we can best promote health and well-being. Effective partnerships among these agencies and others involved in health and health care can in the long run potentially decrease demand for medical care, reduce chronic disease burden, and lower costs.

In order to truly improve the health of the state's residents, we need to make changes to the places where they live, learn, earn, play, and pray [1]. All of these locations are influenced by decisions that shape the built environment. This term refers to the human-made resources and infrastructure designed to support human activity, such as buildings, roads, parks, restaurants, grocery stores, and other amenities. The way we design our communities influences the options that individuals have, as well as their ability, to live a healthy, active life. In this context, tobacco-free policies and local food systems, which shape the communities around us, are part of our built environment, too.

What Is a Healthy Community?

For medical and public health professionals, the vision of a healthy community may include improved overall health for the entire population, a decrease in health disparities, reduced demand for medical services, and improved access to preventive care and services. When a broader community lens is applied, this vision of public health can expand to also include such variables as health equity, clean water and air, safe and reliable transportation choices, and adequate housing, income, and education. There are many parties striving for healthy communities, and some have additional variables in addition to those mentioned here that they want to include.

For example, the Department of Commerce's vision of a healthy community is one that has a healthy population, and thus healthy workers as discussed by Smith and Morck

Electronically published August 10, 2012.

Address correspondence to Dr. Ruth Petersen, 1915 Mail Service Center, 5505 Six Forks Road, Raleigh, North Carolina 27699 (ruth.petersen@dhhs.nc.gov).

N C Med J. 2012;73(4):270-273. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73404

in their commentary [2]. An attractive community is also important to the department as it is one in which businesses will want to operate and prosper. This type of community includes high-quality schools, which both assure a pool of highly trained job applicants and maximize the likelihood that workers will relocate to or stay in the area because it provides excellent educational opportunities for their children. Because DENR is accountable for maximizing the protection of the state's natural environment and resources, its vision of a healthy community focuses on being one that has optimal air, water, and soil quality. Riegel and colleagues [3] discuss DENR's air and water quality protection efforts, brownfield revitalization projects, and integrating natural resource conservation into community planning to make communities as healthy as they can be from that department's perspective. As discussed by Conti and colleagues [4], the DOT's vision of a healthy community includes systems of transportation that not only move people and goods safely and efficiently, but that also enhance the economy, health, and well-being of the state. Thomas and colleagues [5] delve into DPH's vision for a healthy state and healthy population in their commentary on the division's partnerships with other state agencies to implement strategies to increase physical activity as a primary prevention strategy. No matter what its particular vision may be, every agency agrees that healthier and more sustainable communities are critically important in addressing the state's public health needs. McKinney and Huskins [6] discuss the North Carolina Tomorrow initiative launched in 2010 by the North Carolina Association of Regional Councils. Focused on economic development, the initiative is guided by principles related to transportation and valuing communities and neighborhoods. This initiative in many ways ties together the visions or strategies, at least in part, of many agencies concerned with promoting healthy and sustainable communities.

The Health of North Carolinians and the Costs of Poor Health

While many of the above measures are more about the health of the community, which certainly affects the health of individuals, there are excellent indicators to measure the health status of North Carolinians. Perhaps the best indicator is the state's overall health status ranking, which was 32nd in the nation in 2011 (with 1 being the best) [7]. In 2010, 66.9% of deaths in North Carolina were caused by chronic diseases, this equates to 144 average deaths per day due to chronic disease [8]. Although many other factors are involved, much of the death and disability in North Carolina is attributable to diabetes, heart disease, stroke, and cancer and can be linked to the use of tobacco, poor nutrition, and low physical activity levels of North Carolinians. In 2011, 1.4 million of the state's adults smoked and 2.1 million were obese [7]. In North Carolina and across the nation, there are disparate health outcomes among different segments of the population. For example, the prevalence of diabetes in

adult North Carolinians in 2009 was higher among African Americans (15.6%) and Native Americans (14.2%) than among Hispanics (6.1%) and whites (8.4%), and the prevalence of diabetes was 3 times higher among adults whose annual household income was less than \$15,000 than it was among those whose household income was \$75,000 or more [8]. Additionally, 72% of African Americans and 69% of Native Americans in North Carolina in 2010 were overweight or obese, compared with 64% of whites [9]. All of these statistics bring attention to the need we have in this state to do more to improve health.

In his commentary, Chenoweth [10] discusses some of the economic considerations of physical inactivity and community design. He notes that in North Carolina, the direct medical care and lost productivity costs of physical inactivity was approximately \$8.3 billion in 2010. Adding in tobacco use and low dietary intake of fruit and vegetables increases these costs. An estimated \$14 billion in direct medical costs and lost-productivity costs in North Carolina were attributable to those 3 preventable risk factors in 2010 [11]. Because of these costs and also the burden and suffering to individuals, communities and regions are coming together to make positive changes that impact leading health behaviors such as physical activity, tobacco use, and poor nutrition. For example, in her sidebar, Shoe [12] tells the story of how the Cabarrus County Board of Commissioners approved a tobacco-free policy for all Cabarrus County parks. Creamer and Dunning [13] review the impact of local food systems on local economies and individuals' fruit and vegetable consumption, while Cramer [14] shares the work of the Appalachian Sustainable Agriculture Project to build healthy communities through connections to local food.

The Role of the Built Environment in Health

The health of individuals is clearly a product of their individual characteristics and behaviors, but it is also a product of their social, economic, and physical environments. In essence, the community in which people live greatly influences their health.

Designing communities in a way that considers health effects on the entire population requires a comprehensive approach to planning, designing, and building. Such community designs need to ensure that plans and policies do not disproportionately affect some segments of the population or increase health disparities between populations. It requires that those who work in health and health care partner with those whose decisions affect community-level built environments, such as planners, elected officials, environmental protection experts, and representatives from the business community and school boards. In his commentary, Silver [15] notes the importance of this type of collaboration and reviews the history of the planning and public health professions and how these two worlds are once again coming together, but this time to tackle the issue of suburbanization and associated health effects. Bors and Lee [16] discuss

in their sidebar how the national program, Active Living By Design, has worked with various partners on policy change and community design efforts to support active living in North Carolina.

The focus of this issue is on the many partners working together across North Carolina to create healthy communities and built environments that provide options for healthy living. It is about the state and local partners who are working together to ensure that the entire population has access to clean air and water, employment opportunities, and physical activity, and to decrease the population's need for health services. But healthy communities can only be achieved through implementation at the local level. Morrow and Lovette [17] share built environment and other changes in 2 local health department districts to make communities more active, and thus healthier. The Shape Your World movement in the state, discussed by Thomas and colleagues [18], intends to engage people at the local level by helping people better understand active living, its components, and what their communities need. For local level implementation to occur, all community partners will need to align their roles and responsibilities so that all efforts support one vision of a healthier community. Different partners will play different roles as a community implements the changes needed to achieve such a vision. However, it is important that coordination occurs at the regional level and that statewide policies are supportive.

The Healthy Environments Collaborative (HEC) and the North Carolina Sustainable Communities Task Force (SCTF)

The commentaries by leaders from the DOT, the Department of Commerce, DENR, and DPH show the progress that North Carolina has made in recent years in building supportive statewide programs and policies that affect built-environment decisions and therefore community and individual health. Success in the state has been facilitated by the work of the North Carolina Healthy Environments Collaborative (HEC) and the North Carolina Sustainable Communities Task Force (SCTF). Both of these partnerships have increased the attention paid to health considerations during the decision-making process. The health impact assessment discussed by Hebert [19] is a relatively new tool being used in the state to ensure public health concerns are included in planning efforts.

The HEC, first organized in 2006, is composed of representatives from the DOT, DENR, the Department of Commerce, and DPH. The mission of this group is to integrate and align departmental efforts to improve the health of North Carolina's people, economy, and environments. This partnership played a critical role in North Carolina receiving Community Putting Prevention to Work (CPPW) funding (from the American Recovery and Reinvestment Act [20]) aimed at supporting active living in the state. Active living is a way of living that integrates physical activity into an

individual's daily routine. Environments that support active living include such amenities as bike lanes, parks that people can walk to and play in, and transit stops within walking distance of people's homes. Active living happens when people live in a community that provides them with options for choosing to be more active.

The SCTF is a more recent and expanded partnership among state agencies and other stakeholders that are working to support the integration of health considerations into community design. The North Carolina General Assembly established the SCTF in July of 2010 in recognition of the need to use resources strategically to plan for and accommodate the rapid growth of the state, given the economic challenges facing North Carolina. The goal of the SCTF, as established in article 7 of chapter 143B of the General Statutes as part of North Carolina Session Law 2010-180, [21] is healthy and equitable development that does not compromise natural systems or the needs of future generations of North Carolinians. To meet that goal, the task force is taking several steps. First, it is educating professionals and the public on the practical benefits of sustainable-community strategies and showing them how to integrate these strategies into their current efforts. Second, the task force is working to better align the decisions made by different agencies and by federal, state, and local governments. Last, it is building the capacity of local communities and regions to incorporate benefits to and other impacts on the health of North Carolinians into the decision-making process for a range of development and infrastructure policies and investments.

Members of the SCTF include representatives from 6 state agencies (the Departments of Administration, Commerce, Environment and Natural Resources, Health and Human Services, and Transportation, and the North Carolina Housing Finance Agency), the building industry, the banking industry, a nongovernmental organization, and city, county, and regional governments. The SCTF mirrors the federal Sustainable Communities Partnership between the US Department of Transportation, the US Department of Housing and Urban Development, and the US Environmental Protection Agency. North Carolina is the first state to enact a parallel program and begin implementation. The SCTF members can work with their respective federal counterparts to bring lessons learned in other states to North Carolina communities.

Conclusion

The great momentum toward healthy and sustainable communities described in this issue is intended to inspire medical, public health, and other allied health professionals, as well as policy makers, to join the movement to promote healthier communities in which everyone can thrive—communities that offer transportation alternatives, access to healthy foods and places to be active, opportunities for economic growth and education, and clean air and water. The

adverse effects of chronic disease and the medical costs associated with the outcomes of physical inactivity cannot be decreased without creating healthy communities outside the clinical setting. Medical, public health, and other allied health professionals have a key role to play in creating healthy options within their communities. Physicians are leaders in promoting health within their communities. They can serve as experts on the medical conditions facing their communities, promote dialogue between community members and the many local entities needed to change communities to promote health, and encourage communities to take action. Levin [22] is one North Carolina physician who has taken a stance on this issue. After years of seeing poor health among his patients—in part due to lack of physical activity—he decided to become involved in making his community one that promotes active living as he discusses in his sidebar about the Blue Ridge Corridor project. New and expanded partnerships are needed to create healthier communities, because the task is complex, and it will take many experts working together to plan, design, and allocate resources. Only by approaching the task from many different angles and by forging new relationships will we reach the common goal of healthier people in healthier communities. **NCMJ**

Ruth Petersen, MD, MPH section chief, Chronic Disease and Injury Section, Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Julie A. Hunkins, PE manager, Quality Enhancement Unit, North Carolina Department of Transportation, Raleigh, North Carolina.

Lisa Diaz Riegel, MS executive director, Natural Heritage Trust Fund, North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.

Libby Smith senior policy advisor and assistant ARC program manager, North Carolina Department of Commerce, Raleigh, North Carolina.

Acknowledgment

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. National Prevention Council. National Prevention Strategy: America's Plan for Better Health and Wellness. Washington, DC: US Department of Health and Human Services, Office of the Surgeon General; 2011. www.healthcare.gov/prevention/nphpphc/strategy/report.pdf. Accessed May 17, 2012.
2. Smith L, Morck J. The North Carolina Department of Commerce:

A healthy workforce promotes economic security *N C Med J*. 2012;73(4):278-280.

3. Riegel, LD, Wakild C, Boothe, L, Hildebrandt HJ, Nicholson B. The North Carolina Department of Environment and Natural Resources: Clean land, water, and air for healthy people and communities. *N C Med J*. 2012;73(4):281-285.
4. Conti EA, Morris PF, Hunkins JA. The North Carolina Department of Transportation's vision for healthy communities through sustainable transportation. *N C Med J*. 2012;73(4):274-277.
5. Thomas, C, Rhew LK, Petersen, R. The North Carolina Division of Public Health's vision for healthy and sustainable communities. *N C Med J*. 2012;73(4):286-289.
6. McKinney J, Hunkins BR. North Carolina Tomorrow: Building communities for tomorrow's jobs. *N C Med J*. 2012;73(4):301-303.
7. America's Health Rankings, 2011. United Health Foundation Web site. www.americashealthrankings.org/NC. Accessed May 19, 2012.
8. North Carolina Diabetes Prevention and Control Program Fact Sheet: The Burden of Diabetes in North Carolina in 2010. Accessed May 19, 2012.
9. North Carolina State Center for Health Statistics. 2010 Behavioral Risk Factor Surveillance System Survey Results: North Carolina. Derived Variables and Risk Factors. Adults Who Have a Body Mass Index Greater Than 25.00. <http://www.schs.state.nc.us/schs/brfss/2010/nc/all/rf2.html>. Accessed May 19, 2012.
10. Chenoweth D. Economics, physical activity, and community design. *N C Med J*. 2012;73(4):293-294.
11. Be Active North Carolina. Tipping the Scales: The High Cost of Unhealthy Behavior in North Carolina. 2012. http://www.beactivenc.org/wp-content/uploads/2011/08/Tipping-the-Scales-Final_2012.pdf. Accessed May 19, 2012.
12. Shoe, E. Tobacco-free parks: Maximizing health impact in built environment planning. *N C Med J*. 2012;73(4):287-288.
13. Creamer NG, Dunning RD. Local food systems for a healthy population. *N C Med J*. 2012;73(4):310-314.
14. Cramer M. Appalachian Sustainable Agriculture Project: Growing minds and healthy communities. *N C Med J*. 2012;73(4):312-313.
15. Silver M. Planners and public health professionals need to partner... again. *N C Med J*. 2012;73(4):290-296.
16. Bors P, Lee J. Active Living By Design: Collaborating to build healthy communities in North Carolina. *N C Med J*. 2012;73(4):305-306.
17. Morrow JH, Lovette BG. Two North Carolina Public Health Departments Taking Steps Toward Sustainable Communities. *N C Med J*. 2012;73(4):304-309.
18. Thomas C, Rhew LK, Petersen R. Shape Your World. *N C Med J*. 2012;73(4):289.
19. Hebert KA. Health impact assessments in North Carolina: Promoting public health through informed decisions. *N C Med J*. 2012;73(4):297-300.
20. American Recovery and Reinvestment Act, Pub. L. No. 111-5, 123 Stat. 115 (2009).
21. 2010-180 NC Sess Laws, HB 1766 (2009).
22. Levin S. The Blue Ridge Corridor experience. *N C Med J*. 2012;73(4):291-292.

The North Carolina Department of Transportation's Vision for Healthy Communities Through Sustainable Transportation

Eugene A. Conti Jr, Paul F. Morris, Julie A. Hunkins

The North Carolina Department of Transportation increasingly includes the health of North Carolinians in its transportation decision-making. With an expanded mission that now includes health, the agency is integrating public health considerations into its initiatives, plans, and policies, as well as exploring the use of health impact assessments.

North Carolina's economic vitality and the quality of life of its residents are highly dependent on having a safe, reliable, and efficient transportation network. Although the focus of the North Carolina Department of Transportation (NCDOT) is mobility (the movement of people and goods), its mission also includes safety, environmental sensitivity, and enhancement of the state's economy, health, and well-being. The NCDOT recognizes its role in supporting vibrant, healthy communities. The department also recognizes that it is continuously shaping the built environment throughout the state. North Carolina has the second-largest system of state-maintained roads in the United States. The NCDOT maintains nearly 80,000 miles of roads (approximately 75% of all roads in the state) and is considered to be the state's largest developer. In an attempt to optimize the overall benefits derived from the investments it is making on the public's behalf, the NCDOT is increasingly including the health of North Carolinians as a consideration in its transportation network decision-making.

The transportation network can serve as an enabler of or as a barrier to better health outcomes, especially through its ability to create a built environment that provides opportunities for physical activity. In North Carolina, the general preference of the state's residents for automobile travel, in combination with development patterns that contribute to increased travel distances, has resulted in a transportation network designed primarily for travel by motorized vehicle. At the same time, lifestyles have generally become more sedentary. This combined with other factors has led to an increase in obesity, which in turn is linked to high blood pressure, high cholesterol, diabetes, heart disease, stroke, arthritis, and cancer [1]. The public health and health care communities are working hard to encourage people to change behaviors that lead to these diseases, but signifi-

cant positive changes in public health will not be realized unless there are changes to the built environment. In this regard, making the healthy choice the easy choice not only applies to what we eat, but also how we move around our communities.

A 2007 survey found that 60% of adults in North Carolina believe that they would be more physically active if their communities had more accessible sidewalks or trails for walking or bicycling [2]. A research brief prepared by the Robert Wood Johnson Foundation in 2009 states in its conclusion that

A substantial body of research shows that certain aspects of the transportation infrastructure—public transit, greenways and trails, sidewalks and safe street crossings near schools, bicycle paths, traffic-calming devices, and sidewalks that connect schools and homes to destinations—are associated with more walking and bicycling, greater physical activity and lower obesity rates [3].

This evidence, coupled with the fact that the state's population is increasing and North Carolinians want more choices in the modes by which they travel, is motivating the NCDOT and its sister state agencies and local government partners to try to influence public health outcomes by considering the inclusion of active transportation features such as sidewalks and bike facilities when creating transportation and land-development plans.

Although accommodations for nonmotorized transportation, such as sidewalks and bike lanes, have been integrated into some parts of the transportation network, additional facilities that afford opportunities for active transportation are needed in other parts of the network. The key to this is working with communities to identify the areas in which investment in such facilities would provide the highest overall benefit to the public in terms of mobility, health, reduc-

Electronically published August 10, 2012.

Address correspondence to Ms. Julie A. Hunkins, North Carolina Department of Transportation, 104 Fayetteville St, Raleigh, NC 27601 (jhunkins@ncdot.gov).

N C Med J. 2012;73(4):274-277. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73405

tion in health disparities, the environment, and the economy. Understanding where mutual mobility and health benefits can be derived requires that health, transportation, and land development professionals talk with one another and share data in order to better understand needs, evaluate options, and leverage resources to optimize outcomes.

Because the state owns or maintains a large proportion of the transportation system, the NCDOT can provide meaningful, immediate impact and can influence the built environment more effectively and more widely than can many other state and local entities. The NCDOT carries out more than a thousand projects across the state each year, materially changing the environment and altering the landscape daily. For example, the department's current Bridge Program involves the replacement or rebuilding of more than 1,800 bridges in the state over the next 3 years. As a part of decision-making, the agency is considering bicycle and pedestrian accommodations in a meaningful way. In the reconstruction and resurfacing of existing roads and on new projects, many transportation options are considered, including sidewalks, crosswalks, bicycle lanes, paved shoulders, and transit stops.

The Healthy Environments Collaborative is an inter-agency collaboration between the NCDOT, the North Carolina Department of Health and Human Services, the North Carolina Department of Commerce, and the North Carolina Department of Environment and Natural Resources; the agencies work closely with one another and with partners at the University of North Carolina at Chapel Hill and North Carolina State University to improve the health of North Carolina's people, economy, and environments. With support provided by the collaborative, NCDOT leaders are increasingly integrating health considerations into transportation decision-making through a programmatic focus. This includes setting policies that can serve as a compass for the efficient delivery of projects that will add value to the communities they serve. The department's mission statement was recently revised to underscore the importance of mobility in supporting healthy people and healthy places; it now states that the NCDOT's mission is "connecting people and places safely and efficiently with accountability and environmental sensitivity to *enhance the economy, health and well-being of North Carolina.*" With the addition of this last part of the mission statement, the agency's mission has expanded to include how the transportation network can support economic growth and development, improved public health outcomes, livable communities, and improved quality of life [4].

North Carolina's Statewide Bicycle and Pedestrian Transportation Plan is currently being developed. It will guide the NCDOT and its partners in developing and implementing programs and projects that expand opportunities for walking and bicycling and will also increase safety. These programs and projects will, in turn, provide the opportunity for increased physical activity and will thus ultimately lead to improvements in overall health outcomes. The plan will

focus on bicycling and walking as basic means of transportation while recognizing their value in terms of public health, economic development, recreation, and tourism. The plan has strong support from other state agencies in the Healthy Environments Collaborative, given the benefits desired by each member. The Department of Commerce sees the increased appeal for businesses to locate in a state with a comprehensive bicycle and pedestrian network; the Department of Health and Human Services sees the benefit from increased access to physical activity and a resulting improvement in health status for the state's residents; and the Department of Environment and Natural Resources supports the prioritization of alternative forms of transportation over automobiles as a way to protect the environment.

Identifying common transportation and health goals is of key importance in making the best decisions to support healthy people and healthy communities. As additional evidence of NCDOT's increasing support of including health in all policies, the department is working with transportation and health professionals to better integrate public health considerations into the 25-year comprehensive long-range transportation planning process. Comprehensive transportation plans are developed at the county or local level and set the stage for the location and type of transportation improvements needed to serve future growth and other goals of the community. Public health goals can be part of these local transportation-planning efforts, but it is important for the public health community to be engaged as a stakeholder so that unique health interests are reflected in the comprehensive goals of the planning area. Because the built environment, development patterns, and transportation are so interrelated, the NCDOT is working with its partners in the Healthy Environments Collaborative and with local planning entities to better link transportation and land-development planning. Integrated and coordinated planning efforts can result in projects that better support community goals such as more choices in how to travel, increased access to transportation options for lower-income households, improved public health outcomes, and reduced environmental impacts. The effort to improve the long-range transportation planning process also includes better integration of active transportation modes such as walking, biking, and transit into local or regional transportation plans.

NCDOT's Complete Streets Policy, which was adopted in 2009, has tremendous potential to shape the built environment to be more supportive of nonmotorized transportation and increased physical activity. For the past 50 years, streets were generally designed to serve one mode of transportation: motor vehicles. Sidewalks and bike facilities were often neglected. In contrast, the Complete Streets Policy is intended to serve all modes of transportation and to be safe and comfortable for all users, including pedestrians, bicyclists, transit riders, motorists, and individuals of all ages and capabilities. (NCDOT Complete Streets information is available at <http://www.nccompletestreets.org>.) North

Carolina's nationally renowned Complete Streets pilot program carries out projects that demonstrate value to communities through efficient mobility, safety for all travelers using all modes of transportation, improved physical health, enhanced economic opportunity, and a clean environment.

The NCDOT also has established Traditional Neighborhood Development Street Design Guidelines with the intent of supporting community development that encourages walking and biking, enhances transit service opportunities, and improves traffic safety through promoting low-speed, cautious driving while fully accommodating the needs of pedestrians and bicyclists. The overall function, comfort, and safety of the multipurpose or "shared" streets in traditional neighborhoods are deemed more important than vehicular efficiency alone. Other elements of traditional neighborhoods that encourage walking and biking are higher proportions of interconnected streets, sidewalks, and paths.

Other programmatic approaches that are being explored by the NCDOT include accounting for health impacts, costs, and benefits throughout the transportation planning, programming, and project decision-making processes. Actions that may be taken include setting health-related criteria as part of transportation funding decisions, as well as conducting health impact assessments to help inform what the NCDOT and its local planning and funding partners will do and when. Health impact assessments can be used as evidence-based tools to document the health costs of land use and transportation decisions. It is important to evaluate the benefits that can be derived from investments and to evaluate how prosperity, a clean environment, and improved or expanded mobility can lead to better public health outcomes.

The cumulative effects of transportation projects, along with the impacts of projects carried out by other entities also need to be considered in transportation decision-making. The consequences of decisions, including those related to public health, may be realized immediately upon completion of a particular project, but they can also be felt much later in time. In addition, the impacts of multiple decisions related to projects across sectors (transportation, development, and other infrastructure projects) are cumulative over time, influencing the public health within an area. For example, paved surfaces can create heat islands that make the temperatures higher, especially in urban areas. Higher temperatures, coupled with pollutants from vehicle exhaust, create a chemical reaction that worsens air quality and can exacerbate associated diseases, such as asthma and cardiovascular disease.

The silver tsunami—the near doubling of people over the age of 60 in North Carolina's population by 2030 [5]—must also be considered. As North Carolinians live longer and as older residents form a growing percentage of the total population, it will become more challenging and important to provide appropriate mobility options for people over 65

years of age. The NCDOT recognizes that it must respond to this and other demographics-related challenges, which will result in substantial impacts on travel patterns, increased traffic congestion, and inadequate transportation infrastructure. Confronting the challenges presented by the current built environment, an automobile-dependent culture, and projected growth in vulnerable and general populations will necessitate new approaches.

Although the NCDOT's primary business is building transportation infrastructure that moves people and goods, it can also be considered an applied research organization with goals of continuous improvement and innovation. In many ways, it is conducting applied research in the health arena. The department's shift to "health in all policies" involves the integration of public health considerations into broad agency policy including funding, programs, guidelines, processes, projects, performance measurement, and incentives.

The NCDOT cannot simply put sidewalks, bike lanes, and greenways everywhere—funding is limited. Strategic decisions must be made to ensure that the public is getting the highest return on the state's investment. This means figuring out what the communities' needs are with regard to mobility, as well as considering where facilities have the greatest potential to create increased physical activity, especially for at-risk populations. In partnership with other agencies, the NCDOT is looking for opportunities to implement policies, plans, and projects to make the biggest difference in communities that have made mobility and health a priority. Effective decision-making can only occur if the public health community, local planners, and transportation planners are at the table and engaged in dialogue. The decision-making process must include the identification of issues and community needs; data collection, sharing and analysis; solution generation and evaluation; implementation strategies and funding; monitoring and measurement; and communication and capacity building.

In support of a more integrated approach to transportation planning and consistent with its mission, which acknowledges the connection between transportation and public health, the NCDOT is committed to working with its partners at the state and local levels to provide safe, efficient, and reliable transportation options, including bicycle, pedestrian and transit facilities. It is also committed to considering public health issues and concerns as they relate to transportation decisions. **NCMJ**

Eugene A. Conti Jr, PhD secretary, North Carolina Department of Transportation, Raleigh, North Carolina.

Paul F. Morris, FASLA deputy secretary, Transit, North Carolina Department of Transportation, Raleigh, North Carolina.

Julie A. Hunkins, PE manager, Quality Enhancement Unit, North Carolina Department of Transportation, Raleigh, North Carolina.

Acknowledgment

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. F as in Fat: How Obesity Threatens America's Future. July 2011. Trust for America's Health Web site. <http://www.healthyamericans.org/report/88/>. Accessed July 3, 2012.
2. North Carolina State Center for Health Statistics. Behavioral Risk Factor Surveillance System (BRFSS): Calendar Year 2007 Results, North Carolina Counties and Regions. <http://www.schs.state.nc.us/SCHS/brfss/2007/index.html>. Accessed May 8, 2012.
3. Robert Wood Johnson Foundation. Active Transportation: Making the Link from Transportation to Physical Activity and Obesity. Research brief. Summer 2009. <http://www.rwjf.org/files/research/20091112alractivetransportationfinal.pdf>. Accessed May 8, 2012.
4. Mission and goals. North Carolina Department of Transportation. <http://www.ncdot.gov/performance/missiongoals/>. Accessed on July 3, 2012.
5. Reports from the Governor's Aging Policy Roundtables. Building a Livable and Senior-Friendly North Carolina. <http://www.aging.unc.edu/nccoa/2010/PolicyBriefs2010Booklet.pdf>. Accessed July 3, 2012.



To the moon, Alice.

That's how high you can stack gas cans filled with the fuel Americans saved by riding public transportation a record 10.1 billion times last year – the highest ridership in 49 years. Saving 1.4 billion gallons of gasoline annually is not just good news, it's good public policy.

By supporting increased investment and incentives for public transportation, you're helping create an energy-independent America of the future.

PUBLIC TRANSPORTATION
Wherever life takes you



The North Carolina Department of Commerce: A Healthy Workforce Promotes Economic Security

Libby Smith, John Morck

To thrive economically, North Carolina needs a healthy, productive workforce. The public and private sectors should collaborate on the prevention and management of chronic diseases, which significantly impact the state's economy. Evidence-based prevention strategies should be prioritized, and communities should be designed with public health considerations in mind.

A healthy, productive workforce is vital to strong economic growth and is a critical factor in economic development. Such a workforce helps attract businesses to a community and enables employers to meet their productivity goals and to curtail their bottom-line costs.

The North Carolina Department of Commerce is the state's leading economic development agency, and its mission is to improve the economic well-being and quality of life of all North Carolinians. In essence, it is the agency's charge to help create environments in which businesses thrive and jobs multiply. Key components to accomplishing this include assuring the state has a robust pool of highly skilled, healthy workers and assuring its communities are designed to support an active, healthy constituency.

Importance of a Healthy Workforce

The health problems associated with chronic disease have a significant economic impact not only on the state's health care system, but also on its economy. Lost labor time and the inability of employees to concentrate or perform optimally when they are at work—due to their own poor health or a family member's poor health—are drains on the economy.

Health care costs are rising more quickly than costs in other sectors, with the majority of health care insurance in the United States being provided by employers [1]. The average annual percent growth in health care expenditures per capita from 1991-2009 was 6% in North Carolina compared to the national average of 5.3% [2]. The state's employer contribution for employer-based health insurance in 2010 averaged 81% (\$4,054) versus the national average of 79% (\$3,919) for single premium, 74% (\$10,151) versus 73% (\$10,150) for family premium, and 76% (\$6,814) versus 74% (\$7,166) for employee-plus-one premium per enrolled employee [3].

Medical costs associated with chronic disease include not just the direct costs of preventive, diagnostic, and treatment services, but also indirect costs related to morbidity (the value of income lost from decreased productivity, restricted activity, and absenteeism) and mortality (the value of future income lost by premature death). These costs affect everyone, regardless of whether it is the employer or the employee who covers them. Health care costs matter. A North Carolina Chamber report on manufacturing published in 2008 [4] notes that "A recent analysis by the New America Foundation found that 'many manufacturers have blamed rising healthcare costs for decisions to drop health benefits for workers or shift jobs overseas.'" The report goes on to state that "North Carolina manufacturers complain that health care costs are outpacing wages and productivity." High health care costs make it more difficult for small businesses in North Carolina to provide health insurance, and that in turn makes it more difficult for those businesses to retain and compete for good workers. Also, entrepreneurship suffers when individuals are reluctant to leave the security of their current job's health coverage to start up a new and innovative business venture. With the increased cost of health care also comes a growing uninsured population. This too has serious implications for employment and for economic development.

A Milken Institute report titled *An Unhealthy America* [5] published in 2007 states that the economic burden of chronic disease in the United States is "costing us lives, quality of life and prosperity." The report states that in 2003, the top 7 chronic diseases—cancers, diabetes, heart disease, hypertension, stroke, mental disorders, and pulmonary conditions—resulted in lost productivity nationwide totaling \$1.1 trillion dollars per year, with another \$277 billion being spent on treatment. The report projects that if the country stays on its current path, lost economic output and treatment costs will total \$4.2 trillion by 2023. However, even modest improvements in preventing and treating disease could

Electronically published August 10, 2012.

Address correspondence to Ms. Libby Smith, NC Department of Commerce, 100 E Six Forks Rd, Raleigh, NC 27609 (lsmith@nccommerce.com).

NC Med J. 2012;73(4):278-280. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved.
0029-2559/2012/73415

TABLE 1.
Economic Impact of Chronic Diseases in North Carolina in 2003 and in 2023.

Type of cost	Annual costs of chronic diseases in North Carolina in 2003 (in billions of dollars)	Projected annual costs of chronic diseases in North Carolina in 2023 (in billions of dollars) ^a
Treatment expenditures	7.9	28.9
Lost productivity	32.1	111.1
Total costs	40.0	140.0

Note. Data are for 7 chronic diseases: cancers, diabetes, heart disease, hypertension, stroke, mental disorders, and pulmonary conditions. ^aThe projected costs for 2023 assume that no improvements are made in the prevention and management of chronic diseases. Data are from DeVol R, Bedroussian A. An Unhealthy America: The Economic Burden of Chronic Disease—Charting a New Course to Save Lives and Increase Productivity and Economic Growth. The Milken Institute; October 2007.

make it possible to avoid 40 million cases of chronic disease, which would increase the nation’s gross domestic product by \$905 billion and decrease treatment costs by \$218 billion annually [5].

The economic impact of chronic disease in North Carolina is significant. The annual costs of treatment expenditures and of lost productivity totaled more than \$40 billion in 2003. These costs are projected to increase substantially by 2023 [5], as Table 1 shows.

Included in the health care burden is the cost of workers’ compensation. Obese and unhealthy workers are at greater risk of workplace injuries and often require more complicated medical care during recovery. A 2007 retrospective cohort study of results from the Duke Health and Safety Surveillance System [6] found that extremely obese workers (those with a body mass index greater than or equal to 40) filed twice as many workers compensation claims as recommended-weight employees (those with a body mass index of 18.5 to 24.9) filed. In addition, their medical costs were nearly 7 times higher, their indemnity claims costs were 11 times higher, and they missed nearly 13 times as many days of work due to their injuries as did recommended-weight employees. The takeaway message from this study is that to reduce the risk of injury and to avoid the subsequent loss of productivity and increase in health care costs, employers should (in addition to doing whatever they can to make the workplace safer), give high priority to encouraging employees to maintain a healthy weight through healthy eating and physical activity [6].

The nation’s leading medical organization devoted to worker health and safety, the American College of Occupational and Environmental Medicine (ACOEM), understands that employers must have a healthy workforce to compete in the global economy. The ACOEM is actively advocating that greater attention and resources be committed to “health-related services that protect the employability of the working-age population to maximize workforce participation and productivity” [7]. In 2009 ACOEM developed an action agenda based on the following principles: 1) to keep the economy strong, it is essential to keep the workforce healthy and productive, 2) workforce health and productivity will benefit from public investment in better health and

better health care, 3) investment in evidence-based primary, secondary, and tertiary prevention strategies should be prioritized, and 4) spending on prevention should not be discretionary. Employers and disability insurers should be given greater incentives to help people stay healthy and employed, and benefits should not be designed to give employees any disincentives for healthful behavior [7].

As the ACOEM acknowledges, health care professionals who specialize in occupational and environmental medicine best understand the correlation between health and productivity. They must partner with employers in all sectors of the economy—private, public and nonprofit—to identify workplace initiatives that reduce risks and better ensure that employees stay healthy and productive.

Importance of Community Design to Public Health

Community design can play an important role in maintaining a healthy workforce by encouraging a less sedentary lifestyle. Active transportation options allow workers the chance to increase their physical activity level during their daily commute or while taking breaks during the workday. To encourage biking or walking to work, safe street and sidewalk facilities must be provided that allow these activities to take place. The best place for local governments to address these needs is within their comprehensive planning process. Historically, public health concerns have not always been directly included in plans; however, the movement to include these issues in the process has gained momentum within the past decade. Today public health officials are increasingly consulted about and involved with local planning efforts. In a 2010 article in *Planning Magazine* [8], the American Planning Association highlighted efforts under way across the country to identify critical public health concerns and the solutions that have been proposed within the planning process. The American Planning Association has also launched the Planning Healthy Communities forum on their website, which provides a forum for dialogue between professions and offers a host of resources [9]. The American Planning Association has also partnered with the National Association of County and City Health Officials to develop a jargon fact sheet to help planners and public health professionals better communicate [10]. In addition, the National Association of County and

City Health Officials have released a factsheet titled Public Health in Land Use Planning and Community Design [10] to help educate public health officials about the reasons to become involved in local planning. In an effort to help communities understand the linkages between health and community planning, the Community Planning Division of the North Carolina Department of Commerce, which was established in 1957 to help prepare local governments for growth and development through planning technical assistance, is engaged in an effort to include public health considerations in an upcoming revision to the division's land use planning guidelines. The purpose of the guidelines is to give staff members and local officials a blueprint for developing local plans, especially in rural areas. The project will include input from the North Carolina Department of Transportation, the North Carolina Department of Environment and Natural Resources, and the North Carolina Division of Public Health, as well as other agencies. The goal is to develop an easy-to-use guide to help local communities make better planning decisions, while also satisfying planning requirements of other state agencies.

Promoting Better Health Is an Investment in Economic Security.

North Carolina is participating in an increasingly competitive global economy, and the state's performance is linked with its ability to produce the best educated, most highly skilled, and healthiest workforce possible.

We recognize that to avoid being overwhelmed by a tide of chronic illness there must be a partnering of the public and private sectors—health care professionals, business owners, educational institutions, and public policy makers—to provide incentives and make investments that encourage and reward prevention and early intervention. To this end, the North Carolina Department of Commerce and its sister agencies are working to realign programs and resources, and are working together to promote healthier economic and community development strategies and outcomes for North Carolina. NCMJ

Libby Smith senior policy advisor and assistant ARC program manager, North Carolina Department of Commerce, Raleigh, North Carolina.

John Morck, AICP director, Community Planning, Division of Community Investment and Assistance, North Carolina Department of Commerce, Raleigh, North Carolina.

Acknowledgment

Potential conflicts of interest. L.S. and J.M. have no relevant conflicts of interest.

References

1. DeNavas-Walt C, Proctor BD, Smith JC. Income, Poverty, and Health Insurance Coverage in the United States: 2010. US Department of Commerce Report; September 2011. <http://www.census.gov/prod/2011pubs/p60-239.pdf>. Accessed June 18, 2012.
2. The Henry J. Kaiser Family Foundation. State Health Facts. Average annual percent growth in health care expenditures per capita by state of residence, 1991-2009. The Henry J. Kaiser Family Foundation Web site. <http://www.statehealthfacts.org/comparemaptable.jsp?ind=598&cat=5>. Accessed July 6, 2012.
3. The Henry J. Kaiser Family Foundation. State Health Facts. North Carolina: employer-based health premiums. The Henry J. Kaiser Family Foundation Web site. <http://www.statehealthfacts.org/profileind.jsp?cat=5&sub=67&rgn=35&cmprgn=1>. Accessed July 6, 2012.
4. Toft GS, Melton SB. What North Carolina Makes, Makes North Carolina: Manufacturing's Value Proposition for a State on the Go. North Carolina Chamber Manufacturing Report; August 2008. http://www.ncchamber.net/docs/WhatNCMakes_CompleteReport_Final.pdf. Accessed May 7, 2012.
5. DeVol R, Bedroussian A. An Unhealthy America: The Economic Burden of Chronic Disease—Charting a New Course to Save Lives and Increase Productivity and Economic Growth. The Milken Institute; October 2007.
6. Østbye T, Dement JM, Krause AM. Obesity and workers' compensation: Results from the Duke Health and Safety Surveillance System. *Arch Intern Med*. 2007; 167(8):766-773.
7. Special Committee on Health, Productivity, and Disability Management, American College of Occupational and Environmental Medicine. Healthy workforce/healthy economy: the role of health, productivity, and disability management in addressing the nation's health crisis: why an emphasis on the health of the workforce is vital to the health of the economy. *J Occup Environ Med*. 2009;51(1):114-119. http://www.acoem.org/uploadedFiles/Healthy_Workplaces_Now/Healthy%20Workforce%20-%20Healthy%20Economy.pdf. Accessed May 8, 2012.
8. Wooten H. Healthy planning in action. *Planning Magazine*. Washington, DC: American Planning Association; 2010. http://www.gethealthysmc.org/uploads/pages/197_healthy_planning_in_action.pdf. Accessed July 17, 2012.
9. American Planning Association. Planning and Community Health. *Planning Healthy Communities* Web site. <http://planninghealthycommunities.webs.com>. Accessed July 11, 2012.
10. National Association of County and City Health Officials. Public health in land use planning and community design factsheet. <http://www.naccho.org/topics/environmental/landuseplanning/upload/Land-Use-Fact-Sheet6-19-03.pdf>. Accessed May 8, 2012.
11. American Planning Association and the National Association of County and City Health Officials. APA Fact Sheet: Public Health Terms for Planners & Planning Terms for Public Health Professionals. *Get Healthy* Web site. www.planning.org/research/healthy/pdf/jargonfactsheet.pdf. Accessed July 11, 2012.

The North Carolina Department of Environment and Natural Resources: Clean Land, Water, and Air for Healthy People and Communities

Lisa Diaz Riegel, Charles Wakild, Laura Boothe, Heather J. Hildebrandt, Bruce Nicholson

The North Carolina Department of Environment and Natural Resources works with communities and other agencies to sustain clean air, water, and land. Sustainability efforts include protecting air quality through community design, community enhancement through brownfields revitalization, community development strategies to protect water resources, and the integration of natural resource conservation.

North Carolina is a large, diverse state with a rich variety of resources, from its people and vibrant cultural amenities to its environment and natural resources. The North Carolina Department of Environment and Natural Resources (DENR) is the state's lead stewardship agency whose mission is to protect the air, water, and land quality in the state. Clean air, drinkable water, and abundant outdoor recreational opportunities are important for peoples' health and well-being, and they allow North Carolina to remain competitive by attracting world-class companies and skilled workers. As North Carolina grows, maintaining its environmental quality and protecting its natural resources will be one of the state's most important challenges.

One way that DENR has embraced these challenges is by adopting a strategy of environmental sustainability. The agency chairs the Sustainable Communities Task Force (SCTF), a statewide stakeholder group working to provide educational, technical and financial assistance to communities to encourage healthy and equitable development that meets the needs of our growing and changing demographics in the most cost-effective manner. The SCTF has developed a community practices assessment tool that not only helps build capacity by providing examples of the six livability principles but also provides a self-assessment scoring system to help communities gauge their current sustainability status and benchmark it for tracking improvements over time [1]. An important focus of the SCTF is to develop recommendations to better align state investments and policies with local development and conservation decisions. In addition to the SCTF, DENR is involved in a number of other programs aimed at enhancing the efforts of North Carolina communities to become more livable places that encourage physical activity.

Protecting Air Quality Through Better Community Design

The reduction of pollution is one of DENR's most important roles. Where air quality is concerned, the US Environmental Protection Agency establishes National Ambient Air Quality Standards (NAAQS) to protect human health and the environment. In North Carolina, ozone and fine particulate matter are pollutants, and thus standards, of major concern. Exposure to high concentrations of either ozone or fine particulate matter can adversely affect human health, especially respiratory and cardiovascular systems. Individuals particularly sensitive to these pollutants include children, people with heart and lung disease, and older adults [2].

Ozone is formed by a complex set of chemical reactions involving volatile organic compounds and nitrogen oxides. Fine particulate matter is made up of airborne particles (such as those found in smoke or haze) that are 2.5 μm in diameter or smaller. These pollutants can be emitted directly into the environment by combustion processes such as those used by industry and by tailpipe emissions from motor vehicles, or they may result from evaporation that occurs during activities such as gasoline refueling or painting.

The department is responsible for developing plans to ensure that air quality standards are met. DENR has worked with the North Carolina General Assembly to develop legislation such as the North Carolina Clean Smokestacks Act of 2002 [3], which required emissions reductions from electric utilities, and the Ambient Air Quality Improvement Act of 1999 [4], one provision of which required annual emissions testing of motor vehicles in certain counties. Testing is now required in 48 counties (which are considered the most populated of the 100 counties).

Additionally, DENR works with the North Carolina Department of Transportation (DOT) to help select projects to be funded through the Congestion Mitigation and Air

Electronically published August 10, 2012.

Address correspondence to Ms. Lisa Diaz Riegel, Natural Heritage Trust Fund, North Carolina Department of Environment and Natural Resources, 217 W Jones St, Raleigh, NC 27603 (lisa.riegel@ncdenr.gov).

NC Med J. 2012;73(4):281-285. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73417

Quality Improvement (CMAQ) Program. Many of the CMAQ projects support sustainable communities by funding sidewalks, bike paths, and transit. DENR also partners with the DOT and with local governments to ensure that roadway projects in urban areas do not affect the ability of those areas to comply with air quality standards. Additionally, DENR administers grants that reduce emissions from motor vehicles. Among the funded projects that support sustainable communities are bike racks (mounted) on transit buses, cleaner school buses, neighborhood electric vehicles, and hybrid electric refuse haulers.

Through the North Carolina Air Awareness Program, the department provides outreach to the community by educating members of the public on ways of reducing their environmental impact. Because motor vehicles are a significant source of air pollution, reducing vehicle miles traveled (VMT) is one way that people can reduce their impact on the environment. Sustainable communities make it easier for residents to reduce their VMT by designing the built environment so that it supports the ability to bike, walk, or take public transit to shopping, schools, and work.

DENR also advises local governments and communities on ways of promoting a healthier environment. One way local governments can promote a sustainable community is with ordinances that require sidewalks to be included in new developments. Sustainable communities reduce emissions that contribute to air quality issues in North Carolina and provide a healthier environment that promotes walking, biking, and a greater sense of community.

Community Enhancement Through Brownfields Revitalization

The department's Brownfields Program encourages the redevelopment of blighted abandoned properties that contain environmental contaminants. The US Government Accountability Office estimates that there are 450,000 to 1 million brownfield properties nationwide [5]. Prospective developers of these properties and their lenders used to shy away from purchasing them because of uncertain environ-

mental liability [6]. This left many abandoned properties that were not only not aesthetic, but also presented potential public health risks. Under the Brownfields Program, a prospective developer's environmental liability is limited to and defined by that which makes the property safe for the reuse a prospective developer proposes. The North Carolina program has prepared more than 200 agreements with developers that have encouraged an estimated capital investment of more than \$8.2 billion in redevelopment of brownfield properties [7]. Many of these projects are in urban areas, and the redevelopment of brownfields is a key component of recent trends toward smart growth, infill, and walkable communities that encourage physical activity instead of vehicle use. Redevelopment of brownfields brings public health benefits by cleaning up the environment and reducing exposure to contaminants. Such redevelopment also improves the quality of life in local communities. Recycling these properties also reduces sprawl and saves green space from development.

One prime example is the Gateway redevelopment in Winston-Salem—a redevelopment costing an estimated \$60 million built on various abandoned or idle industrial properties in the city's Old Salem area [8]. One element of the redevelopment project is the Gateway YWCA (Figure 1), which houses a state-of-the-art aquatic center. It is a premier wellness facility in the Southeast, with programs and an infrastructure designed to promote healthy lifestyles for all ages. The Gateway project also includes a mixed retail residential redevelopment known as The Summit at Gateway and the medical offices of Gateway Family Practice, all of which have helped create a healthier, walkable urban community. Without a brownfields agreement to define and address environmental liabilities, these properties would likely have remained abandoned and could have exposed trespassers to various hazards.

Some of these revitalization projects improve overall quality of life and public health in unexpected ways. Many low-income communities in urban areas have little or no access to healthy foods or food markets, and there is concern that these areas may have higher incidences of diabetes

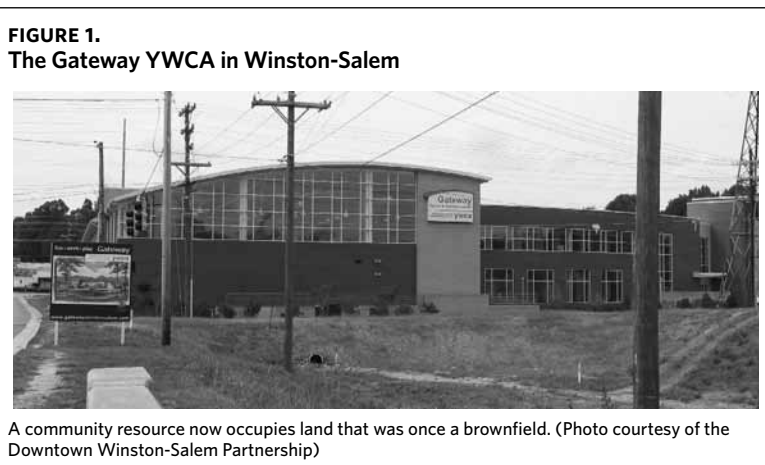


FIGURE 2.
Vegetated Streamside Buffers (Riparian Buffer)



The Water Supply Watershed Protection Program requires that streamside vegetated buffers be protected. Buffers help stormwater runoff infiltrate the soil, reducing the quantity of pollutants entering streams and rivers. (Photo courtesy of the Division of Water Quality, North Carolina Department of Environment and Natural Resources)

and other food-related health consequences [9]. Referred to as *food deserts*, these low-income communities face a serious public health problem [10]. In a Winston-Salem neighborhood near the Gateway YWCA, 2 separate community groups advocating for seniors and others without transportation cited a supermarket as a specific need of their community. The neighborhood was a predominantly low-income area that had been deemed a *food desert* (where people have low access to a grocery store) by the USDA [11]. The community groups strongly supported a brownfields redevelopment project that brought a Food Lion supermarket to Waughtown Street [12], bringing healthy foods to the area and helping to make it less of a food desert.

Community Development Strategies to Protect Water Resources

The department is charged with protecting water quality in North Carolina and ensuring that citizens have safe water for drinking, fishing, swimming, and other recreational activities. Clean water is a fundamental and critical component of healthy, sustainable communities.

Polluted stormwater runoff is the most prevalent source of water-quality impairment in our state and the nation. *Stormwater runoff* is the term for rainfall that “runs off” of impervious (or hardened) surfaces such as rooftops, parking lots, and roadways. As the water flows along, it picks up pollutants in its path. Once the runoff reaches storm drains, it flows to the nearest creek or stream, bypassing treatment plants. However, in many areas of North Carolina, state stormwater programs require that the effects of stormwater be mitigated in some fashion. Common stormwater pollutants include sediment, nutrients, bacteria, oil, and toxic substances such as metals, pesticides, and herbicides.

Stormwater runoff can affect aquatic life and human recreational activities and can pose threats to human health and

safety. Large volumes of stormwater can cause floods that damage property and cause unsafe conditions for people. Stormwater also carries the nutrients phosphorus and nitrogen, which promote an overabundance of aquatic plants and algal blooms. These contribute to problems that affect recreational areas, such as weeds around boat propellers, fouled swimming areas, and fish kills. Algal blooms also contribute to taste and odor problems with drinking water, increasing treatment costs. People with open cuts or other health problems who come into contact with untreated stormwater risk possible infection from bacteria carried by it.

DENR’s Water Supply Watershed Protection Program aims to protect drinking water sources by limiting the impact of development, a major contributor to stormwater runoff pollution. The program sets mandatory standards for development in the watersheds of drinking water sources. These standards include limiting the amount of surface area that may be covered by impervious substances, managing stormwater volume, controlling pollutant loading, and protecting streamside vegetated buffers (Figure 2). In water supply watersheds, new wastewater treatment facilities and landfills are prohibited or are required to have additional controls.

In recent years, DENR has started encouraging the use of low-impact development (LID), a planning and design approach that improves water quality protection by mimicking natural hydrology. Through the use of best management practices, LID design slows the flow of stormwater runoff, allowing it to infiltrate the soil onsite, unlike traditional designs, which result in discharges to surface waters. Elements of LID design include rain gardens, permeable pavers (Figure 3), rain barrels, and cisterns. Implementing LID practices and principles improves water quality and reduces the overall impact of development.

Green infrastructure practices, such as maintaining *riparian buffers* (areas of vegetated or forested land border-

FIGURE 3.
Permeable Interlocking Pavers



Low-impact development encourages the use of permeable pavers to allow stormwater to infiltrate the soil. (Photo courtesy of the Department of Biological and Agricultural Engineering, North Carolina State University)

ing a body of water, which stabilize the stream bank), open spaces, and greenways, can also be used to support the principles of LID. In addition to improved water quality, flood mitigation, water conservation, and improved air quality, green infrastructure provides greater recreational opportunities to the community.

Looking to the future, DENR is a member of a new statewide partnership formed to address the ever-growing need for clean drinking water. The North Carolina Source Water Collaborative includes representatives from government, academia, and nonprofit organizations, as well as other stakeholders. The group seeks to identify and develop tools that can be used by local communities to promote good stewardship of the state's drinking water sources, with an ultimate goal of protecting the quality and quantity of drinking water for future generations.

Integrating Natural Resource Conservation

State land-conservation programs can protect air and water quality and offer recreational opportunities. Green infrastructure planning is becoming a key component of community development, along with traditional gray infrastructure planning (for roads, sewer, water, and other utilities) [13]. Green infrastructure is an interconnected green space network that includes natural areas, public and private conservation land, and working (agricultural) land. Several collaborative efforts support green infrastructure planning and management as a means of enhancing natural and human communities. The department's Conservation Planning Tool, funded by the Natural Heritage Trust Fund, identifies important natural heritage areas, critical surface waters, farm and forest lands, and wildlife habitat corridors [14]. This information is publicly available and is used by local and regional planners, nonprofit organizations, the DOT, other state agencies, and private developers. For example, DENR is collaborating with the DOT on its statewide bicycle and pedestrian master plan using this tool to assist in linking key conservation areas with bicycle and pedestrian corridors.

DENR also partners with the North Carolina Department of Agriculture and Consumer Services (DACs). Through the North Carolina Agriculture Development and Farmland Protection Trust Fund and other DACs programs, the state works to assist farmers. Agricultural data is provided to DENR and incorporated into the Conservation Planning Tool; then the tool is available to DACs to assist in its program prioritization. Agriculture and agribusiness (food, fiber, and forestry) is still the No. 1 industry in North Carolina; in 2009, it provided nearly \$70 billion of value-added income in the state [15]. Protecting the viability of agricultural land is critical for the economy. Such land can also serve as wildlife habitat and provide wildlife corridors, and it is part of the overall green infrastructure.

In addition to the Natural Heritage Trust Fund and the North Carolina Agriculture Development and Farmland

Protection Trust Fund, the state has 2 other sources of funding for natural resource conservation. The Clean Water Management Trust Fund (CWMTF) provides funding to assist local governments and conservation nonprofits in protecting riparian buffers for streams and greenways, while and the Parks and Recreation Trust Fund provides matching funds for local parks and recreation projects. Open space and parks provide opportunities for physical activity. According to a recent study of the parks and recreation system of Mecklenburg County conducted by the Trust for Public Land [16], the health savings resulting from physical activity in that county's park system in 2009 exceeded \$81 million. The report documents that the parks and recreation system has also increased property values, increased tourism, and enhanced the county's ability to deal with the environmental challenges of stormwater management and air pollution.

In summary, it is vitally important to protect North Carolina's air and water quality and to provide recreational opportunities for its citizens. Doing so will result in healthier, more sustainable communities that will better position the state for economic success. **NCMJ**

Lisa Diaz Riegel, MS executive director, Natural Heritage Trust Fund, North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.

Charles Wakild, PE, MBA, MS director, Division of Water Quality, North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.

Laura Boothe, MS supervisor, Division of Air Quality-Attainment Planning Branch, North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.

Heather J. Hildebrandt, MS environmental engineer, Division of Air Quality-Attainment Planning Branch, North Carolina Department of Environment and Natural Resources, North Carolina.

Bruce Nicholson, BS program manager, Brownfields, Division of Waste Management, North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.

Acknowledgment

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. North Carolina Department of Environment and Natural Resources. The community practices assessment. The Sustainable Communities Task Force Web site. <http://portal.ncdenr.org/web/sctf/community-practices-assessment-overview>. Accessed July 18, 2012.
2. Ozone and your patients' health: training for health care providers. Health effects of ozone in the general population. US Environmental Protection Agency Web site. <http://www.epa.gov/apti/ozonehealth/population.html>. Accessed May 23, 2012.
3. Improve Air Quality/Electric Utilities Act, NCGS §143-215.107D (2002).
4. Ambient Air Quality Improvement Act, NCGS §143-215.107A (1999).
5. US Government Accountability Office. Brownfield Redevelopment: Stakeholders Report That EPA's Program Helps to Redevelop Sites, but Additional Measures Could Complement Agency Efforts. Washington, DC: US Government Accountability Office; December 2004:1. GAO-05-94. <http://www.gao.gov/new.items/d0594.pdf>. Accessed May 23, 2012.
6. Davis TS, ed. Brownfields: A Comprehensive Guide to Redeveloping Contaminated Property. 2nd ed. Chicago, IL: American Bar Association; 2002.
7. North Carolina Department of Environment and Natural Resources. The NC Brownfields Program: Annual Report to the General Assembly. October 2011:3. <http://portal.ncdenr.org/c/>

document_library/get_file?uuid=b4d044a6-aa16-44cc-8418-37b8c4749bcb&groupId=38361. Accessed May 23, 2012.

8. Southeast Gateway Ventures. Brownfields Letter of Intent and Attachments. Gateway at Old Salem Brownfields Project, Winston-Salem, NC. North Carolina Brownfields Program Project ID# 08009-04-34. May 24, 2004.
9. US Department of Agriculture. Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences. Report to Congress. Economic Research Service Web site. June 2009. <http://www.ers.usda.gov/Publications/AP/AP036/AP036.pdf>. Accessed May 23, 2012.
10. Schmidt K. Food deserts and social justice: Joy-Southfield's farmers market in Detroit, MI. November 2011. Article 25: The GlobeMed blog. <http://www.globemed.org/blog/posts/food-deserts-and-social-justice-joy-southfields-farmers-market-in-detroit-m>. Accessed May 23, 2012.
11. United States Department of Agriculture. Food Desert Locator. Economic Research Service Web site. <http://www.ers.usda.gov/data-products/food-desert-locator.aspx>. Accessed June 27, 2012.
12. Food Lion, Inc. Brownfields Letter of Intent and Attachments. Food Lion Brownfields Project, Winston-Salem, NC. North Carolina Brownfields Program Project ID# 01007-97-34. December 19, 1997.
13. Benedict MA, McMahon ET. Green Infrastructure: Smart Conservation for the 21st Century. The Sprawl Watch Clearinghouse Monograph Series. Washington, DC: Sprawl Watch Clearinghouse; 2001. <http://www.sprawlwatch.org/greeninfrastructure.pdf>. Accessed May 23, 2012.
14. North Carolina Department of Environment and Natural Resources. Conservation Planning Tool. One North Carolina Naturally Web site. <http://www.onencnaturally.org/pages/ConservationPlanningTool.html>. Accessed May 23, 2012.
15. Walden M. Agriculture and agribusiness: North Carolina's number one industry. North Carolina State University Web site. <http://www.ag-econ.ncsu.edu/faculty/walden/ncagsz2011.pdf>. Accessed May 23, 2012.
16. Trust for Public Land. The Economic Benefits of the Park and Recreation System of Mecklenburg County, North Carolina. November 2010:10-11. http://cloud.tpl.org/pubs/ccpe_MecklenburgNC_econben.pdf. Accessed May 23, 2012.

DIVERSE NEIGHBORHOODS PROMOTE UNDERSTANDING AND RESPECT...



AND BEST OF ALL, FRIENDSHIP.

Neighborhood diversity promotes a greater sense of engagement, teaches that stereotypes are wrong and better prepares our children for the global community. When you welcome diversity, you encourage fair housing for all and help to stop housing discrimination.

Learn more about how fair housing promotes diversity at:

www.HUD.gov/fairhousing



A public service message from the U.S. Department of Housing and Urban Development in partnership with the National Fair Housing Alliance. The federal Fair Housing Act prohibits discrimination because of race, color, religion, national origin, sex, family status or disability. For more information, visit www.hud.gov/fairhousing.

NFHA
National Fair Housing Alliance

The North Carolina Division of Public Health's Vision for Healthy and Sustainable Communities

Cathy Thomas, Lori K. Rhew, Ruth Petersen

The North Carolina Division of Public Health is working to improve access to physical activity through changes in the built environment by participating in the Healthy Environments Collaborative and by leading the state's Communities Putting Prevention to Work project and the Shape Your World movement.

Prevention is critical if we are to curb the steady increase in health care costs that is greatly affecting our state. In 2010, an estimated \$14 billion in medical costs and lost-productivity costs in North Carolina were attributable to 3 preventable risk factors: tobacco use, physical inactivity, and low dietary intake of fruits and vegetables [1]. Prevention is necessary to decrease demand for limited health care resources, to decrease health care costs, and most important of all, to increase the health and quality of life of North Carolinians, especially those affected by health disparities. Advancing health through prevention will require continued improvement of and support for the provision of health care services, as well as a new emphasis on making changes with respect to environmental influences on health. These changes include improving air quality, decreasing exposure to secondhand smoke, decreasing exposure to lead and other potential toxins, assuring continued access to safe drinking water, and designing the built environment to improve access to physical activity. The built environment consists of human-made resources and infrastructure designed to support human activity, such as buildings, sidewalks, parks, stores, and roads [2]. Increasing access to safe places to be physically active makes it more likely that individuals will engage in physical activity, which is associated with decreased risk of developing heart disease, type 2 diabetes, stroke, and some cancers [3].

Research shows that the built environment affects physical activity levels. A cross-sectional study was recently conducted to examine the effect of light rail transit (LRT) on body mass index (BMI) and physical activity levels in Charlotte. Individuals living within a 1-mile radius of a new LRT line were surveyed by telephone 8 to 14 months before the line was operational and again 6 to 8 months after it began operating. When the people who used LRT were com-

pared with similar individuals who did not use it, a significant association was found between LRT use and reductions in BMI over time. LRT use was also associated with reduced odds of becoming obese. In addition, the study found that people who reported a more positive perception of their neighborhood had a lower BMI, were less likely to be obese, and were more likely to engage in the recommended amount of physical activity (20 minutes of vigorous activity 3 times a week, or 30 minutes of walking 5 times a week) [4].

Putting Prevention to Work

Affecting change in the built environment will require new partnerships, and to this end the Physical Activity and Nutrition (PAN) Branch of the Division of Public Health (DPH), North Carolina Department of Health and Human Services has expanded its strategic approach to increasing access to physical activity across the state. With an understanding that decisions made outside of the public health and health sectors affect the health of the population by improving or limiting access to physical activity, the DPH has aligned strategically with other state agencies. Understanding the interconnectedness of the different agencies that shape the community and how their decisions affect health is critical to achieving good health for the population. "Health in all policies" is an approach to the decision-making process that acknowledges that many decisions made outside of the health sector affect the health of the population. Including health benefits and impacts as a part of the decision-making process ensures that health is considered along with economics, commerce, transportation, safety, environment, education, and other factors.

Since 2006, the North Carolina Departments of Transportation (DOT), Environment and Natural Resources (DENR), Commerce, and Health and Human Services (specifically DPH) have been working together through the Healthy

Electronically published August 10, 2012.

Address correspondence to Ms. Cathy Thomas, Physical Activity and Nutrition Branch, NC Department of Health and Human Services, 5505 Six Forks Rd, Raleigh NC 27699 (Cathy.Thomas@dhhs.nc.gov).

NC Med J. 2012;73(4):286-289. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved.
0029-2559/2012/73418

Tobacco-Free Parks: Maximizing Health Impact in Built Environment Planning

Erin Shoe

Established in 1997 as a successor to the Cabarrus County Health Department, Cabarrus Health Alliance (CHA) is organized as an independent governmental entity and is incorporated as the Public Health Authority of Cabarrus County. The CHA board of health has expressed its philosophy and vision in the alliance's mission statement: "We aim to achieve the highest level of individual and community health through collaborative action."

CHA seeks to improve overall community health and to eliminate health disparities by providing clinical services, health education, and prevention programming to the uninsured and underserved in Cabarrus County. Additionally, CHA has a model health initiatives department that provides programming to address needs identified through the community needs assessment (a comprehensive report containing primary and secondary data, which is compiled every four years by a variety of community stakeholders to analyze the health of the community). These programs include heart disease and stroke prevention, teen pregnancy prevention, tobacco prevention and cessation, faith-based exercise and nutrition, and childhood obesity prevention.

Reducing exposure to secondhand smoke is one of the most critical steps that can be taken to protect the public's health. The Surgeon General released a report in 2006 stating that scientific evidence indicates that there is no risk-free level of exposure to secondhand smoke. Thus, breathing even small amounts of secondhand smoke can be harmful to your health. Exposure causes heart disease, lung cancer, and acute respiratory effects. Among children, secondhand smoke increases the risk for ear problems and exacerbates asthma, and infants who are exposed are at greater risk for Sudden Infant Death Syn-

drome (SIDS) [1].

While tobacco and smoke-free initiatives have been present in public health programs for many decades, there were multiple local and state efforts in the mid-2000s working toward tobacco-free policies and helping people become tobacco-free. Examples of such initiatives include the statewide TRU (Tobacco Reality Unfiltered) campaign, advocacy for tobacco-free venues, local Healthy Carolinians partnerships, and local heart disease and stroke prevention efforts. In addition, social acceptance of tobacco free and smoke-free venues was on the rise. Equally important to note, Cabarrus County was home to one of the world's largest and most successful tobacco manufacturers, Phillip Morris, from the early 1980s until 2009 when Phillip Morris closed the Cabarrus plant and consolidated operations in another state. All of these forces combined to form a springboard for public health and county leaders to move forward in adopting tobacco-free policies, ordinances, and rules.

With all of this in mind, CHA initiated one of the first tobacco-related policies in the county with the adoption of a board of health rule in 2005 prohibiting tobacco use within 50 feet of county-owned or county-operated buildings and air intakes. This rule still allowed tobacco use in some key areas such as outdoor spaces including parks. Allowing tobacco use in parks and other recreational spaces really counters what those spaces are intended for—places for people to be active and healthy.

Park directors from Cabarrus County, the City of Concord, and the City of Kannapolis all agreed that an additional policy was necessary to further restrict usage in the parks. At a meeting in 2010, the Cabarrus County Parks and

Environments Collaborative (HEC) to address areas of intersection between the environment, the economy, and health. This work was accelerated in 2010, when DPH became one of only 13 state health departments to receive Communities Putting Prevention to Work II (CPPW II) funding. This funding, provided through the 2009 American Reinvestment and Recovery Act, was awarded to state health departments that could demonstrate a readiness to implement special large-scale, statewide policy, or environmental change initiatives that affect population groups rather than individuals. One of the stated goals of the funding was to reduce health care costs through prevention.

The PAN Branch of DPH partnered with the Department of Health Behavior and Health Education of the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill (UNC-Chapel Hill) on the design and implementation of the CPPW II project. The UNC-Chapel Hill partners brought innovation and expertise in policy anal-

ysis to the project, and the PAN Branch had a strong working relationship with the HEC. Working together, the team designed and implemented a project to create environments that support active living. Strategies include working with the HEC to integrate health concerns into projects involving transportation, the environment and natural resources, and commerce; working with municipalities to inform state-level work by providing information on barriers and facilitators to creating active living environments at the local level; and creating a communications campaign to help people understand how the environment around them affects their health and to let them know how they can become involved in making changes in their local communities to support active living.

Using an approach that involves state-level partners, community-level partners, and community members was critical in creating change across the state. The state-level partners in the HEC reviewed their practices, policies, and

Recreation Commission suggested eliminating tobacco use from all parks owned or operated by Cabarrus County. After speaking with management and sensing initial approval, parks and recreation leaders, including Cabarrus County Parks and Recreation Director Londa Strong, began working with CHA on the best way to proceed.

In addition to CHA, many partners were involved from the onset of policy development, including all municipal parks and recreation departments. All departments agreed that it would be ideal to create a policy or ordinance and signage that were consistent across all parks to reduce confusion among citizens. One municipality, Harrisburg, located within Cabarrus County already had an ordinance, but had neither signage nor enforcement. The Cabarrus County staff were the first to take a policy to their elected board, the county commissioners, on June 20, 2011. They unanimously adopted the tobacco free ban in parks. The cities of Kannapolis and Concord quickly followed with policy adoptions of their own. The final policy was finalized after collaborating with the Tobacco Prevention and Control Branch of the Division of Public Health, North Carolina Department of Health and Human Services. The branch was instrumental in providing ordinance examples and guidance on language to include in the final version.

To support the Cabarrus County parks ordinance, a group of teens from the Healthy Cabarrus Teen Task Force presented tobacco facts and expressed their agreement with the policy at a monthly work session of the Cabarrus County Board of Commissioners. The commissioners were very engaged in the presentation and posed questions to the teens. These task force members had been involved in tobacco prevention work and policy advocacy for several years. Their message was passionate and powerful. Much to the surprise of staff, the commissioners unanimously voted to place the policy adoption on the consent agenda for their next board meeting.

After Londa Strong explained Cabarrus County's process and presented its experiences at several North Caro-

lina Recreation and Park Association board meetings and conferences, she was contacted by other agencies for information. The towns of Huntersville, Salisbury, Davidson, and the counties of Rowan, Gaston, New Hanover, and Watauga County are some of entities she has shared information with about the ordinance and how it was implemented.

The feedback from park patrons has been very positive. A number of people have thanked officials for taking this needed step to protect the health of Cabarrus County citizens. Proper research and planning among county department heads, collaboration with the Tobacco Prevention and Control Branch, and a compelling presentation from the teens all made it easier to pass this policy. The time was right to make this courageous step forward for the health of the citizens of Cabarrus County. Having tobacco-free parks is one more way to create spaces where people can be active without the concern of secondhand smoke. NCMJ

Erin Shoe, MPH program manager, Cabarrus Health Alliance, Kannapolis, North Carolina.

Acknowledgment

Potential conflicts of interest. E.S. has no relevant conflicts of interest.

References

1. US Department of Health and Human Services. The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General, US Department of Health and Human Services. Atlanta, GA: US Department of Health and Human Services, 2006. <http://www.surgeongeneral.gov/library/reports/secondhand-smoke/factsheet7.html>. Accessed July 10, 2012.

Electronically published August 10, 2012.

Address correspondence to Ms. Erin Shoe, Cabarrus Health Alliance, 300 Mooresville Rd, Kannapolis, NC 28081 (EKShoe@CabarrusHealth.org).

N C Med J. 2012;73(4):287-288. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73416

planning processes that have an impact on physical activity. They considered ways to increase support for and alignment around these activities. One unique example that arose from this project was the space allotment required at the local level for greenways. Partners at the DOT and the DENR discovered that the DOT's space requirements for local greenways differed from DENR's requirements. Once they became aware of this discrepancy, the 2 departments were able to resolve it, and requirements no longer hinder approval for proposed greenway projects.

Through a competitive application process, 11 municipalities—the cities of Gastonia and Wilmington, and the towns of Midland, Eden, Mount Gilead, Carrboro, Ashokie, Lumberton, Sparta, Banner Elk, and Waxhaw—received funding to identify barriers to active living in their communities, create action plans, and engage in projects to promote active living. The projects included updating comprehensive land use and transportation plans, adopting a resolution in support of the DOT's Complete Streets Policy (which intends to

make streets useable by all types of users including pedestrians, bicyclists, transit riders, motorists, and individuals of all ages and capabilities), implementing bike routes by adding signs and creating maps showing the routes, and initiating new programs. In addition, the municipalities informed the HEC of the barriers they encountered and engaged in dialogue about potential solutions.

Conclusion

As a result of the CPPW II project, the HEC partnership has strengthened and increased its focus on active living, and each partner has found ways to align its efforts with those of other state agencies. For example, the DOT is integrating public health considerations into the long-range transportation planning process, the statewide bicycle and pedestrian plan, and the Complete Streets design guidelines; the North Carolina Department of Commerce hopes to incorporate "access to physical activity" criteria into the worksite certification program; and the DPH has begun

Shape Your World

Cathy Thomas, Lori K. Rhew, Ruth Petersen

Shape Your World (SYW) is a statewide movement of North Carolinians who are committed to creating safer, healthier, and more connected communities to support physically active lifestyles. SYW mobilizes people across the state to get more involved by asking them to see their community in a new way, to connect with the issue by understanding the benefits that an active living environment can bring to them, and to act to shape the built environment in their community. SYW encourages people to think about how their communities are designed and to realize that they have a voice in how the community gets built, developed, or changed.

The SYW Web site (<http://www.ShapeYourWorldNC.com>) contains a wealth of resources that help community members learn about the built environment and learn how they can become engaged in creating the changes they want to see happen. The Web site contains many resources to help community members better understand and become engaged in shaping the active living environment in their community, including the following: a walkability and bikeability checklist; success stories of people across the state who are making changes in their community; a visualization tool that allows the user to upload pictures and add elements to a space, such as bike

racks, lights, or a playground, to see what various changes might look like; and a search tool to help community members find county commissioners, local planners, and parks and recreation departments. **NCMJ**

Cathy Thomas, MAEd, CHES head, Physical Activity and Nutrition Branch, North Carolina Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Lori K. Rhew, MA, PAPHs manager, Physical Activity Unit, Physical Activity and Nutrition Branch, North Carolina Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Ruth Petersen, MD section chief, Chronic Disease and Injury Prevention, North Carolina Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Acknowledgment

Potential conflicts of interest. All authors have no relevant conflicts of interest.

Electronically published August 10, 2012.

Address correspondence to Ms. Cathy Thomas, Physical Activity and Nutrition Branch, NC Department of Health and Human Services, 5505 Six Forks Rd, Raleigh NC 27699 (Cathy.Thomas@dhhs.nc.gov).

NC Med J. 2012;73(4):289. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73425

work on increasing joint-use agreements between communities and facilities offering green space and playground access as part of public health interventions. The HEC state agencies are collaboratively looking at how to increase the inclusion of health considerations in comprehensive planning with an understanding of the connections between health and land use planning, transportation planning, environmental equality, and economic development.

The participation of state-level partners, community-level partners, and community members in the CPPW II project has been essential to its success. The HEC partnership has played a critical role in helping each individual agency understand how state departments could align and integrate efforts to support active living. Municipalities have been able to inform state partners of barriers they experience in their communities as a result of state practices and policies. Local community partners and community members have been able to better understand how the built environment can help or hinder their ability to make healthy choices.

In the end, we all win when North Carolina communities become healthier through increased access to physical activity. This requires collaboration between local community members, health officials, the public health community, parks and recreation organizations, regional planners, decision makers, and local and state agencies. The DPH is incorporating this vision in planning its work. Adding input from the medical and public health communities will facili-

tate success in these efforts and set us on a path to lower the demand for medical treatment, decrease health care costs, and improve the quality of life and the level of wellness for the entire population. **NCMJ**

Cathy Thomas, MAEd, CHES head, Physical Activity and Nutrition Branch, North Carolina Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Lori K. Rhew, MA, PAPHs manager, Physical Activity Unit, Physical Activity and Nutrition Branch, North Carolina Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Ruth Petersen, MD section chief, Chronic Disease and Injury Prevention, North Carolina Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

Acknowledgment

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. Tipping the Scales: The High Cost of Unhealthy Behavior in North Carolina. Be Active North Carolina 2012 Report. http://www.beactivenc.org/wp-content/uploads/2011/08/Tipping-the-Scales-Final_2012.pdf. Accessed May 9, 2012.
2. County Health Rankings and Roadmaps. University of Wisconsin Population Health Institute. <http://www.countyhealthrankings.org/health-factors/built-environment>. Accessed June 29, 2012.
3. Task Force on Community Preventive Services. Recommendations to increase physical activity in communities. *Am J Prev Med* 2002;22(4S):67-72. <http://www.thecommunityguide.org/pa/pa-ajpm-recs.pdf>. Accessed June 29, 2012.
4. MacDonald JM, Stokes RJ, Cohen DA, Kofner A, Ridgeway GK. The effect of light rail transit on body mass index and physical activity. *Am J Prev Med.* 2010;39(2):105-112. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2919301/>. Accessed May 11, 2012.

Planners and Public Health Professionals Need to Partner...Again

Mitchell Silver

The planning profession traces its origins to the efforts of 19th century reformers to improve public health by addressing problems resulting from urbanization. So it is fitting that in the 21st century, planners are once again working with public health professionals to make communities healthier, this time by addressing problems caused by suburbanization.

Planning (also known as urban and regional planning) did not officially emerge as a profession in the United States until 1909. However, its origins can be traced to the sanitary reform movement that began in the 1840s and the housing reform movement of the last third of the 19th century. The explosion of growth in the United States in that era, fueled by immigration and the industrial age, brought opportunity and challenges to America.

The biggest challenge was rapid urbanization. In 1800, the United States had a population of more than 5 million people, more than 300,000 (approximately 6%) of whom lived in urban areas. By 1900, the population had swelled to 76 million people, more than 30 million (approximately 40%) of whom lived in urban areas [1]. The lack of transportation in the rapidly growing cities meant that workers had to live within walking distance of their places of employment. Houses were poorly constructed, poorly maintained, and overcrowded. Most households lacked access to clean water and sanitation. Contagious diseases spread easily under these conditions.

The first partnership among public health and planners started due to the need to improve sanitary and housing conditions. John Snow, a London physician in the mid-1800s, is credited as one of the first to make a scientific connection between poor housing and public health. (He developed a plotting technique—still used today—to identify a polluted public well that was the source of a cholera outbreak. Because of this work, he now is recognized as one of the first planners and public health professionals) [2]. While the terms *public health professionals* and *planners* were not used at the time, it's fair to say that groups interested in public health and those interested in urban planning came together to consider ways of improving sanitary conditions and housing. They considered themselves reformers and were dedicated to improving the health, safety, and welfare of city dwellers. Lessons from England's sanitary reform

movement were introduced and implemented in American cities. Housing reform followed. Over the 50-year period from 1860 to 1910, reformers were instrumental in advocating for public sewer and water systems, housing reform, and building codes that required tenements to have fire escapes and adequate light, air, and ventilation.

Birth of the Planning Profession

By the beginning of the 20th century, it had become clear that the influx of migrants and immigrants to cities demanded a managed approach to planning and development. Several forces converged to make this apparent. The World's Columbian Exposition, a World's Fair held in Chicago in 1893, contained a section called the White City, which gave Americans a glimpse of the city of the future—clean, orderly, efficient, and modern. The White City also suggested what comprehensive city planning and design could accomplish. As America grew, the reformers, who included public health advocates, civic groups, and city officials working to improve urban conditions, were joined by business and real estate interests, and by architects and landscape architects. Although each group had its own agenda, they all realized that cities needed orderly growth and management.

In May 1909, the first national conference on city planning took place in Washington, DC. Progressive reformers, public health reformers, architects, landscape architects, and pioneer planners attended the conference. The 2 most influential people in attendance, Benjamin Clarke Marsh and Frederick Law Olmsted, Jr, had different agendas [3]. The schism between them would create a rift in the young profession that would take decades to heal.

Marsh was a progressive social reformer interested in housing and in social welfare issues, including the problem of congestion of population (ie, overcrowding). Olmsted, son of the famous landscape architect Frederick Law Olmsted and a landscape architect himself, wanted cities to be more

Electronically published August 10, 2012.

Address correspondence to Mr. Mitchell Silver, Department of City Planning, City of Raleigh, One Exchange Plaza, PO Box 590, Raleigh, NC 27602-0590 (mitchell.silver@raleighnc.gov).

NC Med J. 2012;73(4):290-296. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73406

The Blue Ridge Corridor Experience

Stuart Levin

During the 33 years that have passed since moving to Raleigh at age 16, I have witnessed a dramatic increase in the population of the Piedmont and the influence of that growth on land use. As a primary care practitioner with the rare benefit of living within walking distance to my office on Blue Ridge Road in west Raleigh, I have also become aware of the lack of attention in the modern urban environment to the health and safety of those not traveling by motor vehicle. I am now privileged to be involved in a project that is trying to bring about land-use decisions designed to make our community healthier and more sustainable.

In the mid 19th century, landscape architect Frederick Law Olmsted Sr was a pioneer in recognizing that urban planning should take public health concerns into account. (Olmsted Jr, discussed in Silver's commentary, did not share his father's passion for public health.) Olmsted Sr envisioned New York City's Central Park as the "lungs of the city" [1]. This synergy—between public health and city planning—continued for about a century, and improvements in community infrastructure generally resulted in public health benefits. However, these two disciplines were separated for many reasons over the years, one of which was the advent of automobile-centric urban sprawl during the last half of the 20th century. Indeed, urban planning during this period had unintended negative consequences for individual and population health.

Locally, Raleigh's land use increased more than 10-fold between 1950 and 2000, growing more than 3 times as fast as the population [2]. Long considered "a city within a park," Raleigh earned another nickname: "Sprawleigh" [3]. Although the city has a nationally renowned greenway system primarily designed for recreational use, pedestri-

ans, bicyclists, and those traveling by public transportation have rarely been considered during development of the city's major corridors. During the second half of the 20th century, Raleigh's thoroughfare plan and buffering and landscaping requirements also created barriers to physical activity through an imbalance of preferred transportation modes [4].

Over the past few years, the pendulum has begun to swing in the opposite direction both locally and nationally. The economic downturn has forced a reassessment of existing resources, with developers and the public now more likely to join urban planners in recognizing the need to coordinate land use, transportation, and infrastructure. At the same time, a growing body of evidence has developed documenting the role of the built environment in health problems associated with physical inactivity [5]. Additionally, the Centers for Disease Control and Prevention, in conjunction with the US Department of Health and Human Services, has begun to promote the use of health impact assessments as a means of identifying the potential effects of proposed projects on the health of a population. In fact, the national Healthy People 2020 goals incorporate measures of the built environment [6].

I became interested in the literature on these topics while serving as chair of a group of stakeholders in the Blue Ridge Corridor (BRC) that is focused on coordinating the area's rapid growth. In my office, I was seeing firsthand the rise in obesity and associated diseases such as diabetes over the past two decades and noted that minimal attention was being paid to the root causes of obesity within the medical literature. Ultimately, my professional interests began to overlap with my role in the BRC planning process.

efficient, more livable, more attractive, and less chaotic. The planning conferences held in 1909 and 1910 were both called the National Conference on City Planning and the Problems of Congestion. But by 1911, Olmsted had persuaded the planning association to drop the phrase "the Problems of Congestion" from the name of the conference. Olmsted wanted to develop city planning as a field of physical planning and knowledge. Unlike Marsh, he was not interested in mounting a national campaign for social reform [3]. So city planners took their leave of social reformers and public health advocates and went in a different direction. In 1917, the American City Planning Institute was formed as a professional society [4].

The history and purpose of planning and public health are clearly intertwined. In the early 20th century, policymakers also recognized this interconnectedness. Congress passed the standard state enabling acts for zoning and planning in the 1920s [5]. Section 1 of the zoning legislation states that the act is for regulating land use "for the purpose of promoting

health, safety, morals, or the general welfare of the community..." [6] Then and today, any local government with a zoning code has language in it that ties zoning to public health. Although, public health is one of the pillars of zoning, it had lost its connection with the planning profession until recently.

Planning and public health, which had once had much in common, became very specialized and separate fields in the 20th century. The 2 professions are once again joining forces to tackle a common problem: the public health consequences due to suburbanization.

Planners Get Interested in Public Health Again

The Futurama exhibit at the 1939 New York World's Fair sold Americans on the dream of highways and suburbs; they bought the vision hook, line, and sinker. Congressional action, including passage of the National Interstate and Defense Highways Act of 1956 [7], helped build more than 40,000 miles of highways. By the 1950s, the suburbanization of America was in full swing. By the end of 20th cen-

The BRC group began as a small-scale effort to leverage the expansion plans of Rex Healthcare and the North Carolina Museum of Art into improvements in connectivity, including pedestrian access, on Blue Ridge Road. Over the past 4 years our group has grown, and it now includes stakeholders representing some 2,000 acres in west Raleigh, including the Centennial Authority's PNC Arena, the North Carolina State Fairgrounds, and North Carolina State University's Centennial Biomedical Campus. During the course of our discussions, the BRC stakeholders group realized that this district could serve as a statewide model for 21st-century urban planning. This was confirmed by the first-place ranking given to the corridor in the 2011 grant program of the North Carolina Sustainable Communities Task Force, a multiagency group created by the North Carolina General Assembly in 2010 to lead and support the state's sustainable community initiatives [7].

In keeping with the goals of the Sustainable Communities Task Force, the corridor offers the potential to bring together the components of land-use planning, transportation, and affordable housing while preserving open space and the environment, enhancing economic development, and optimizing public health. As part of the planning process for the corridor, one of North Carolina's first comprehensive health impact assessments (funded by the Blue Cross and Blue Shield of North Carolina Foundation) will be conducted through the Gillings School of Global Public Health and the Department of City and Regional Planning at the University of North Carolina at Chapel Hill with the cooperation of the city of Raleigh.

Furthermore, the BRC can also serve as a pilot program for the North Carolina Department of Transportation's new Complete Streets Policy (which intends to make streets useable by all transportation modes), by collaborating on multimodal transportation options needed to serve the community, including pedestrians, bicyclists, and public transit users. Ultimately, the corridor provides a possible paradigm for statewide healthy development

that does not compromise natural systems or the needs of future generations of North Carolinians. NCMJ

Stuart Levin, MD chair, Blue Ridge Corridor Stakeholders Advisory Group, Raleigh, North Carolina, and clinical professor, School of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Acknowledgment

Potential conflicts of interest. S.L. has no relevant conflicts of interest.

References

1. Fisher T. Frederick Law Olmsted and the campaign for public health. The Design Observer Group Web site. <http://places.designobserver.com/feature/frederick-law-olmsted-and-the-campaign-for-public-health/15619/>. Accessed May 9, 2012.
2. City of Raleigh. 2030 comprehensive plan. Last revised April 5, 2011:14. Downloadable at <http://www.raleighnc.gov/business/content/PlanLongRange/Articles/2030ComprehensivePlan.html>. Accessed May 9, 2012.
3. Goldberg, S. Reigning in Sprawleigh. Time. March 25, 2011. http://www.time.com/time/specials/packages/article/0,28804,2026474_2026675_2061559,00.html. Accessed May 9, 2012.
4. Kochtitzky CS, Frumkin H, Rodriguez R, et al. Urban planning and public health at CDC. MMWR Morb Mortal Wkly Rep. 2006;55(suppl 2):34-38.
5. Frumkin H, Frank L, Jackson R. Urban Sprawl and Public Health: Designing, Planning and Building for Healthy Communities. Washington, D.C.: Island Press; 2004.
6. Health impact assessment. Centers for Disease Control and Prevention Web site. <http://www.cdc.gov/healthyplaces/hia.htm>. Accessed May 9, 2012.
7. Blue Ridge Road district study. City of Raleigh Web site. <http://www.raleighnc.gov/business/content/PlanUrbanDesign/Articles/BlueRidgeRoadDistrictStudy.html>. Accessed May 9, 2012.

Electronically published August 10, 2012.

Address correspondence to Dr. Stuart Levin, Wake Internal Medicine Consultants, 3100 Blue Ridge Rd, Suite 100, Raleigh, NC 27612 (stuson@bellsouth.net).

N C Med J. 2012;73(4):291-292. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73407

tury, suburban sprawl and an environment designed for cars rather than for pedestrians had resulted in lower levels of physical activity and a rise in obesity. These emerging trends have led public health professionals and planners to recognize that they once again have in common a problem that needs to be addressed. This time the threat is not urbanization, but suburbanization.

The health trends attributable to sprawl are troubling. According to the Centers for Disease Control and Prevention (CDC), only 43.5% of adults are highly physically active, and 25.4% engage in no leisure-time physical activity whatsoever [8]. Based on 2007-2008 data, it is estimated that 68% of people in the United States are either overweight or obese, and this proportion is rising rapidly [9]. The CDC estimates that nationally, more than one third of adults are obese, and in 2008, medical costs associated with obesity amounted to \$147 billion [10]. In North Carolina in 2010, 29.4% of adults were obese [11], and a 2012 study estimated that the state

spends \$4.6 billion a year on medical care associated with obesity-related illnesses [12]. Further, it should be noted that certain groups of people tend to be more at risk for obesity, including those with less household income, less education, and those of certain racial/ethnic groups such as African Americans and Latinos [11].

Although some planners are beginning to work with public health professionals to address concerns about physical activity levels and obesity, many are not yet doing so. A 2011 survey conducted by the American Planning Association (APA) and funded by the CDC found that most cities do not consult public health professionals when creating comprehensive plans. It is noted that the survey "was intended as an information-gathering tool to inform further case-study research" and will be used to "help develop a policy report that will feature tools and strategies planning and health professionals can use to integrate health into the plan-making process" [13].

Economics, Physical Activity, and Community Design

David Chenoweth

The direct medical care cost of physical inactivity in North Carolina in 2010 was \$3.67 billion [1]. When lost productivity costs such as those resulting from absenteeism and presenteeism are factored in, the economic tab rises to more than \$8.38 billion. Yet these costs would actually have been even higher had it not been for a slight improvement in physical activity rates among North Carolina adults over the preceding few years [2]. And when medical care and lost productivity costs for excess weight—which typically coexists with physical inactivity—are added into this cost equation, North Carolinians are saddled with additional costs of \$17.60 billion per year [1].

Certainly many factors contribute to the high prevalence of physical inactivity in North Carolina. Social, cultural, economic, and technological factors are commonly cited. We know that the inextricably interwoven nature of these factors shapes our ever-changing built environment and has profound influences on our health. The importance of these factors becomes apparent when one considers the inverse relationship between the substantial growth in our roadways (and dependence on motor vehicles) and the decline in physical activity rates over the past 50 years. Yet in contrast to the well-documented connection between physical activity and health, the effect of the built environment on physical activity levels is a relatively new area of inquiry [3]. Thus, it is fair to ponder the question of whether a community's built environment—its land use patterns, transportation systems, building designs, and natural resources—influences the physical activity patterns and levels of its citizens.

The relationship between the built environment and physical activity is complex and operates through many mediating factors such as social and demographic characteristics, personal and cultural variables, safety and security, and time allocation [3]. Yet, physical activity levels tend to increase when physical activity venues are in close proximity to the places where people live, go to school, recreate, and work [4]. A study on the cost-effectiveness of readily-available bicycle and pedestrian trails found that the per capita annual cost of using the trails was nearly \$210 compared to a per capita annual direct medical benefit of using the trails of approximately \$564.

This benefit-cost ratio of 2.94 to 1 means that every \$1 investment in trails for physical activity led to \$294 in direct medical benefit. The sensitivity analyses indicated the ratios ranged from 1.65 to 13.40. The most sensitive parameter affecting the cost-benefit ratios were equipment and travel costs; however, even for the highest cost, every \$1 investment in trails resulted in a greater return. Therefore, building trails is cost-beneficial from a public health perspective. [5]. Other researchers, using actual construction and maintenance cost values provided by state recreational officials in Colorado, reported a benefit-cost ratio of nearly 3 to 1 (for the local economy) tied to existing bike and pedestrian trails [6]. And, a 2004 study of the annual economic impact of bicycling tourists on the northern Outer Banks of North Carolina found that an initial \$6.7 million expenditure of public funds to construct bicycle facilities was yielding a return each year of 9 times the original investment [7].

Of course, the design and availability of various transportation modes within a built environment is an important consideration when studying physical activity levels. For example, communities adopting “smart growth” street designs (ie, those incorporating designated bike lanes, pedestrian-friendly sidewalks, below-ground utilities, tree-lined streets, a designated median for light rail, and mixed use [residential and commercial] zoning) generally show substantially higher rates of physical activity than areas without a smart-growth approach [3]. Some of the impetus for these particular smart-growth designs is provided by research showing that designated bike lanes can substantially increase the number of commuters bicycling to and from work and are likely to generate substantial health care cost savings and fuel savings [8, 9].

Worksites also make up an important part of our built environment, and their structural design and policies can spur or suppress physical activity. Many larger organizations have onsite fitness centers. Also, many worksites have successfully promoted the use of stairways as a viable strategy for boosting employees' physical activity levels [10]. Innovative building design features such as “skip-stop” elevators, which stop only at every third floor, can increase stairway use [11].

In 2006, Marya Morris, in a Planning Advisory Service Report published by the American Planning Association, reminded planners that public health professionals and advocates are their allies and have useful information about how the built environment affects health:

Supporters of good planning and smart growth have a new ally—public health practitioners and advocates. In the mid to late 1990s, noting the tremendous increase in the rate of obesity in Americans and limited success of the medical profession's efforts to persuade people to change their eating

habits and get regular exercise, public health policy makers and researchers turned their attention to factors of the built environment that affect peoples' eating habits, and exercise habits. In particular, they are focusing on patterns of development at the neighborhood, communitywide and regional level as well as transportation mobility options [14].

After decades of sprawl and poor eating habits, obesity has increased dramatically among adults and children. That emerging trend has compelled the CDC and public health advocates to examine ways that the built environment con-

North Carolina is one of the fastest-growing states in terms of population. This fast growth brings into question the level of prospective planning needed to ensure the built environment keeps pace with the size of the population so that physical activity can be adequately fostered. After all, the slight annual improvement (+1.045%) in physical activity rates over the past few years among North Carolina adults still lags behind the rate of annual population growth in the state (+1.85%). Taken together these trends imply an increase in the absolute number of physically inactive adults, rendering the importance of developing an infrastructure that supports physical activity even more critical. And based on physical activity percentage rates among North Carolina adults over the past decade, there is no guarantee that the slight improvement seen in the past few years will continue. Moreover, as the state's population of older adults continues to grow, the prevalence of chronic diseases will also grow, and the need for increased access to physical activity will become even more important for citizens of all ages. Indisputably, these evolving forces provide us with a provocative opportunity to think about establishing appropriate venues in the built environment.

Of course, creating an expanded built environment that fosters physical activity for all ages is a logical, and essential, first-step toward meeting this challenge. At a minimum, a unified and sustained commitment from key decision makers, policymakers, and individual citizens will be needed to push the needle forward. Now is the time for decision makers in education, government, transportation, real estate, and industry to form nonpartisan partnerships in order to achieve this universal goal. Given that all of these individuals have the potential to positively influence the quality of our ever-evolving built environment, it is absolutely crucial for them to work together for the betterment of all North Carolinians. Of course, physicians and other health care practitioners can play an important role in addressing this evolving challenge as well. They command a high level of respect among their patients and thus should continue to push them to understand that exercise is the best medicine in preventing and mitigating many illnesses. As we navigate a new path to tackle today's lifestyle and health care challenges, is it not time to transform the Good Roads State into a Good Health State? Building an environment for physical activity is a good start. **NCMJ**

David Chenoweth, PhD president, Chenoweth and Associates, New Bern, North Carolina, and professor emeritus, East Carolina University, Greenville, North Carolina.

tributes to the problem. Not only are public health, planning, and design professionals coming together, but state and local agencies are also joining forces to collaborate and plan for a more sustainable and healthier future. And the federal government has begun to require collaboration and a regional approach on the part of those seeking to secure certain types of federal funding for planning.

University courses in planning now teach emerging professionals that communities are interconnected and inter-

Acknowledgment

Potential conflicts of interest. D.C. has no relevant conflicts of interest.

References

1. Tipping the Scales: The High Cost of Unhealthy Behavior in North Carolina. Be Active North Carolina 2012 Report. http://www.beactivenc.org/wp-content/uploads/2011/08/Tipping-the-Scales-Final_2012.pdf. Accessed May 9, 2012.
2. Centers for Disease Control and Prevention. State Indicator Report on Physical Activity, 2010. Atlanta, GA: US Department of Health and Human Services; 2010. http://www.cdc.gov/physicalactivity/downloads/PA_State_Indicator_Report_2010.pdf. Accessed May 9, 2012.
3. Committee on Physical Activity, Health, Transportation, and Land Use, Transportation Research Board, Institute of Medicine of the National Academies. Does the Built Environment Influence Physical Activity?: Examining the Evidence. TRB special report 282. Washington, DC: National Academy of Sciences; 2005. <http://onlinepubs.trb.org/onlinepubs/sr/sr282.pdf>. Accessed May 9, 2012.
4. Brownson RC, Baker EA, Housemann RA, Brennan LK, Bacak SJ. Environmental and policy determinants of physical activity in the United States. *Am J Public Health*. 2001;91(12):1995-2003.
5. Wang G, Macera C, Scudder-Soucie B, Schmid T, Pratt M, Buchner D. A cost-benefit analysis of physical activity using bike/pedestrian trails. *Health Promotion Pract*. 2006;6(2):174-179.
6. Flusche D. The economic benefits of bicycle infrastructure investments. Policy Research Reports. League of American Bicyclists Web site. http://www.bikeleague.org/resources/reports/pdfs/economic_benefits_bicycle_infrastructure_report.pdf. Published June 2009. Accessed July 18, 2012.
7. Laurie J, Guenther J, Cook T, Meletiou MP, O'Brien SW. The Economic Impact of Investment in Bicycling Facilities: A Case Study of the Northern Outer Banks. Technical Report. North Carolina Department of Transportation, Division of Bicycle and Pedestrian Transportation; July 2004. http://www.ncdot.gov/bikeped/download/bikeped_research_EIAfulltechreport.pdf. Accessed May 9, 2012.
8. Gotschi T. Cost and benefits of bicycling investments in Portland, Oregon. *J Phys Act Health*. 2011;8(suppl 1):S49-S58.
9. Parker KM, Gustat J, Rice JC. Installation of bicycle lanes and increased ridership in an urban, mixed-income setting in New Orleans, Louisiana. *J Phys Act Health*. 2011;8(suppl 1):S98-S102.
10. StairWELL to better health. Centers for Disease Control and Prevention Healthy Worksite Initiative Web site. <http://www.cdc.gov/nccdphp/dnpao/hwi/toolkits/stairwell/index.htm>. Accessed May 9, 2012.
11. Nicoll G, Zimring C. Effect of innovative building design on physical activity. *J Public Health Policy*. 2009;30(suppl 1):S111-S123.

Electronically published August 10, 2012.

Address correspondence to Dr. David Chenoweth, 128 St. Andrews Cr, New Bern, NC 28562 (dave@chenoassociates.com).

N C Med J. 2012;73(4):293-294. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73408

related and that social and physical issues are connected and related as well. Clearly, this is a shift away from the philosophy the profession embraced in the early 20th century at Olmsted's urging. It is now clear that ignoring the relationship between social and physical issues can produce poor results and health disparities.

The American Planning Association, an organization of 40,000 members, has created a research center dedicated to planning for healthy communities. The American Planning

Association's Planning and Community Health Research Center is intended to help planners, health professionals, and citizens create healthy communities and shape better places for future generations [15].

Healthier Communities

Today, planners and public health professionals are finding common ground and are now engaged in tangible efforts to create healthier communities. The most recent type of intervention to build the alliance between the professions is the health impact assessment (HIA). An HIA is a process that is used to evaluate the potential health effects of a policy or project by finding ways to maximize positive health benefits [16].

Other points of collaboration include designs for active living and improved development patterns; access to parks and greenways that promote more exercise, such as walking, biking, and hiking; and urban agriculture, to address food deserts and provide healthier food choices.

Active living is a way of life that integrates physical activity into daily life, and includes such activities as walking or biking to work or school. Active living is also a movement that involves urban planners, architects, transportation engineers, and public health professionals. Current trends suggest that obesity will get worse unless all of these groups intervene. Fortunately, emerging markets of boomers and millennials are demanding walkable communities. Businesses are seeking healthier communities to ensure a better quality of life, a healthier workforce, and reduced health care costs.

In June 2010, the American Dietetic Association, the American Nurses Association, the American Planning Association, and the American Public Health Association met to develop a set of shared food-system principles. It was the first time that national leaders in the nutrition, nursing, planning, and public health professions had worked collaboratively to create a shared platform for system-wide food policy change [17].

Raleigh's Blueprint for a Healthy City

A good example of the planning and public health professions working together successfully can be found in Raleigh, North Carolina. The city is known for its access to recreation and its quality of life, but it is in a region known for its sprawled development pattern.

When developing a comprehensive city plan, Raleigh used both an outreach strategy and an inreach strategy. The outreach strategy sought to engage external stakeholders. The inreach strategy focused on engaging city-department stakeholders. The intent was to avoid a silo approach to planning. The planners shared emerging issues and trends with the public in order to reach agreement on shared values and a shared vision for Raleigh's future. These emerging trends included the graying and browning of America, the changing

size and composition of households, and other demographic issues. Through public meetings and online bulletin boards, public health professionals, advocates, and educated citizens underscored the need for a healthier community.

Six core themes emerged that included public health as a core principle, and a number of policies were developed to advance public health. A new development pattern was proposed that would curb sprawl over the next 20 years by shifting 60% to 70% of all new development to 8 growth centers and 12 transit corridors. These corridors would accommodate multiple modes of transportation, such as cars, light rail, buses, walking, and biking. It was decided that parks and greenways should be expanded. The intent was not just to enhance scenic beauty and address the recreational needs of residents, but also to use the 80-mile greenway system as a transportation route for people who want to bike or walk to work. Health Impact Assessments were introduced. Thanks to Leah Devlin, former state health director, Raleigh is exploring how it can adapt HIAs to analyze the health implications of new projects. The city is undertaking its first HIA on Blue Ridge Road near Rex Hospital. Raleigh is rewriting its development code to require connectivity standards, usable open space, and sidewalks on both sides of the street in new subdivisions, with connections to the greenway system where possible. The city council passed a new pedestrian access requirement for all new development, especially commercial projects. The transportation planning staff is working on creating safe routes for walking and biking to schools and on promoting urban agriculture and community gardens.

Thus it comes as no surprise that the survey on Comprehensive Planning for Public Health conducted by the American Planning Association in March 2011 found that Raleigh was the only city in the country to address at least 50 percent of specific health topics in its comprehensive plan [13]. The only jurisdiction that addressed more public health issues in its plan was the Oneida Nation of Wisconsin.

Furthermore, many publications and media outlets, such as Reuters, Businessweek, and the magazines Men's Health and Women's Health, consistently rank Raleigh as one of the top cities for overall health for men and women [18].

It's Time to Come Home

Public health professionals and planners share a "professional DNA", and an urgent need to respond to trends that surfaced in the mid-1990s is bringing us back to together. A half-century of suburban development patterns has made Americans less healthy and has limited their choices. Now more than ever, professionals need to form new alliances or revive old ones to address the enormous challenges of the 21st century.

Planners and public health professionals need to work together. They must work together. It's time to come home. Our communities need us. NCMJ


Mitchell Silver, AICP president, American Planning Association, and chief planning and development officer and planning director, City of Raleigh, Raleigh, North Carolina.

Acknowledgment

Potential conflicts of interest. M.S. has no relevant conflicts of interest.

References

1. Levy JM. Contemporary Urban Planning. 5th ed. Upper Saddle River, NJ: Prentice-Hall; 2012:7.
2. Krueckeberg, Donald A. The Culture of Planning. In: Donald A. Krueckeberg, ed. Introduction to Planning History in the United States. New Brunswick, NJ: Rutgers University, Center for Urban Policy Research; 1987: 1-12.
3. Peterson J. The birth of organized city planning in the United States, 1909-1910. J Am Plann Assoc. 2009;75(2):123-133.
4. Birch EL, Silver C. One hundred years of city planning's enduring and evolving connections. J Am Planning Assoc. 2009;75(2):113-122.
5. Standard State Zoning Enabling Act and Standard City Planning Enabling Act. American Planning Association Web site. <http://www.planning.org/growingsmart/enablingacts.htm>. Accessed July 10, 2012.
6. Advisory Committee on City Planning and Zoning of the US Department of Commerce. A Standard City Planning Enabling Act. Washington, DC: US Government Printing Office; 1928. <http://www.planning.org/growingsmart/pdf/CPEnabling%20Act1928.pdf>. Accessed July 10, 2012.
7. Federal-Aid Highway Act, 70 USC §374 (1956).
8. State Indicator Report on Physical Activity, 2010 National Action Guide. Centers for Disease Control and Prevention Web site. http://www.cdc.gov/physicalactivity/downloads/PA_State_Indicator_Report_2010_Action_Guide.pdf/ Accessed June 5, 2012.
9. Ogden CL, Carroll MD. Prevalence of overweight, obesity, and extreme obesity among adults: United States, trends 1960-1962 through 2007-2008. June 2010. National Center for Health Statistics Web site. http://www.cdc.gov/NCHS/data/hestat/obesity_adult_07_08/obesity_adult_07_08.pdf. Accessed June 5, 2012.
10. Adult Obesity Facts. Centers for Disease Control and Prevention Web site. <http://www.cdc.gov/obesity/data/adult.html>. Accessed June 5, 2012.
11. F as in Fat: How Obesity Threatens America's Future. July 2011. Trust for America's Health Web site. <http://www.healthyamericans.org/report/88/>. Accessed June 5, 2012.
12. Trogon JG, Finkelstein EA, Feagan CW, Cohen JW. State-and-payer-specific estimates of annual medical expenditures attributable to obesity. Obesity (Silver Spring). 2012;20(1):214-220.
13. Hodgson K. Comprehensive Planning for Public Health: Results of the Planning and Community Health Research Center Survey. March 2011. <http://www.planning.org/research/publichealth/pdf/surveyreport.pdf>. Accessed June 5, 2012.
14. Morris M, ed. Planning Active Communities. Planning Advisory Service Report No. 543/544. Chicago: American Planning Association; 2006.
15. The Planning and Community Health Research Center advances plans and policies for improving the built environment to promote public health. American Planning Association Web site. <http://www.planning.org/nationalcenters/health/>. Accessed June 5, 2012.
16. Salkin PE, Ko P. The effective use of health impact assessment (HIA) in land-use decision making. Zoning Practice. October 2011. Albany Law School Legal Studies Research Paper Series, No. 33 of 2011-2012. http://www.healthimpactproject.org/resources/document/Salkin-201_Effective-Use-of-HIA-in-Land-Use.pdf. Accessed June 5, 2012.
17. Principles of a healthy, sustainable food system. American Planning Association Web site. <http://www.planning.org/nationalcenters/health/foodprinciples.htm>. Accessed June 5, 2012.
18. Raleigh Ranks Among Best Places. City of Raleigh Web site. <http://www.raleighnc.gov/government/content/PubAffairs/Articles/AccoladesRaleigh.html>. Updated June 29, 2012. Accessed July 10, 2012.




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.

A Public Service Message brought to you by the American Council on Exercise, a not-for-profit organization committed to the promotion of safe and effective exercise




ACE CERTIFIED

ACE Certified: The Mark of Quality
Look for the ACE symbol of excellence in fitness training and education.
For more information, visit our website:
www.ACEfitness.org

American Council on Exercise®

4851 PARAMOUNT DRIVE, SAN DIEGO, CA 92123 USA
(800) 825-3636 X653 | WWW.ACEFITNESS.ORG



ACE
AMERICAN COUNCIL ON EXERCISE

AMERICA'S AUTHORITY ON FITNESS™

Health Impact Assessments in North Carolina: Promoting Public Health Through Informed Decisions

Katherine A. Hebert

Health impact assessment (HIA), a systematic way of incorporating health considerations into the public policy decision-making process, has been set into motion in North Carolina. The state's public health and planning fields are well positioned to become leaders of HIA and should prepare to take proactive measures to promote health in their communities.

Once asked a colleague at the Centers for Disease Control and Prevention (CDC) why he left a profitable practice in family medicine to join the Public Health Corps. His answer surprised me. I expected him to say the malpractice insurance was too expensive or the hours too demanding. Instead, he simply said he had reached the point where he felt that if he saw another child who was obese, asthmatic, or prediabetic, he would go insane. It was time for a change, he said, and he thought it would be better to help prevent health problems rather than just treat the diseases. He was embracing an upstream approach to health that would have a profound influence on public health by focusing on preventive strategies such as making changes to the built environment and passing health-promoting policies.

Because I was a city planner working for the first time in public health, this concept took a while to resonate with me. After all, at the time I defined health as the opposite of being sick. I had a lot to learn. Fortunately, at the CDC, I was in one of the best places possible to learn about public health, the social determinants of health, health inequities, and a process that considers all of these: health impact assessment (HIA).

What Is Health Impact Assessment?

The National Research Council proposes the following technical definition for HIA:

HIA is a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of the effects within the population. HIA provides recommendations on monitoring and managing those effects [1].

The HIA process is broken into 6 steps: screening, scoping, assessment, recommendations, reporting, and monitoring and evaluation. These steps, which are elaborated on in

Figure 1, are fluid and tend to influence one another.

HIA uses a combination of sources and methods of analysis, depending on the topic and the sector (eg, transportation, housing, energy) in which the assessment is being conducted. Each sector is unique, and the flexibility of the HIA process, which makes it possible to evaluate potential health outcomes of diverse types of decisions, is one of its greatest strengths. HIA is a participatory process; it gathers stakeholder input and incorporates public engagement at every stage. Public engagement can take many forms and should be appropriate for each stakeholder group. HIA can also be applied to the 4 Ps, which include policies, plans, programs, and projects. For example, it can be used to inform decisions concerning the built environment (typically in the form of plans, projects, and policies, such as a comprehensive transportation plan, specific transit project, and local planning ordinances), as well as programs and policies outside of the built environment (such as the Supplemental Nutrition Assistance Program and a minimum wage policy).

It estimates the distribution of health impacts across a population and can be used to study and address health inequities. One of the main tenets of HIA is that it considers those who, as a result of various circumstances, may be more adversely affected by the decision being made than other people are. Therefore, community engagement and empowerment are key components of HIA. HIA is proactive and provides suggestions to promote positive health impacts and to prevent or mitigate negative ones. This means that HIA must be completed before a decision is made, preferably early enough in the planning or policy development process for recommendations to be incorporated.

The Value of HIA

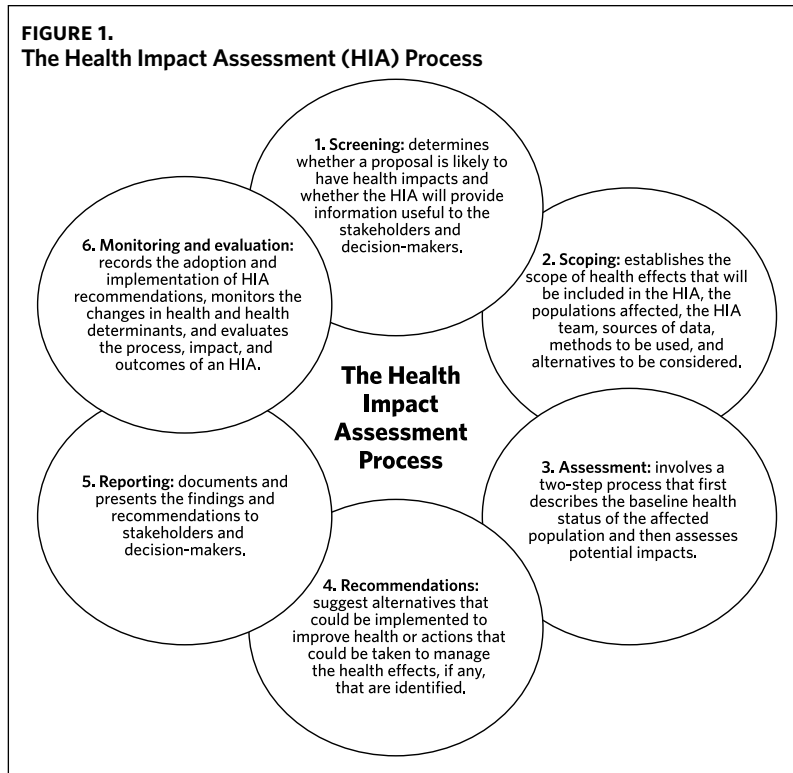
The value of HIA is felt by those participating in it—from health professionals to community members. For health professionals, HIA is a way to bring health concerns to the attention of decision makers and to form partnerships with professionals in other fields, such as planning, in order to

Electronically published August 10, 2012.

Address correspondence to Ms. Katherine A. Hebert, Davidson Design for Life, 216 South Main St, PO Box 579, Davidson, North Carolina 28036 (Khebert@townof davidson.org).

N C Med J. 2012;73(4):297-300. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73410

FIGURE 1.
The Health Impact Assessment (HIA) Process



incorporate health considerations into local policies and procedures. For planners, HIA is another source of information to strengthen plans and an additional means of community engagement. For members of a community, HIAs can be a form of empowerment and can provide useful information for grassroots community action. For decision makers, HIA can provide additional perspectives on and information about a decision, and can also facilitate community buy-in. Ultimately, the value of doing an HIA is to create health-promoting policies and a healthier built environment.

HIA in the United States and North Carolina

HIA was initially developed in the early 1990s in Europe (mainly the United Kingdom) and the Australasian region [2]. International banking corporations such as the International Finance Corporation also incorporated HIA into the evaluation process for development loans in third-world nations [2]. As the practice grew, guides for conducting HIAs were developed, and the process was refined and tailored to serve the needs of specific sectors, such as transportation and housing [2].

By April 2012, more than 170 documented HIAs had been conducted or were in progress in the United States, with about half of them taking place on the West Coast or in Alaska [3]. The practice of HIA has developed slowly in the United States. The first recognized HIA report in this country was completed in San Francisco in 1999 on a proposed minimum wage policy [3].

By April 2012, when the inaugural HIA conference in the United States was held, 13 HIAs had been carried out or

were under way in other southeastern states, including 7 in Georgia, 2 in Tennessee, 2 in Kentucky, 1 in South Carolina, and 1 in Virginia [2]. Two HIAs have been completed in North Carolina, one in association with the comprehensive bicycle plan for Haywood County (November 2011) [4], and another with regard to the Aberdeen pedestrian transportation plan (December 2011) [5]. In Raleigh, 2 HIA efforts have been under way since early 2012, one regarding the Blue Ridge Road District study [6] and the other, the New Bern Avenue Corridor study [7].

HIA Efforts in Davidson: The Davidson Design for Life Initiative

Davidson, a small college town about 20 miles north of Charlotte with a population of approximately 11,000, has set a precedent. By launching Davidson Design for Life (DD4L), a 3-year initiative using HIAs to promote healthy community design, the town is one of the first municipalities and the first small town in the nation to make a concerted effort to establish a continuous HIA program.

In September 2011, Davidson was awarded a grant by the Healthy Community Design Initiative of the CDC's National Center for Environmental Health. The 5 other grant winners were the local health departments in San Francisco, Baltimore, and Douglas County, Nebraska, and the state health departments of Oregon and Massachusetts. As the only grantee operating outside of a health department (DD4L is operated within the town's planning department), Davidson has a unique opportunity to test how HIA works within a local government setting and how it can be used to

improve health in a small town.

With unique opportunities come unique challenges, including limited localized health data, limited resources external to the grant, and a small, though dedicated, staff. To overcome these challenges, Davidson has needed to rely on partnerships to conduct the 3 HIAs and 2 trainings required by the grant each year. These partnerships have been solidified with the formation of the DD4L Regional Advisory Commission, which consists of statewide leaders from public health and planning, local nonprofit organizations, and universities within the region.

In the first year of the grant, DD4L selected 3 HIAs to estimate the potential health impacts of state policies, regional transportation projects, and local planning ordinances that could significantly affect Davidson. Senate Bill 731 (Session 2011-2012) [8] is proposed state legislation that would limit a municipality's ability to implement specific design standards in low-density residential areas (those with 5 or fewer units per acre). Removing local authority to regulate garage door location through a municipal design standard is of particular concern. Garages that protrude in front of the main entrance of a house encroach upon the pedestrian realm and may reduce the likelihood that people will walk. Such garages may also make those who continue to walk by choice or necessity less safe.

An HIA on the Red Line Regional Rail project, a proposal to convert a heavy-rail freight line to include commuter rail service from Charlotte to Mooresville, is currently underway and will likely demonstrate that the project will result in multiple health improvements. In particular, air pollution will be reduced as drivers become transit riders, and physical activity will increase as passengers walk to and from the train station. Health concerns over noise, dust, and increased rail traffic will also be examined.

The third HIA being conducted considers updates to Davidson's street design ordinances to promote physical activity and enhance safety for all road users. As a bronze-level bicycle-friendly and walk-friendly community (as recognized by the League of American Bicyclists and Walk Friendly Communities, respectively), Davidson's standards are already considered advanced within the state. By comparing them with national best-practice standards and models from other localities, Davidson hopes to further improve its planning ordinance.

Growing the Practice of HIA in North Carolina

North Carolina is in a good position to become a leader in HIA efforts in the Southeast. The state already has strong partnerships and state-level expertise, and innovative efforts to promote healthy communities are under way. For example, the Healthy Environments Collaborative, composed of representatives from the North Carolina Departments of Transportation, Environment and Natural Resources, Commerce, and Health and Human Services, is working to integrate and align departmental efforts to improve the

health of North Carolina's people, economy, and environments. We have excellent education and training centers in the state as well. The University of North Carolina at Chapel Hill has highly regarded graduate programs in both public health and city and regional planning, including a 3-year dual degree program combining the two fields. Active Living By Design, funded by the Robert Wood Johnson Foundation and located in North Carolina, provides communities nationwide with support for built environment projects to promote public health. In addition, the state has a very diverse population and geographic composition, with both small rural towns and large metropolitan areas, sometimes in close juxtaposition to one another, as in the case of Davidson and Charlotte. This diversity allows for HIAs to be conducted on a wide variety of topics and for various community engagement techniques to be developed.

For the practice of HIA to expand in North Carolina, 3 things must take place. First, capacity must be built through the training of current and future professionals in several fields, including public health and planning. Second, dedicated funding for HIAs must be found, whether from state funds, health foundations, or some other source. And last, a statewide network of those interested in conducting or promoting the use of HIA must be developed.

The foundation for all of these activities is currently being laid through initial HIA trainings and the statewide discussion of HIA that has begun. However, it will take the continued coordination and dedication of many sectors, agencies, and organizations to construct a firm foundation on which to build the HIA field in North Carolina.

Conclusion

To return to the story of my friend the physician-turned-public-health-professional, I am not suggesting that every physician make such a career change. We need physicians to treat patients with diseases and to help educate individuals on how to live healthy lifestyles. What I am suggesting is that it is time for physicians to return to the status of being mainstays regarding the health in their communities and to learn how decisions being made outside of the health sector are affecting their patients. I have had the chance to work with individuals from multiple sectors through my HIA efforts, and it has definitely been one of the most challenging and rewarding experiences of my life. I encourage all of you reading this article, including physicians, public health officials, and planners, to spend some time learning more about HIA and to become a champion for HIA in your communities. The time for a new approach to chronic disease prevention and health inequity is long overdue. **NCMJ**

Katherine A. Hebert, MCRP coordinator, Davidson Design for Life, Davidson, North Carolina.

Acknowledgments

The author would like to thank Dr. Bill Williams, Chair, DD4L Regional Advisory Commission; Lori Rhew, Physical Activity Unit Manager, Division of Public Health, North Carolina Department of

Health and Human Services; and Dr. Jacqueline MacDonald Gibson, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, for their contributions to this article. The author would also like to thank Marguerite Williams and Megan Pillow Davis for their review of the article.

Potential conflicts of interest. K.A.H. is the Davidson Design for Life Coordinator and a recipient of funding from the Centers for Disease Control and Prevention's Health Impact Assessment to Foster Healthy Community Design cooperative agreement 1UE1EH000897-01. The contents of this article are solely the opinion of the author and do not necessarily represent the official views of the Centers for Disease Control and Prevention.

References

1. National Research Council of the National Academies. Improving Health in the United States: The Role of Health Impact Assessment. Washington, DC: National Academies Press; 2011:46. Free PDF access to this book is available at http://www.nap.edu/openbook.php?record_id=13229. Accessed May 10, 2012.
2. Hebert KA, Wendel AM, Kennedy SK, Dannenberg AL. Health impact assessment: a comparison of 45 local, national, and international guidelines. *Environ Impact Assessment Rev*. 2012;34:74-82.
3. Wernham, A. HIA in the United States: overview of current practice. Presented at the University of Michigan HIA Mini Symposium. April 16, 2012. <https://practice.sph.umich.edu/mphtc/media/coursedocs/WernhamSlides.pdf>. Accessed May 10, 2012.
4. Yount C, Carleton C, Ivey G, et al. Haywood County Comprehensive Bicycle Plan Health Impact Assessment. November 7, 2011. http://www.kostelecplanning.com/wp-content/uploads/2011/12/HaywoodBicyclePlan_HealthImpactAssessment_Web.pdf. Accessed May 10, 2012.
5. Buescher B, Harker L, Kaur H, Mote K. Health Impact Assessment: Aberdeen Pedestrian Transportation Plan. December 16, 2011. http://www.healthimpactproject.org/resources/body/FINAL_HIA_Aberdeen_12-8-2011.pdf. Accessed May 10, 2012.
6. Gibson JM. Blue Ridge Road Corridor Health Impact Assessment Project. Presented at public meeting #3, options presentation and feedback session, April 12, 2012. City of Raleigh Blue Ridge Road District Study Web site. <http://www.raleighnc.gov/home/content/PlanUrbanDesign/Articles/BlueRidgeRoadDistrictStudy.html>. Accessed May 10, 2012.
7. City of Raleigh. New Bern Avenue Corridor Study. City of Raleigh New Bern Corridor Web page. <http://www.raleighnc.gov/search/content/PlanLongRange/Articles/NewBernCorridorStudy.html>. Accessed May 1, 2012.
8. Zoning/Design and Aesthetic Controls, SB 731, 2011-2012 Sess.

I WILL MOVE MORE!

EMPOWER YOURSELF.



Don't sweat it – you can do it!

Walk, jog or go bike riding with the kids – get your heart pumping at least 30 minutes a day. Try 10 minute intervals, 3 times a day to fit your schedule better. Get moving and make small changes that can have a big effect on your life.

For more ways to get and stay active, visit:

www.MyEatSmartMoveMore.com



MOVE
MORE

RIGHT SIZE
YOUR
PORTIONS

WATCH
LESS TV

EAT MORE
FRUITS
& VEGGIES

PREPARE
MORE MEALS
AT HOME

DRINK MORE
WATER

North Carolina Tomorrow: Building Communities for Tomorrow's Jobs

Joe McKinney, Betty R. Huskins

The North Carolina Tomorrow initiative develops the North Carolina Strategy for Economic Development based on economic development planning best practices, which can serve as a blueprint for creating an economically sustainable economy. It is made possible through government agency and private sector collaboration. Thought leaders from all sectors, including health care, are involved at the regional level.

The North Carolina Association of Regional Councils is a nonprofit organization made up of the 16 regional councils of government that serve the state of North Carolina. The association's mission is "to provide 'creative regional solutions' to relevant and emerging issues in North Carolina while providing a standard of excellence in the delivery of federal, state, and regional services" for its member communities [1].

Regional councils were organized by state legislation [2] that was prompted by Congressional passage of the Intergovernmental Cooperation Act in 1968 [3], which called for closer cooperation between federal programs and state and local governments. The councils aid, assist, and improve the capabilities of their local government members with regard to community and economic planning and development, administration, fiscal management, and grant writing. They also serve as a convener for regional issue management. All regional councils administer and distribute state funds for community and economic development and for workforce preparedness. In addition, they serve as area agencies on aging, and are affiliates of the North Carolina State Data Center. The regional councils are the designated Economic Development Districts for the US Economic Development Administration. It should also be noted that the councils retain the institutional knowledge needed to serve as the repository and provider for these services. This is an extremely important role of the councils in many small towns and rural counties since continuity could be lost as local officials come and go from election to election.

The regional councils have always been committed to environmental protection of North Carolina's natural resources and have worked closely in this topic area with their member governments, as well as with the North Carolina Department of Environment and Natural Resources statewide. At the request of their local governments, the

councils have led many initiatives for land preservation and conservation, water resource management, and local planning for land use and resource protection.

The Association of Regional Councils launched a new statewide initiative in 2010 called North Carolina Tomorrow—Building Communities for Tomorrow's Jobs, which will produce a statewide strategy for comprehensive economic development. This strategy will be based on best practices in economic development and will incorporate the 6 livability principles for sustainable and resilient communities established at the federal level by the Partnership for Sustainable Communities. These principles are to provide more transportation choices; to promote equitable, affordable housing; to enhance economic competitiveness; to support existing communities; to coordinate policies and leverage investment; and to value communities and neighborhoods [2]. The partnership is made up of the US Department of Housing and Urban Development (HUD), the US Environmental Protection Agency, and the US Department of Transportation.

The movement for sustainable communities, meaning communities that are built to last and to withstand global threats (eg, massive job loss in the manufacturing sector, lack of non-renewable energy sources), began to spread across the country in 2009 and 2010. North Carolina has garnered 5 of the federal grants awarded by HUD on behalf of the Federal Partnership for Sustainable Communities over the past 2 years. Asheville, Charlotte, the Triad, the Triangle, and the Wilmington areas are currently carrying out the planning process for that federal program and incorporating it into North Carolina Tomorrow.

The first initiative of North Carolina Tomorrow is to facilitate the planning for regional comprehensive economic development strategies (CEDS) across North Carolina and then use these plans as the foundation for creating a state comprehensive economic development strategy, which will serve as a blueprint for creating an economically sustainable economy for North Carolina. The 16 regional councils

Electronically published August 10, 2012.

Address correspondence to Ms. Betty R. Huskins, PO Box 182, Linville Falls, NC 28647 (betty@ridgetopassociates.com).

NC Med J. 2012;73(4):301-303. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved.
0029-2559/2012/73409

across North Carolina, using the expertise of their professional staffs, are conducting regional strategy sessions with community leaders, professional economic developers and planners, and private industry. They are also synthesizing analytical data and incorporating best practices in the planning process. Thought leaders from all sectors of the economy, including health care, are involved in the process at the regional level.

The sixth livability principle—to value communities and neighborhoods—is elaborated on as follows: “Enhance the unique characteristics of all communities by investing in healthy, safe, and walkable neighborhoods in rural, urban, and suburban areas” [4]. This principle is particularly important to a successful economic recovery for North Carolina, because tomorrow’s jobs will require innovative, talented, and healthy people, and those people will want to live in innovative, healthy communities. Therefore, the discussion of economic development in communities across North Carolina now includes such health issues as clean air and water, access to fresh foods, access to outdoor activities, and affordable health care. Attributes such as these that affect health are becoming more and more important to the workers of tomorrow. For example, local foods have become more important as research has continued to reveal that processed foods are creating health problems across America [5]. However, some areas in North Carolina have little access to fresh vegetables. The planning process must address this by looking at systems that can move locally grown food products from rural to urban areas more efficiently. Another concern mentioned above is lack of access to green space in urban areas and lack of walking trails or greenways in rural areas are barriers to a healthy lifestyle, and are thus community issues that must be addressed. Towns and cities will need to analyze just how “walkable” their communities really are if they want to flourish in the new economy.

Funding for the North Carolina Tomorrow initiative comes from the US Economic Development Administration and the North Carolina Department of Commerce’s Division of Community Investment through the North Carolina Catalyst Program of the Community Development Block Grant funds program. Other partners have also come on board, including the North Carolina Rural Economic Development Center, the North Carolina Department of Transportation, the North Carolina Department of Environment and Natural Resources, the North Carolina Division of Public Health, the North Carolina Department of Agriculture and Consumer Resources, Duke Energy, and the SAS Institute.

The SAS Institute is developing software specifically for the initiative. Called the North Carolina Regional Economic Prosperity Solution (REPS), the software will be used by planning and economic development professionals, elected officials, and private industry developers for data collection and analysis and will help measure success at economic development and sustainability. REPS will be hosted at SAS Institute headquarters in Cary in the SAS Analytics Lab for

State and Local Government (a cloud computing center established in 2010) and will be available for communities to use statewide.

Land-of-Sky Case Study

The Land-of-Sky Regional Council serves Buncombe, Henderson, Madison, and Transylvania counties in western North Carolina. Communities in that part of the state are already reaping the benefits of years of regional sustainable planning. In recent months, 2 major national breweries have announced that they are locating their East Coast headquarters in western North Carolina, bringing more than 350 new jobs to the area. Sierra Nevada Brewing Company and New Belgium Brewing Company have chosen rural Mills River and downtown Asheville, respectively, as headquarters for their East Coast operations. Company officials from both breweries point to sustainable development principles, including community health, as the primary reason for selecting western North Carolina over other areas in the eastern United States.

Sierra Nevada went through a 3-year process and considered more than 200 different sites in painstaking detail before ultimately deciding on the Mills River community south of Asheville. In an interview with *The Revivalist: Word from the Appalachian South* blog, marketing manager Erika Bruhn noted that quality of life, shared values, and access to the outdoors were key factors in the decision-making process:

The intricacies and particulars of the brewing process relating to water quality, coupled with the infrastructure needs Ken [Grossman, CEO] wanted around sustainability (close proximity to rail transport), made the requirements of a location challenging. Add to that, finding a community with shared values around the outdoor lifestyle . . . and you begin to understand more about our . . . approach: it’s about making great beer of course, but also quality in everything we do: family, community and finding our sense of place were all unequivocally part of our decision [6].

Kim Jordan, cofounder and CEO of New Belgium Brewing Company, is part of a new breed of international business leaders who believe that their company’s “bottom line” is more than just how much profit can be generated. Quality of life for employees and environmental stewardship mean as much to Jordan as traditional profit margin. At the recent announcement of the company’s selection of Asheville as New Belgium’s East Coast distribution center, Jordan spoke more about reuse of brownfield property, bike paths, and affordable housing within walking distance of downtown and its new plant than she did about financial incentives and traditional infrastructure.

These recent job announcements in western North Carolina come at a time when 5 counties in the region around Asheville (the 4 Land-of-Sky counties plus Haywood County) have come together to work on planning for the region’s future and preserving the qualities that make the

area so attractive to 21st-century businesses. GroWNC is a 3-year project that will, in conjunction with the North Carolina Tomorrow initiative, develop regional and local strategies for competitiveness and job creation. A consortium of local governments, nonprofit organizations, and businesses is guiding the project, seeking significant input from residents of the region, gathering existing and historical data, and synthesizing it to create a vision of the future. Together, members of the consortium will draw on existing plans and strategies to develop a plan to foster economic prosperity through a regional vision that identifies implementable projects and actions. The project will include significant public outreach and involvement.

GroWNC will allow local governments, businesses, nonprofit organizations, citizens, and others to realize unprecedented regional coordination on jobs, energy, housing, transportation, resources, and other interconnected issues. This will foster more prosperous, livable communities in our region through new high-quality jobs, new investment, diverse economic development strategies, quality housing options, efficient transportation systems, healthier people and communities, and better use of natural and cultural resources.

The GroWNC Consortium will gather public input and combine existing plans and strategies across the topic areas in the local livability framework depicted in Figure 1. Workgroups for each topic area listed (jobs/economic development, energy, housing, health, transportation, natural and cultural resources, and land use) are convening to identify challenges and opportunities, review existing plans and strategies, examine future scenarios and develop alternatives, and integrate public input into their findings.

GroWNC is funded by a grant from HUD through the Sustainable Communities Initiative. GroWNC is not about starting from scratch. It will draw on significant work that has already been accomplished in the region, weaving

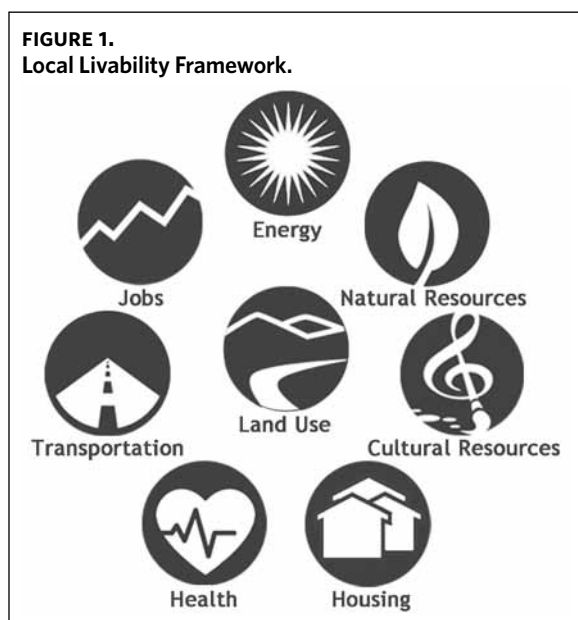
together existing plans with public involvement. GroWNC is not a central authority over the region's local governments; rather, it is a way for the region to identify common goals and objectives that can be attained by working together.

The health workgroup contributing to policy recommendations for the GroWNC consortium will explore current and future health challenges in the region. The group has established four primary goals: to advocate for a built environment that supports health promotion in the planning, assessment, and intervention processes; to increase individual and community resilience through the integration of community, holistic and medical resources; to maintain a unified focus on investment in prevention that improves quality of life and reduces health care expenses; and to advocate for improved access to health care options for all regardless of ethnicity, age, state of disease, or financial resources.

Using available data, this group will examine public health indicators, and guided by the methodology employed for Community Health Assessments (CHAs) and Health Impact Assessments (HIAs), will evaluate the region to determine what policies, plans, programs, and projects are needed to improve the health of the population and workforce for a better future. Strategies will be developed and include the use of HIAs and CHAs, as well as other evaluation tools, for analyzing the potential health effects of various activities and the development of partnerships that can ensure health impacts are taken into consideration when decisions are being made about transportation, housing, and employment.

In conclusion, planning for more sustainable and resilient communities is taking place all across North Carolina. Community, regional, state, and federal leaders both from government and from the private sector, working together, can make a difference in how North Carolina moves forward in a new economy while building communities that make a real difference in the lives of their residents. NCMJ

FIGURE 1.
Local Livability Framework.



Joe McKinney executive director, Land-of-Sky Regional Council, Asheville, North Carolina.

Betty R. Huskins executive director, North Carolina Association of Regional Council Directors, Linville Falls, North Carolina.

Acknowledgment

Potential conflicts of interest. J.M. and B.R.H. have no relevant conflicts of interest.

References

1. North Carolina Regional Councils Web site. <http://www.ncregions.org/>. Accessed May 22, 2012.
2. Creation of regional councils, definition of. N C Gen Stat §160A-470.
3. Intergovernmental Cooperation Act. 31 USC §6506 (1968).
4. Six livability principles. HUD.GOV US Department of Housing and Urban Development Web site. http://portal.hud.gov/hudportal/HUD?src=/program_offices/sustainable_housing_communities/Six_Livability_Principles. Accessed May 22, 2012.
5. Public health takes aim at sugar and fat. Harvard School of Public Health, Harvard Public Health Magazine. Published 2009. <http://www.hsph.harvard.edu/news/magazine/fall-2009/sugar-and-salt.html>. Accessed July 25, 2012.
6. Why Sierra Nevada Fell for Asheville. The Revivalist: Word from the Appalachian South. <http://therevivalist.info/sierra-nevada-asheville/>. Accessed May 22, 2012.

Two North Carolina Public Health Departments Taking Steps Toward Sustainable Communities

John H. Morrow, Beth G. Lovette

Communities Putting Prevention to Work grant funding, provided to the state through the Centers for Disease Control and Prevention since 2010, is aimed at impacting obesity. This has enabled 2 local health departments—Pitt County and the Appalachian District—to make broad, sustainable environmental changes that foster improvements in health outcomes.

North Carolina's Communities Putting Prevention to Work (CPPW) initiative, made possible through Affordable Care Act funding, has given the Appalachian District Health Department and the Pitt County Health Department the opportunity to get a 2-year head start on the future of local public health efforts to improve the health of communities. This is particularly important because both Appalachia and eastern North Carolina have historically lagged behind much of the United States in population health status. The CPPW grant recognizes that population health status is determined not just by the usual health measurements such as morbidity and mortality and access to health care, but also by socioeconomic factors, such as the percentage of children living in poverty, density of fast-food restaurants, and easy access to parks and recreation facilities.

Both health departments used CPPW's 5 evidence-based MAPPs (media, access, point of purchase/promotion, price, social support and services) strategies for improving health behaviors to create a community impact plan. The MAPPs strategies pertain to the following areas: 1) media (eg, restriction of advertising for unhealthy products, production of counter-advertising promoting healthy behaviors), 2) access (eg, usage bans, sales and zoning restrictions, incentives for retailers), 3) point of decision (eg, signage, product placement, menu labeling), 4) price (eg, banning free samples of unhealthy products, subsidizing membership in recreation facilities), and 5) social support and services (eg, smoking cessation assistance). The grant funds have refocused public health efforts toward redesigning an environment that has contributed to and exacerbated poor health outcomes. The grant targets policies, systems, and environmental changes that can lead to and assure population health for the future. When one looks at how population health status has been improved in the past, it is

clear that public health policy has had the greatest impact. Having public health policies (and laws) that require clean water, clean air, safer workplaces, seatbelts, and immunizations has helped to significantly increase not only the length of life, but also the quality of life for people in the United States. A great example is how tobacco-free policies decrease tobacco use and exposure to secondhand smoke. Such policies have been proved to decrease the incidence of tobacco-related illnesses and premature deaths that result from them. In the 2 years since the Smoke-Free Restaurant and Bar law [1] was passed by the North Carolina General Assembly, the weekly rate of visits to hospital emergency departments in the state for episodes of acute myocardial infarction has decreased 21% [2].

In 2006, the city of Greenville in Pitt County was recognized by the restaurant industry as the nation's No. 1 market for fast-food users because 59% of fast-food users there had patronized a quick-service restaurant 12 or more times per month [3]. Pitt County has both food swamps, in which an abundance of unhealthy fast food is readily available, and food deserts, where there is poor access to regular grocery stores or other sources of fresh fruits and vegetables. These swamps and deserts are often located near our poorest populations and minority communities. In response, the CPPW initiative has brought fresh fruits and vegetables to corner stores in both rural and urban locations around the county. The grant helped to purchase refrigeration equipment and encouraged the owner/operators to offer these healthy food options to their customers. Now residents in these communities can walk to their corner store and select healthy options at a reasonable price. In addition CPPW helped establish farmer's markets in the 2 small towns of Grifton and Farmville, which are in the southern and western parts of the county, respectively. The city of Greenville provided a regular Saturday bus route to the large Pitt County farmer's market and CPPW helped make additional improvements at this busy market. Across the road from this farmer's market

Electronically published August 10, 2012.

Address correspondence to Dr. John H. Morrow, Pitt County Health Department, 201 Government Circle, Greenville, NC 27834 (jhmorrow@pittcountync.gov).

NC Med J. 2012;73(4):304-309. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73411

Active Living By Design: Collaborating to Build Healthy Communities in North Carolina

Philip Bors, Joanne Lee

Active Living By Design (ALBD), a national program created to increase physical activity through community design and policy change, opened its doors in 2002. This new organization started just as public health practitioners, researchers, and funders were beginning to recognize the important influence of built environments on physical activity and health. At that time the nation was also growing increasingly aware of its epidemic of overweight and obesity, a condition closely related to physical activity levels of the population. ALBD was created as a collaboration between the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill and the Robert Wood Johnson Foundation (RWJF). Although it was originally created to serve 25 RWJF-funded community partnerships across the United States, ALBD has worked formally with a variety of funders and with more than 170 communities seeking to promote active living and, more recently, healthy eating. Despite the fact that ALBD was created to provide technical and other assistance on a national level, its efforts in North Carolina are a significant part of the work.

ALBD is well known in North Carolina for its work on the Fit Community and Fit Together initiatives. In 2005, ALBD partnered with the North Carolina Health and Wellness Trust Fund (HWTF) to develop the Fit Community initiative, along with Blue Cross and Blue Shield of North Carolina Foundation (BCBSNC Foundation) and the Division of Public Health (DPH), North Carolina Department of Health and Human Services. Each Fit Community partnership used ALBD's Community Action Model as the framework to improve physical activity and healthy eating opportunities in communities, schools, and worksites. Between 2006 and 2011, 38 communities were awarded two-year grants of \$60,000 from HWTF plus technical assistance from ALBD. These projects resulted in health-promoting community changes such as a 10-mile nature trail in the Rough Creek Watershed in the town of Canton, a new natural play area in the city of Goldsboro, a trail and policy change to support safer routes to school in the village of Pinehurst, the state's first bicycle boulevard

giving bicyclists priority on certain streets in downtown Wilmington, and a comprehensive worksite wellness initiative involving more than 75 worksites in Mecklenburg County [1]. In addition, 27 municipalities and counties in North Carolina received 3-year Fit Community designation awards recognizing their support for physical activity, healthy eating and tobacco use prevention through environments and policies. In an effort to focus specifically on rural communities in the state, ALBD also provided consultation and technical assistance for Fit Together, a grant program of the BCBSNC Foundation, for which 5 rural counties implemented comprehensive strategies for increasing physical activity. Health-promoting, sustainable outcomes of this initiative include new trails at a church and park in Pitt County, sidewalk improvements enabling children in Walnut Cove to walk safely to school, and a Smart Growth checklist for developers building new subdivisions in Camden County, which prioritizes walkability, compactness, and accessibility to transportation [2]. (More information about the Fit Community initiative and Fit Together initiative is available at http://www.activelivingbydesign.org/fit_community_final_case_studies and http://www.activelivingbydesign.org/Fit_Together_Case_Studies.)

Over the past decade, ALBD has had a close collaboration with the North Carolina Department of Health and Human Services (DHHS), which is a national leader in built-environment physical activity initiatives and a public health role model. For example, the Physical Activity and Nutrition Branch within DPH developed and currently conducts the Move More Scholars Institute, an annual intensive 4-day training course that teaches participants how to promote and support physical activity in their communities. The course, which was initially designed for public health practitioners, has taught nearly 100 health educators, recreation supervisors, city planners, youth coordinators, and other professionals about the key elements of comprehensive community active living initiatives. ALBD has contributed to this training by helping conceptualize the learning experience, developing and delivering presen-

and adjacent to the county recreational park, a large Making Pitt Fit community garden was built with support from both CPPW and the Blue Cross and Blue Shield of North Carolina Foundation. Residents can now increase both their physical activity by working in their leased garden plot and increase their consumption of healthy foods by growing their own produce. In addition, residents also have ready access to walking trails and opportunities for other physical activities in the adjacent park. A gardening technician employed with CPPW grant funds through the Pitt County Cooperative Extension provides additional support to groups throughout

the county interested in establishing community gardens. An elementary and middle school are located just across from the garden and down the road from the farmer's market, so these students take regular field trips to learn about growing and eating healthy foods.

Better access to opportunities for physical activity is also a priority of the CPPW initiative in Pitt County. Through CPPW, the Pitt County Health Department has worked with Pitt County Schools and the Boys and Girls Club to recruit 18 sites to use the Move More After-School Standards to increase the amount of physical activity in their after-school

tations on the built environment, and facilitating interactive learning exercises.

In 2010, DPH received a federal Communities Putting Prevention to Work (CPPW) award from the Centers for Disease Control and Prevention. ALBD worked in partnership with DPH to support 11 North Carolina communities that had received CPPW funding as they implemented small projects to make streets safer for walking and bicycling. These communities also provided the state's Healthy Environments Collaborative with local perspectives on policy barriers to creating healthier environments.

In addition to consulting on program development and providing technical assistance to community partnerships, ALBD has advocated for active living by participating in a variety of short-term statewide initiatives, task forces, and ad hoc efforts. For example, ALBD has contributed to review teams for grant programs, including the Bicycle and Pedestrian Planning Grant Initiative of the North Carolina Department of Transportation (DOT) and the Eat Smart, Move More grants of DPH. ALBD staff members have also provided presentations, testimony, and other input for the North Carolina General Assembly's Legislative Task Force on Childhood Obesity, the North Carolina Board of Transportation, the North Carolina Institute of Medicine's Prevention Task Force, DPH's Healthy North Carolina 2020 plan [3], and the DOT's Bicycle and Pedestrian Safety Summit.

Important lessons have emerged from ALBD's experiences with North Carolina communities, funders, state agencies, and nonprofit organizations. First, it is apparent that the most effective "active living leaders" often operate outside the public health profession. They include city planners, transportation officials, school principals and superintendents, mayors, recreation directors, disability advocates, community development professionals, nonprofit partners, and community members with no formal training in public health. Also, community engagement in active living initiatives is critical to ensuring that the most appropriate built-environment approaches are identified, prioritized, implemented, and sustained. For example, an engaged grassroots public is more likely to advocate for long-term investment in healthier streets, playgrounds, schools, and neighborhoods. Finally, communities may feel that they work in isolation from, or in competition with, other municipalities and counties in the state and their region, particularly when funding opportunities are

limited. Collaborative peer learning networks facilitate the exchange of ideas and innovations among communities and connect newly emerging health advocates with experienced professionals and local leaders.

As ALBD celebrates its 10-year anniversary, it looks to a future filled with persistent challenges and considerable work to be done, particularly in addressing health disparities related to physical activity and transforming environments so that they support this essential behavior. North Carolina trails the nation in nearly all measures of physical activity, and the state is playing catch-up to meet its physical activity targets for 2020. In fact, the North Carolina Prevention Report Card for 2012 gave the state a grade of D for physical activity [4]. As health care costs escalate, it is even more critical that North Carolina communities support active living among children, older adults, and other vulnerable populations. NCMJ

Philip Bors, MPH project officer, Active Living By Design, North Carolina Institute for Public Health, Gillings School of Global Public Health, University of North Carolina at Chapel Hill.

Joanne Lee, MPH, RD project officer, Active Living By Design, North Carolina Institute for Public Health, Gillings School of Global Public Health, University of North Carolina at Chapel Hill.

Acknowledgment

Potential conflicts of interest. P.B. and J.L. have no relevant conflicts of interest.

References

1. Fit Community case studies. Active Living by Design Web site. http://www.activelivingbydesign.org/fit_community_final_case_studies. Accessed May 14, 2012.
2. Communities on the move: Fit Together case studies. Active Living by Design Web site. http://www.activelivingbydesign.org/Fit_Together_Case_Studies. Accessed May 14, 2012.
3. Healthy North Carolina 2020: a better state of health. North Carolina Division of Public Health Web site. <http://publichealth.nc.gov/hnc2020>. Accessed May 14, 2012.
4. North Carolina Report Card: Measuring North Carolina's Progress in Prevention and Health toward 2020 Goals. Chapel Hill, NC: North Carolina Prevention Partners; 2012. <http://www.ncpreventionpartners.org/ncpp/Document/Download?id=92007136-34e0-4e6d-8e13-1dea68c907d3>. Accessed May 14, 2012.

Electronically published August 10, 2012.

Address correspondence to Mr. Philip Bors, Active Living By Design, 400 Market St, Ste 205, Chapel Hill, NC 27516 (phil_bors@unc.edu).

N C Med J. 2012;73(4):305-306. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73412

programs. This program incorporates at least 30 minutes of physical activity into after-school programs for children. The grant has also helped the schools create safe routes to schools for both walkers and bicyclists.

The Greenville-Pitt County Chamber of Commerce has been instrumental in working with local employers to improve worksite wellness initiatives. The Chamber leadership recognizes the critical role that health plays in attracting new business to a community and in maintaining healthy and happy workforces.

The Pitt County CPPW leadership team is made up of a

broad coalition from the Greenville-Pitt County Chamber of Commerce, East Carolina University, Pitt County Cooperative Extension, Vidant Medical Center, Pitt County Schools, municipal and county planners, and public health staff. These leaders have helped to bring about significant changes in policies across the county. The Pitt County Board of Health first adopted a resolution that broadly promotes improved nutrition and physical activity in policy formation for municipalities and local government. This resolution was then taken to planning boards and city and town councils throughout the county where it was also adopted.

This then led the way for the modification of the Pitt County comprehensive land use plan to include improving health as an overall goal. This comprehensive land use plan was later approved by the county commission and helps to assure that future policy decisions around planning will always consider the impact on public health before adoption. In June of 2012 the town of Ayden updated their comprehensive land use plan in response to these CPPW efforts and placed special emphasis on the relationship between access to healthy foods, physical activity opportunities, and the health of the public. The town of Winterville is now working on a similar update.

The Appalachian District Health Department is tackling obesity in 3 rural counties in Western North Carolina: Alleghany, Ashe, and Watauga. These counties are home to nearly 90,000 residents. Approximately 64% of the residents living in Western North Carolina are overweight or obese [4], and only 24.1% of adults in the region meet the current recommendations for fruit and vegetable consumption [5]. Contributing to this problem are limited access to fresh, healthy food and a lack of opportunities for physical activity, in part because the Appalachian District is a rural, geographically large area with narrow mountain roads, and also experiences severe winter weather. The Appalachian District Health Department has worked for years to build community partnerships with both traditional and nontraditional health partners in each community in the district. But with the CPPW grant, the department was given an opportunity to expand these partnerships and create a district-wide leadership team to increase the impact of our work.

The leadership team includes high-level community leaders from multiple sectors, who have the combined resources and capacity to make it easier to live healthfully. Members of the Appalachian District's leadership team are key agents for change in their community. The leadership team includes people from Alleghany, Ashe, and Watauga counties who represent county governments, schools, hospitals, Partnerships for Children, the District Board of Health and Health Department, Appalachian State University, boards of education, county offices of the North Carolina Cooperative Extension, the Be-Active Appalachian Partnership, the Children's Council of Watauga, the town of Boone, the town of Sparta, the town of West Jefferson, county departments of parks and recreation, the Watauga Tourism Development Authority, and the Western Youth Network. The mountainous terrain and the distances between towns across the 3 counties presented some challenges in keeping team members connected. However, the project provided political cover for those wanting to make changes (but experiencing resistance from others within their organizations) and wonderful opportunities for support and cross-sector learning.

As the CPPW leadership team began work, it became apparent that education of team members would be critical to achieving the buy-in that would be needed if they were to think differently about their communities. Even though

the teams were made up of people with a strong background in thinking creatively about solutions to problems, it was not intuitive for them to understand that our society has engineered physical activity right out of its towns. Mark Fenton, who describes himself as "a public health, planning, and transportation consultant who is trying to help America find its way to more active and more livable cities, towns, and neighborhoods," visited both Pitt County and the Appalachian District. Leadership team members in Appalachia spent 3 days riding and walking around their communities with Mr. Fenton, as he pointed out things they had never given much thought to before. Here are just a few highlights of what they learned: (1) A downtown that is walkable and bikeable has a positive impact on the economy, because it encourages shopping and dining downtown. Exchanging traffic signals for stop signs, improving crosswalk visibility, and adding buffers between the sidewalk and traffic slows down cars and improves walkability and bikeability. These changes can be seen in downtown West Jefferson. (2) Goat paths (informal trails) from the sidewalk to a destination, like the ones in Sparta that lead to a town park and a walking track, can help communities identify needed sidewalk improvements. (3) Even in tough economic times, it makes sense to consider improving streets for pedestrians and cyclists. As municipalities and the state repave existing streets, improvements can be made, some without adding to the cost; for example road surface markings can be painted differently. (4) Team members had thought that initiatives encouraging walking or biking to school were impractical in the District's rural, mountain communities, but observing Harden Park Elementary School at pick-up time changed their minds. They learned from the principal that 80% of the students live within 2 miles of the school, yet fewer than 5% of students walk or bike to school.

This 3-day event gave area planners, engineers, and municipal and county officials all an opportunity to learn more about how to think about active transportation and make it an important goal of comprehensive planning and development guidelines. The time that Mr Fenton, municipal and county staff members, and North Carolina Department of Transportation (DOT) staff members spent together during the event was invaluable. The occasion provided an opportunity for towns and the DOT to focus on shared priorities. It also opened lines of communication for further discussion about potential future projects using the new concepts.

The Appalachian District Board of Health decided to adopt a "complete streets" resolution that encourages municipalities in the district to keep all users in mind—including bicyclists, pedestrians, and public transportation vehicles and riders—when designing, constructing, operating, and making improvements to roadways. To date, 3 municipalities in the Appalachian District—West Jefferson, Boone, and Sparta—all have adopted their own resolutions stating their support of complete streets. All have indicated that it was

politically important that other nearby communities and the District Board of Health also made the resolution.

The importance of making health concerns a priority when planning the built environment has not always been readily apparent. In 2008 there was an opportunity to use funds from the North Carolina Obesity Prevention Demonstration Project to connect the Boone greenway with the neighborhood adjacent to Watauga High School. Fears over unsupervised walking and biking and potential stranger danger almost derailed the project. Fortunately, community collaboration and discussion overcame opposition to the project, and there is now a direct connection used both by cross-country teams and by community residents. When a group from the CPPW leadership team was last on the greenway, a sports team was spotted trotting out of the school gate and onto the greenway on their way to the community soccer complex. Just a few years ago, that trip would have required several cars maneuvering through congested traffic, which would have been much more dangerous than that jog. The CPPW grant is offering another opportunity to enhance this connection by placing better signage and emergency call boxes along multiple sites on the trail beyond this new link that is three quarters of a mile long.

One of the most exciting changes to the built environment now under way in the High Country—thanks in large part to the new relationships developed between the CPPW Team and the DOT—is a project widening a stretch of Highway 421 North leading into Boone. This busy stretch of highway connects area hotels and apartments that house Appalachian State University students with shopping, downtown Boone, and the campus. Historically, this road had only spotty stretches of sidewalk. Initial plans for the road-widening project called for complete sidewalks, but no bike lanes. As the CPPW project continued and the group learned more about the importance of making the healthy, active choice the easy, safe choice, the DOT division engineer invited town leaders and a member of the CPPW leadership team to discuss making improvements in the design plan before construction of the project was completed. Through the CPPW partnership and commitment by the leadership team, multiple opportunities have been realized across the region. In Watauga County, the Watauga Tourism Development Authority has expanded opportunities for hiking, mountain biking, and more at Rocky Knob Bike Park. Nearby, the Town of Boone is extending partnership to support engineering and design work to help connect Highway 421 to New Market Boulevard with sidewalks, so that children can walk to school and people living in public housing nearby can access the bus system safely. West Jefferson has instituted new designs to slow traffic patterns using stop signs and has created a more inviting downtown corridor by increasing signage and redesigning curb bump-outs to increase pedestrian visibility. Sparta has created a new brand for the town and has newly engineered plans ready for implementation to create a vital, active Sparta.

The town has also partnered with the newly established Alleghany County Farmer's Market by locating the market in the town's Crouse Park.

These projects have created lasting impressions and are the leadership team's legacy. They have supported additional development in built-environment capacity in each municipality. They have also demonstrated the value of a community that has active transportation on health and, and notably, on economic development.

Both the Appalachian District Health Department and the Pitt County Health Department, in partnership with the Division of Public Health, North Carolina Department of Health and Human Service have launched a Take Step Two campaign (more information available at <http://www.takestepstwo.com>), to help would-be advocates take the next step toward building their own healthy communities. The momentum is spreading: In April, a group of elementary school students presented their plans to promote biking to school to the Boone Town Council, and other partners have leveraged additional funding opportunities to expand their good work.

The issue of obesity is a challenge statewide. A report based on Centers for Disease Control and Prevention (CDC) data for 2008 through 2010 found that North Carolina ranked 14th in the nation for adult obesity (29.4% of the adult population had a body mass index of 30 or higher) and 18th in the nation for physical inactivity (25.6% of adults classified as physically inactive) [6]. And on the 2007 National Survey of Children's Health, North Carolina ranked 11th in the nation in the percentage of children ages 10 through 17 who were obese (18.6%) [6]. To address this public health problem, it is important that we change the environments in which we live, work, learn, play, and pray. The CPPW initiative is changing the policies of governments, employers, schools, parks and recreation facilities, and places of worship. North Carolina also recently received a Community Transformation Grant from the CDC. This new grant will spread much of what has been learned in these 4 counties to other counties across the state. NCMJ

John H. Morrow, MD, MPH director, Pitt County Health Department, Greenville, North Carolina.

Beth G. Lovette, RN, BSN, MPH director, Appalachian District Health Department, Watauga, Ashe, and Alleghany Counties, North Carolina.

Acknowledgment

Potential conflicts of interest. J.H.M. and B.G.L. have no relevant conflicts of interest.

References

1. 2009-27 NC Sess Laws 130A-496.
2. Epidemiology and Evaluation Unit, North Carolina Tobacco Prevention and Control Branch, North Carolina Division of Public Health. The North Carolina Smoke Free Restaurant and Bars Law and Emergency Department Admissions for Acute Myocardial Infarction: A Report to the North Carolina State Health Director. November 4, 2011. <http://tobaccopreventionandcontrol.ncdhhs.gov/smokefreenc/docs/TPCB-2011SFNCRpt-SHD.pdf>. Accessed May 14, 2012.
3. Southeast and Southwest: top 10 fast food markets. QSR Magazine, April 11, 2007. <http://www.qsrmagazine.com/news/southeast>

-southwest-top-10-fast-food-markets. Accessed May 14, 2012.

4. North Carolina State Center for Health Statistics. Behavioral Risk Factor Surveillance Survey. <http://www.schs.state.nc.us/schs/brfss/2010/west/rf2.html>. Accessed July 18, 2012.
5. North Carolina State Center for Health Statistics. Behavioral Risk Factor Surveillance Survey. <http://www.schs.state.nc.us/schs/brfss>

/2009/west/_FV5SRV.html. Accessed July 18, 2012.

6. Levi J, Segal LM, St. Laurent R, Kohn D. F as in Fat: How Obesity Threatens America's Future 2011. Trust for America's Health and the Robert Wood Johnson Foundation; July 2011. <http://healthyamericans.org/reports/obesity2011/Obesity2011Report.pdf>. Accessed May 13, 2012.



David Alan Harvey / Magnum Photos



1 in 8 Americans is struggling with hunger. Including people like your office secretary on her way to work, the cashier at the grocery store, or your old friend from high school. Who's the 1 in 8 in your life that needs help? Go to feedingamerica.org to see how your support can help those in need.



Local Food Systems for a Healthy Population

Nancy G. Creamer, Rebecca D. Dunning

Working together across disciplines and organizational boundaries, North Carolina is leading national efforts to foster environments that increase access to healthy foods and raise awareness about the complexity and benefits of local food systems.

We are all familiar with the rise in rates of diet-related diseases including diabetes, heart disease, and hypertension, as well as with the connection between these diseases and obesity. A 2012 study estimates that the state of North Carolina spends \$4.6 billion annually on medical care arising from obesity-related illnesses [1]. The trend toward obesity is associated with an increasingly sedentary lifestyle combined with greater consumption of energy-rich but nutrient-poor processed foods, which have taken over a larger share of the diet from vegetables, fruits, and whole grains [2]. Public health researchers have acknowledged the influence of the food environment on health by measuring consumer access (based on distance to supermarkets and other sources of fresh fruits and vegetables) but only recently has attention turned to creating built environments that give individuals opportunities to engage more directly with all aspects of their food systems.

In this commentary we focus on efforts to create more opportunities for engagement with local food systems—from stewardship of the natural resources needed to produce healthy foods to distribution and consumption. Individuals and organizations with a variety of food-related concerns, such as improving health outcomes, enhancing food access for low-income consumers, involving youth in food systems, preserving farmland, supporting local farmers, and revitalizing rural economies, are collaborating to foster built environments that increase access to local foods and enhance individual and community health.

Local Food Systems: Connecting People to Food

Research indicates that when individuals play a more direct role in the food system—either by producing food, or by making decisions based on an awareness of where and how food has been grown—their consumption of fruits and vegetables increases. Participation in a community garden, for example, is associated with greater intake of fruits and vegetables. A population-based survey of 436 residents in Denver, Colorado, carried out in 2006 and 2007 found that

56% of those surveyed who participated in community gardens consumed the nationally recommended amount of fruits and vegetables (5 servings per day), compared with 37% of those who were home gardeners and 25% of those who were nongardeners [3]. Another example is a 2003 cross-sectional random telephone survey of 766 adults in Flint, Michigan, which found that adults with a household member who participated in a community garden were 3.5 times more likely to consume fruits and vegetables at least 5 times per day [4]. There are other benefits to community gardens as well. For example, the presence of community gardens is linked to increases in neighborhood property values and rates of home ownership [5], and gardens serve as a center for social activity and civic engagement [6].

School gardens play the same role in children's lives that community gardens play in the lives of adults, serving as centers of social activity and places to reconnect with food and nature. Working in school gardens provides students with feelings of self-efficacy and enthusiasm for nature and growing food. The gardens also help reshape school culture, create a feeling of community, enhance science achievement, increase the intake of healthy foods, and engender parental support, enthusiasm, and involvement [7, 8]. In one study [9], sixth graders at 3 different elementary schools made up 2 treatment groups and a control group. Both treatment groups received 12 weeks of nutrition education, and one of the treatment groups also participated in gardening activities. Only those in the group that gardened had a statistically significant increase in their daily intake of fruits and vegetables, from 1.9 to 4.5 servings. Students in the gardening group also significantly increased their intake of vitamin A, vitamin C, and fiber, and enjoyed the benefits of outdoor physical activity.

Another way of engaging people more directly with food is to create options for buying food through channels that directly link food consumers with food producers. Farmer's markets have become the public face of the local food movement, with the number of farmer's markets in the United

Electronically published August 10, 2012.

Address correspondence to Dr. Nancy G. Creamer, Campus Box 7609, North Carolina State University, Raleigh, NC 27695 (nancy_creamer@ncsu.edu).

NC Med J. 2012;73(4):310-314. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 029-2559/2012/73413

States growing by 150% over the past decade and 17% just between 2010 and 2011. There are now more than 7,000 farmer's markets nationwide and more than 200 in North Carolina [10]. Access to farmer's markets has been linked to greater consumption of fruits and vegetables. A longitudinal study in Charlotte, North Carolina, found that after several community environmental change strategies were implemented in an African American community, including the establishment of a community farmer's market, the proportion of residents who met goals for daily fruit and vegetable consumption increased significantly [11]. State and local governments and private foundations can support farmer's markets by providing opportunities and funding that support attractive locations along well-traveled routes, adequate parking facilities, shaded sales venues, plumbed water, and market managers who can persuade farmers and consumers to frequent the market and make it a self-sustaining part of the community. Farmer's markets can also increase farm profitability and therefore farm viability, as producers are able to garner retail rather than wholesale prices for their products.

Consumer Supported Agriculture programs (CSAs) provide another opportunity for individuals to engage more directly in their local food systems. CSAs link consumers to farmers, who box seasonal items for pickup or delivery. Consumers pay at the beginning of the season for the weekly harvest. This payment system provides cash flow for farmers to purchase seed and other supplies, and it allows consumers to share risk with the farmer in case of weather disaster. CSAs promote transparency for consumers and market assurance for producers. In addition, recent research suggests that those who have CSA memberships have healthier diets than those who do not [12].

Farmer's markets and CSAs also indirectly affect community health and economic sustainability by generating income for area businesses and fostering a culture of entrepreneurship. Numerous studies indicate that food that is produced and consumed locally creates more economic activity in an area than does comparable food produced and imported from a nonlocal source. Research sponsored by Sustainable Seattle found that dollars spent at restaurants using local food and grocers stocking local food resulted in more than twice the usual impact on the local economy. The study found that for every \$100 spent at an average grocery store, \$25 is respent locally, and for every \$100 spent at a farmer's market, \$62 is respent locally [13]. Shoppers at farmer's markets are also highly likely to spend at nearby businesses. An Oregon study of farmer's markets found that between one-third and two-thirds of those shopping at a farmer's market did additional shopping at neighboring businesses on the same trip. For every dollar they spent inside the farmer's market, these shoppers spent another \$0.60 outside it [14]. Farmer's markets and CSAs foster entrepreneurship by serving as business incubators for new growers and by helping existing growers expand and diversify their

operations [15, 16]. Farmer's markets also serve as key catalysts in building local and regional food systems, because they make local food visible in public spaces on a regular basis [17].

Recent studies have made empirical links at the population level between the availability of locally produced food, measured by direct farm-to-consumer sales data, and health outcomes. This research has found significant inverse relationships between county-level direct food sales and rates of mortality, diabetes, and obesity [18]. One study estimated that for each \$100-dollar increase in per capita direct farm sales, the county-level obesity rate declines by 0.90%-1.0% [19]. Moreover, local food often tastes better, because produce is picked when ripe and because plant varieties have been selected for taste rather than extended shelf-life and other attributes that favor long-distance shipping. Better taste encourages higher consumption.

Land use and business planning can constrain or encourage the successful development of local food systems. Zoning and other land use regulations have an impact on the viability of public markets and urban food production, including community gardens. Business licensing and fees affect the potential profitability of local food entrepreneurs. Property tax policies are also critical. For example, North Carolina's present-use value rules [20] directs county governments to assess agricultural land for property tax purposes as farmland rather than as land for potential development. Currently the statute applies to farms growing fruits and vegetables only if they are more than 5 acres in size, thereby exposing smaller farms near urban areas to tax rates that often make it infeasible for owners to continue farming. County governments can also encourage food system growth through purchasing policies. Cabarrus County, for example, requires that at least 10% of all food served at county-catered events be food that was produced within North Carolina.

Collaborations for Healthy Communities

The Centers for Disease Control and Prevention identifies food system support as a strategy for increasing consumption of fruits and vegetables and promoting healthier eating [21]. In North Carolina, diverse organizations have been working together to improve individual and community health through the development of local food systems. In 2008, the Center for Environmental Farming Systems (CEFS), a partnership between North Carolina State University, North Carolina A&T State University, and the North Carolina Department of Agriculture and Consumer Services, launched a statewide initiative, Building a Local Food Economy in North Carolina, From Farm to Fork. The initiative engaged hundreds of partners across the state, including local and state government officials, health professionals, farmers and farmer organizations, food entrepreneurs, business leaders, and many others. The Farm to Fork initiative led to a set of "game changer" strategies, described

Appalachian Sustainable Agriculture Project: Growing Minds and Healthy Communities

Maggie Cramer

Appalachian Sustainable Agriculture Project (ASAP) has been working for a decade to fulfill its mission of helping local farms thrive, linking farmers to markets and supporters, and building healthy communities through connections to local food. Central to that work is its Local Food Campaign, which creates demand and promotes local food and farms through mechanisms such as its local food guide and annual farm tour. Another large part of that work revolves around the Growing Minds farm-to-school program, which builds the next generation of local food supporters and healthy citizens (more information available at <http://growing-minds.org>).

Farm-to-school is a place-based strategy to benefit children's health and education that also provides market opportunities for local farms and health benefits for communities. Because of its positive impacts, the number of programs across the country has increased dramatically. In 2001, there were 6 pilot farm-to-school programs in the United States. Today, there are programs in all 50 states, and more than 9,000 schools participate.

ASAP's farm-to-school program has 4 components: school gardens, local food cooking classes and demonstrations, farm field trips, and local food in school cafeterias. These components are based on the premise that students will make healthy eating choices such as choosing fruits and vegetables, if they have positive experiences with and positive relationships to the source of their food. Although the program has traditionally been associated

with kindergarten through fifth grade, preschools are now embracing farm-to-school programming and are working to create healthy food environments for the youngest of our children.

Historically, it has been difficult to excite children about eating healthy food. Rather than promoting the healthy aspects of fruits and vegetables, ASAP's farm-to-school approach focuses on providing tangible, hands-on, positive experiences with real, fresh food. Children will eat vegetables, but multiple introductions and associations need to be offered, as well as good modeling and easy access. That's where gardens, cooking classes, field trips and local food in cafeterias come in.

If children grow vegetables in a garden, or meet the farmer who grew them, and cook the vegetables themselves, they are more likely to eat them—at school and at home. Local fruits and vegetables taste great and also have a story with which children can connect. When food comes with a relationship, the likelihood is increased that a child will not only eat it, but also enjoy it.

Recently, ASAP expanded its farm-to-school program to include training for university students studying to become teachers and dietitians. This university training program began as a pilot, called the Farm to School Education Project, in Jackson County, North Carolina, with funding from the Blue Cross and Blue Shield of North Carolina Foundation. The concept of working "upstream," integrating farm-to-school programming into college courses of

in the 2009 summary publication *From Farm to Fork: A Guide to Building North Carolina's Sustainable Local Food Economy* [22]. Now, 4 years later, nearly all of the "game changer" plans have been accomplished by CEFS and others, or are under way. CEFS and its partners worked to pass legislation establishing a North Carolina Sustainable Local Food Advisory Council, which provides a forum for policy work and collaborations that enhance the built environment of local food systems. With support from the Golden Leaf Foundation, CEFS in partnership with the North Carolina Cooperative Extension Service launched the statewide 10% Campaign to encourage North Carolina citizens and food businesses to commit 10% of their food budget to North Carolina-grown products. Because North Carolinians spend about \$35 billion a year on food, this would make about \$3.5 billion available in the local economy [23].

CEFS also partnered with the Cooperative Extension Service 4-H Program to bring FoodCorps to North Carolina. North Carolina is one of 10 selected inaugural states for the FoodCorps service program, which places young people 18 years of age or older in school garden settings to foster nutrition education, garden engagement, and links between

local farms and school cafeterias. According to Tes Thraves of CEFS (July 2012), North Carolina currently has 6 service members, and since August of 2011 they have built or revitalized 73 school and community gardens, serving over 6,000 students.

Blue Cross and Blue Shield of North Carolina (BCBSNC) and the North Carolina Recreation and Park Association have joined forces to support the establishment of community gardens in all 100 North Carolina counties by the end of 2013. The BCBSNC Foundation is also supporting healthy food in schools by helping to fund FoodCorps and by providing grant support for the North Carolina Department of Agriculture and Consumer Services' Farm to School Program.

Diverse partnerships create innovative, community-based solutions. A range of community partners in Goldsboro, North Carolina, collaborated to create Produce Ped'lers, a bicycle delivery program to deliver fresh produce from the city farmer's market to areas of the community that have limited access to fresh, local produce. Community partners, including Dillard Academy Charter School, the Wayne County Health Department, the Wayne Food Initiative, the City of Goldsboro, Plum Tree Marketplace and CEFS, teamed

study in education and health science, is being put into practice for the first time. Professors, teachers, faculty, and students of Western Carolina University, as well as community members in the university's town of Cullowhee, embraced this new idea and shared ASAP's goal that education and nutrition students be able to incorporate farm-to-school methods from day 1 of their careers.

With continued funding from W.K. Kellogg Foundation, ASAP has established farm-to-school learning labs, sites where WCU students can observe and participate in the farm-to-school approach, close by the university in Jackson County Public Schools and Head Start centers. The consistent presence of that multicomponent approach—which connects classroom and cafeteria activities to create positive food environments and engages educators, parents, and community members—is making an impact.

ASAP program coordinator Anna Littman recently shared a spinach success story. While making fresh fruit and spinach smoothies with children in kindergarten through fifth grade classrooms, one Western Carolina University student admitted that she was hesitant to bite into the fresh, raw spinach the way elementary students had done at the outset of the class. However, she modeled the healthy eating choice and ended up loving the spinach. As this story illustrates, the farm-to-school program creates a healthy food environment not only in the school itself but also in the community at large. Once positively affected, those involved take the experience beyond the school's walls.

Another component of ASAP's work deals with access to food away from the school cafeteria. To improve access to fresh, healthy, affordable food that is grown locally, ASAP has implemented an electronic payments system at Asheville City Market, a farmers' tailgate market run by ASAP in downtown Asheville. The system allows shop-

pers to pay by swiping debit or credit cards or cards issued through the Supplemental Nutrition Assistance Program, commonly referred to as food stamp cards. Since the program began, Asheville City Market has led the state in food stamp payments at farmers markets, and ASAP has partnered with more than 50 community organizations that work with low-income residents to spread the word about the availability of this payment method. ASAP also hosts a Kids' Corner Market at Asheville City Market, providing fun children's activities relating to local food and the farmers' market.

Whether at school or home, parents want healthy food for their children and for themselves. ASAP believes that people respond to positive messaging and positive associations with healthy food and with the local food community, and much of its work is built around this belief. ASAP is changing the way Western North Carolinians interact with the food environment in hopes of achieving their vision of strong farms, thriving local food economies, and healthy communities where farming is valued as central to our heritage and our future (more information is available at <http://www.asapconnections.org>). NCMJ

Maggie Cramer, MEd communications manager, Appalachian Sustainable Agriculture Project, Asheville, North Carolina.

Acknowledgment

Potential conflicts of interest. M.C. has no relevant conflicts of interest.

Electronically published August 10, 2012.

Address correspondence to Ms. Maggie Cramer, Appalachian Sustainable Agriculture Project, 306 W. Haywood St, Asheville, NC 28801 (maggie@asapconnections.org).

N C Med J. 2012;73(4):312-313. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73414

up to launch this creative pilot program, which employs young people and also trains them in farmer's market management. The under secretary of the US Department of Agriculture attended the project kickoff to announce that the produce delivery program had been approved to accept Supplemental Nutrition Assistance Program benefits (formerly known as food stamps), which will greatly increase the capacity for all people to better afford locally grown produce. The project is funded by a US Department of Agriculture Farmers Market Promotion Program grant.

Collaboration among diverse partners in North Carolina has proved to be of key importance in making North Carolina a national leader in local food system development. Partnerships between agriculturists, health professionals, planners, and local leaders, among others, generate capacity to create built environments that simultaneously support local and sustainable foods, communities, and healthy populations. In addition to ongoing work to bring healthier food options into direct sale and retail markets, we advocate a strong focus on planning for and creating physical environments replete with opportunities for individuals to

directly engage with all components of their food system—from production through consumption. This strategy offers the most promise for communities to benefit from the link between their food systems and individual and community health. NCMJ

Nancy G. Creamer, PhD distinguished professor, Sustainable Agriculture and Community Based Food Systems, Center for Environmental Farming Systems, North Carolina State University, Raleigh, North Carolina.

Rebecca D. Dunning, PhD research associate, Center for Environmental Farming Systems, North Carolina State University, Raleigh, North Carolina.

Acknowledgment

Potential conflicts of interest. N.G.C. and R.D.D. have no relevant conflicts of interest.

References

1. Trogdon JG, Finkelstein EA, Feagan CW, Cohen JW. State-and-payer-specific estimates of annual medical expenditures attributable to obesity. *Obesity* (Silver Spring). 2012;20(1):214-220.
2. Diet quality and food consumption: dietary trends from food and nutrient availability data. US Department of Agriculture Economic Research Service Website. Updated September 2, 2011. <http://www.ers.usda.gov/Briefing/DietQuality/Availability.htm>. Accessed May 15, 2012.

3. Litt JS, Soobader MJ, Turbin MS, Hale JW, Buchenau M, Marshall JA. The influence of social involvement, neighborhood aesthetics, and community garden participation on fruit and vegetable consumption. *Am J Public Health*. 2011;101(8):1466-1473.
4. Alaimo K, Packnett E, Miles RA, Kruger DJ. Fruit and vegetable intake among urban community gardeners. *J Nutr Educ Behav*. 2008;40(2):94-101.
5. Voicu I, Been V. The effect of community gardens on neighboring property values. *Real Estate Economics*. 2008;36(2):241-283.
6. Saldivar-Tanaka L, Krasny ME. Culturing community development, neighborhood open space, and civic agriculture: The case of Latino community gardens in New York City. *Agriculture and Human Values*. 2004;21:399-412.
7. Robinson-O'Brien R, Story M, Heim S. Impact of garden-based youth nutrition intervention programs: a review. *J Am Diet Assoc*. 2009;109(2):273-280.
8. Blair, D. 2009. The child in the garden: an evaluative review of the benefits of school gardening. *J Environ Educ*. 2009;40:15-38.
9. McAleese JD, Rankin LL. Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents. *J Am Diet Assoc*. 2007;107(4):662-665.
10. Farmers markets and local food marketing: farmers markets. US Department of Agriculture Agricultural Marketing Service Web site. <http://www.ams.usda.gov/AMSV1.0/FARMERSMARKETS>. Accessed July 2, 2012.
11. Plescia MH, Herrick H, Chavis L. Improving health behaviors in an African American community: the Charlotte Racial and Ethnic Approaches to Community Health project. *Am J Public Health*. 2008;98(9):1678-1684.
12. Landis B, Smith TE, Lairson M, Mckay K, Nelson H, O'Briant J. Community-supported agriculture in the Research Triangle Region of North Carolina: demographics and effects of membership on household food supply and diet. *J Hunger Environ Nutr*. 2010; 5(1):70-84.
13. Sonntag V. Why Local Linkages Matter: Findings from the Local Food Economy Study. Seattle, WA: Sustainable Seattle; 2008. <http://www.sustainableseattle.org/images/Programs/LocalFoodEconomyStudyLFE%20REPORT%20FINAL-2.pdf>. Accessed May 15, 2012.
14. Lev L, Brewer L, Stephenson G. How Do Farmer's markets Affect Neighboring Businesses? Oregon Small Farms Technical Report No. 16. Corvallis, OR: Small Farms Extension Program, Oregon State University; 2003.
15. Bregendahl C, Flora CB. The Role of Collaborative Community Supported Agriculture: Lessons from Iowa. Ames, IA: Leopold Center for Sustainable Agriculture; September 2006. <http://www.soc.iastate.edu/extension/ncrcrd/CSAReport-2006-LessonsFromIowa.pdf>. Accessed May 15, 2012.
16. Hinrichs CC, Gillespie GW, Feenstra GW. Social learning and innovation at retail farmer's markets. *Rural Sociology*. 2004;69(1):31-58.
17. Gillespie GW, Hilchey DL, Hinrichs CC, Feenstra G. Farmer's markets as keystones in rebuilding local and regional food systems." In: Hinrichs CC, Lyson TA, eds. *Rebuilding the North American Food System: Strategies for Sustainability*. Lincoln, NE: University of Nebraska Press; 2007:65-84.
18. Ahern M, Brown C, Dukas S. A national study of the association between food environments and county-level health outcomes. *J Rural Health*. 2011;27(4):367-379.
19. Salois MJ. Obesity and diabetes, the built environment, and the "local" food economy in the United States, 2007. *Econ Hum Biol*. 2012;10(1):35-42.
20. North Carolina Department of Revenue. Present-Use Value Program Guide. October 18, 2011. http://www.dor.state.nc.us/publications/puv_guide.pdf. Accessed July 2, 2012.
21. Keener D, Goodman K, Lowry A, Zaro S, Kettel Khan L. Recommended Community Strategies and Measurements to Prevent Obesity in the United States: Implementation and Measurement Guide. Atlanta, GA: Department of Health and Human Services, Centers for Disease Control and Prevention; 2009. http://www.cdc.gov/obesity/downloads/community_strategies_guide.pdf. Accessed May 15, 2012.
22. Curtis J, Creamer N, Thraves TE. From Farm to Fork: A Guide to Building North Carolina's Sustainable Local Food Economy. Raleigh, NC: Center for Environmental Farming Systems; 2010. <http://www.cefs.ncsu.edu/resources/stateactionguide2010.pdf>. Accessed May 15, 2012.
23. The 10% campaign. Center for Environmental Farming Systems Web site. <http://www.cefs.ncsu.edu/whatwedo/foodsystems/10percent.html>. Accessed May 15, 2012.

WATCH FOR ME - NC

Watch for me in crosswalks.

WatchForMeNC.org

The Watch For Me campaign is federally funded.

Running the Numbers

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

North Carolina Pedestrian Crash Facts

National Highway Traffic Safety Administration data for 2009 showed that North Carolina ranked 12th among the states in pedestrian fatality rate with 1.56 pedestrian fatalities per 100,000 population [1]. Recent crash data for the state reveal that every year in North Carolina, on average, 159 pedestrians are killed and another 1,507 suffer some type of injury as a result of collisions between pedestrians and motor vehicles. In addition to fatality, there are 3 types of injury that can result from such collision (Table 1). Agencies at various levels of government are taking engineering, educational, and enforcement countermeasures to address the issue of pedestrian injury and fatality—a matter of public concern and safety. This report summarizes characteristics of the pedestrian-motor vehicle crashes that were reported statewide for the 5-year period from 2007-2011, and includes age, sex, and race/ethnicity of the people involved in the crashes, temporal and environmental factors, and type of roadway. Some of the findings that follow are undoubtedly related to exposure and the number of pedestrians, as well as to location, time of day, time of year, and pedestrian char-

acteristics. (Unless otherwise noted, data in this article are from the Division of Motor Vehicles Crash Database, North Carolina Department of Transportation. This database houses police crash reports. The data presented in this article are for all crashes classified as reportable pedestrian crashes (those that involve greater than \$1,000 in property damage and/or a personal injury), and include all road types (ie, state and local maintained roads). Collisions that occurred on either private property or in public vehicular areas (eg, parking lots) are not included.)

It is important to note that pedestrian collisions often go unreported. In a 1998 study, researchers at the Highway Safety Research Center, University of North Carolina at Chapel Hill compared cases of pedestrian injury collected at 8 hospital emergency rooms in 3 states with crashes reported in the motor vehicle files of the state in which the injury occurred. The researchers were able to match only 68% of the pedestrian-motor vehicle hospital cases with a pedestrian-motor vehicle crash record [2].

During the 5-year period we studied, roughly 68% of pedestrian collisions in North Carolina occurred in urban areas, with the remaining 32% occurring in unincorporated areas. These data are coded as having occurred within municipal boundaries (urban) or outside municipal boundaries (rural). The disparity between rural and urban crash percentages likely reflects greater exposure in urban areas, where sidewalks, transit use, compact development, and other opportunities for walking are typically greater than in rural areas of the state.

TABLE 1.
Categories of Harm Caused by Collisions Between Motor Vehicles and Pedestrians

Category	Definition
Fatality	Death occurred within 12 months of the crash.
A-type injury: disabling	Injuries were serious enough to prevent normal activity for at least 1 day, such as massive loss of blood, broken bones, or the like.
B-type injury: evident	Signs of injury were evident at the scene of the crash, such as bruises, swelling, limping, and the like.
C-type injury: possible	There were no visible injuries, but the person involved in the crash complained of pain or of momentary unconsciousness

Note. The categories of harm are those used in the Division of Motor Vehicles Crash Database, North Carolina Department of Transportation.

Electronically published August 10, 2012.

Address correspondence to Ms. Lauren Blackburn, Bicycle and Pedestrian Division, North Carolina Department of Transportation, 1552 Mail Service Center, Raleigh, NC 27699 (lblackburn2@ncdot.gov).

NC Med J. 2012;73(4):315-319. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved.
0029-2559/2012/73419

TABLE 2.
The 10 North Carolina Counties with the Highest Numbers of Pedestrian-Motor Vehicle Crashes From 2007 Through 2011

County	Total no. of crashes over 5-year period	Percentage of total no. of crashes statewide (N = 9,298)	Estimated population in 2010	Mean yearly crash rate per 10K population
Mecklenburg	1,594	17.1	923,944	3.5
Wake	870	9.4	907,314	1.9
Guilford	671	7.2	490,371	2.7
Cumberland	523	5.6	326,673	3.2
Durham	419	4.5	268,925	3.1
New Hanover	313	3.4	203,439	3.1
Buncombe	273	2.9	239,179	2.3
Forsyth	233	2.5	351,798	1.3
Gaston	207	2.2	206,384	2.0
Robeson	179	1.9	134,502	2.7
Total for all 10 counties	5,282	56.8	4,052,529	2.6

Note. Data are from the Division of Motor Vehicles Crash Database, North Carolina Department of Transportation.

The 10 counties with the highest total numbers of pedestrian-motor vehicle crashes for all 5 years are shown in Table 2, in descending order of number of crashes. These 10 counties accounted for more than half (nearly 57%) of the total number of such crashes reported in the state during that time.

The 10 cities with the highest numbers of such crashes during those 5 years, in descending order of number of crashes, were as follows: Charlotte (1,478), Raleigh (639), Greensboro (472), Fayetteville (416), Durham (396), Wilmington (236), Asheville (209), Winston-Salem (181), High Point (149), and Gastonia (122). These 10 cities together accounted for approximately 46% of the state's pedestrian-motor vehicle crashes. Charlotte accounted for the greatest proportion (16%) of statewide pedestrian-motor vehicle crashes over the 5-year interval, followed by Raleigh (6.9%), Greensboro (5%), and Fayetteville (4.5%).

Pedestrian Characteristics

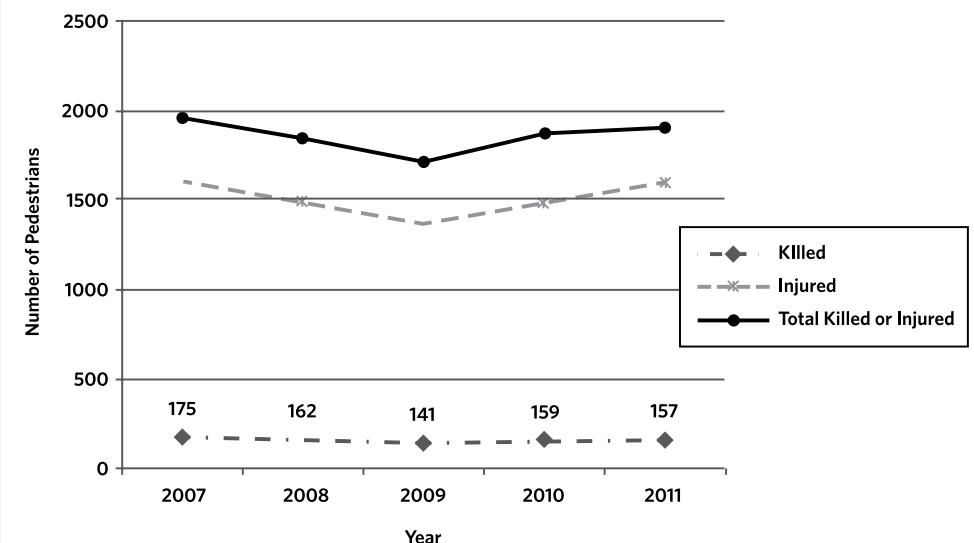
Crash involvement by pedestrian age group reflects, among other risk factors, both the size of the age group and exposure (amount of walking done by people in the age group). Older teens (aged 16-20 years) and young adults (aged 21-25 years) account for the greatest number and proportion of pedestrian crashes. During the 5-year interval studied, the 2 groups combined accounted

for more than 25% of crashes. Approximately 65% of the pedestrians involved in crashes were males.

Pedestrian crashes in North Carolina during this period were most likely to involve pedestrians whose race was reported to be white (48%). However, 41% of the pedestrians involved were reported to be African American. Considering that blacks or African Americans comprised approximately 21% of persons living in the state during this general period [3], they were clearly over-represented in pedestrian crashes based on population. These proportions may, however, reflect greater amounts of walking by African Americans, as well as other exposure factors. Those identified on crash report forms as Hispanic or as persons of Asian descent have accounted for approximately 7% and approximately 1%, respectively, of pedestrians involved in crashes each year. Native American pedestrians were involved in 1.4% of the total number of crashes over the 5 years.

Pedestrian crashes tend to be especially serious. During this 5-year interval, more than 9% of pedestrians struck by a motor vehicle in North Carolina were killed, whereas the fatality rate for all crash-involved people (mostly drivers and passengers) was only 0.3% over the same time period. (This latter statistic includes all crashes, regardless of pedestrian involvement.) An additional 9% of pedestrians suffered disabling (A-type)

FIGURE 1.
Number of Pedestrians Killed and Injured in North Carolina From 2007-2011 as a Result of Reported Collisions With Motor Vehicles



Note. Data are from the Division of Motor Vehicles Crash Database, North Carolina Department of Transportation. The numbers of pedestrians listed here as killed or injured include only the first pedestrian mentioned in a crash report. A few crashes each year involve multiple pedestrians, and some of those result in more than 1 pedestrian being injured or killed.

injuries over the 5 years. In approximately 16% of the pedestrian-motor vehicle crashes during this 5-year period, the investigating officer indicated that the pedestrian was using alcohol.

Driver Characteristics

Younger drivers aged up to 24 years accounted for approximately 23% of collisions with pedestrians over this time period. Those aged 20-24 accounted for approximately 14% of such collisions. Male drivers accounted for 57% of the pedestrian-motor vehicle crashes over the 5 years, and female drivers for approximately 43%.

According to police crash reports, approximately 58% of the crashes with pedestrians involved white drivers, 34% involved black drivers, and approximately 4% involved Hispanic drivers; Asians and Native Americans each accounted for approximately 1% of the crashes. Only 3% of drivers involved in collisions with pedestrians over this time period were reported to have been killed or to have received a disabling or evident (A-type or B-type) injury. Another 5% of drivers were listed as possibly injured (C-Type). Only 0.4% of drivers in crashes involving pedestrians were reported to

have experienced fatal or serious (A-type) injuries. Crashes in which driver injury occurred may have also involved other vehicles or objects. The investigating officer detected or suspected alcohol use by the drivers involved in pedestrian crashes in approximately 4% of all crashes over the 5 years.

Temporal and Environmental Factors

For this 5-year period, the months with the highest average numbers of crashes were October, November, and December. Pedestrian crashes in North Carolina were most likely to occur on a Friday, with the second and third highest numbers of crashes occurring on Saturdays and Thursdays, respectively. The ranking of Friday and Saturday as the highest crash days is due to the numerous crashes that occur between 8 P.M. and midnight, likely reflecting higher pedestrian exposure levels at those times, as well as alcohol as a contributing factor. These results were fairly consistent from year to year.

Pedestrian crashes were most likely to occur in the afternoon (from 3-6 P.M.) or early evening (from 6-9 P.M.). More than 37% of pedestrian collisions occurred during those 6 hours. Although 51% of col-

lisions occurred during daylight hours, few occurred at dawn (1%) or at dusk (3%). More than 45% of pedestrian crashes over the 5-year interval occurred during dark conditions, either on a lighted or an unlighted roadway. Because the exposure levels of pedestrians have historically been shown to be dramatically lower after dark than during daylight hours (fewer pedestrians walk at night), the high percentage of crashes occurring during dark conditions may reveal a need for pedestrians walking at night to take increased safety precautions. The vast majority (92%) of pedestrian crashes occurred when the weather was clear (79%) or cloudy, but not raining (14%), no doubt reflecting exposure.

Roadway Characteristics

More than half (59%) of all pedestrian-motor vehicle crashes occurred on local (mostly city) streets, reflecting higher levels of walking and greater numbers of pedestrians in cities and neighborhoods. Approximately 17% occurred along state secondary roads. Approximately 9% of pedestrian crashes occurred on North Carolina routes, approximately 10% on US routes, and approximately 3% on interstate routes. Crashes occurring in parking lots, public driveways, or other public vehicular areas are not included in these statistics, but historically, these represent roughly 25% of total pedestrian-related crashes.

The majority (56%) of reported on-roadway pedestrian crashes occurred on 2-lane roads; this finding was fairly consistent from year to year. Approximately 32% occurred on multilane roadways with 4 or more travel lanes. Three-lane roadways accounted for another 6% of crashes, and 1-lane roads accounted for 2%.

More than half (57%) of pedestrian crashes took place on roads indicated to have speed limits of ≤ 35 mph, likely reflecting speeds on urban streets, where more walking takes place. Roadways with a speed limit of 40-45 mph account for nearly a quarter (22%) of pedestrian collisions, and those with a speed limit >45 mph account for another 17%. For 3% of the reported crashes, the speed limit on the roadway on which the crash occurred was unknown or had been incorrectly coded.

Improving Pedestrian Safety

Pedestrian safety can be improved through the use of engineering countermeasures and street

redesign, as well as through safety-related programs. The literature shows a number of engineering risk factors that influence pedestrian crashes. For example, pedestrian crash risk increases with higher motor vehicle speeds and volumes and increased width of roadways. Pedestrians have more difficulty safely crossing intersections with multiple turn lanes, wide turning radii, wide crossing distances, or traffic signals that are perceived to be complex or confusing. Drug or alcohol use by motorists and pedestrians, lack of suitable nighttime road lighting, and lack of sidewalks also contribute to pedestrian crashes and severity [4].

In addition, roadways without crossings provisions provided at regular intervals can contribute to pedestrian crashes, as pedestrians may cross these roadways at unsafe locations, particularly those pedestrians who are unable or unwilling to walk a long distance to reach a signalized intersection. Land use decisions can also have an impact upon pedestrian safety. For example, when residential areas are separated from shopping areas by high-volume, high-speed multi-lane roads, some pedestrians may choose to cross streets in unsafe locations.

Some of the most frequent pedestrian crash types occurring in the state from 2005-2009 encompassed a mix of typical roadway crashes such as pedestrian crossing midblock where there is no marked crosswalk and pedestrian dash into the roadway when driver's view of pedestrian is not obstructed, walking along and in the roadway crashes, and motorists striking pedestrians while making left turns. These crash types are provided in the Pedestrian and Bicycle Crash Analysis Tool, which is a crash typing software product intended to assist engineers, planners, and others, with improving walking and biking safety through crash analysis. Knowing the behaviors that may contribute to or lead up to a crash is helpful in identifying interventions. In addition to engineering treatments, educational programs can play an important role in the process of improving pedestrian safety. Such programs allow all road users to improve their abilities to respond to the roadway environment, and thus improve safety. Pedestrian safety programs may employ the assistance of enforcement officers to encourage all road users to obey traffic laws and share the road safely and to deter unsafe driver and pedestrian behavior.

An example of an educational program to improve pedestrian safety is currently underway at the North Carolina Department of Transportation. The department is working with agency partners to launch a pedestrian safety campaign in the Triangle region called Watch For Me NC (more information available at <http://www.watchformenc.org>). The campaign will run from August through October of 2012. It focuses upon improving pedestrian safety by influencing the behaviors of pedestrians and drivers through education and enforcement activities. The campaign will educate drivers about crosswalk laws, which require drivers to yield the right of way to pedestrians crossing in the crosswalk at all marked midblock crosswalks, unmarked crosswalks, and signalized intersections when the light is in the pedestrian's favor. The campaign also educates pedestrians to use the facilities that are provided to them, including sidewalks and crosswalks, and seeks to educate pedestrians and drivers on how to walk and drive safely in various contexts including in parking lots, near bus stops, and in nighttime conditions. **NCMJ**

Lauren Blackburn, AICP director, Bicycle and Pedestrian Division, North Carolina Department of Transportation, Raleigh, North Carolina.

Helen Chaney transportation planner, Bicycle and Pedestrian

Division, North Carolina Department of Transportation, Raleigh, North Carolina.

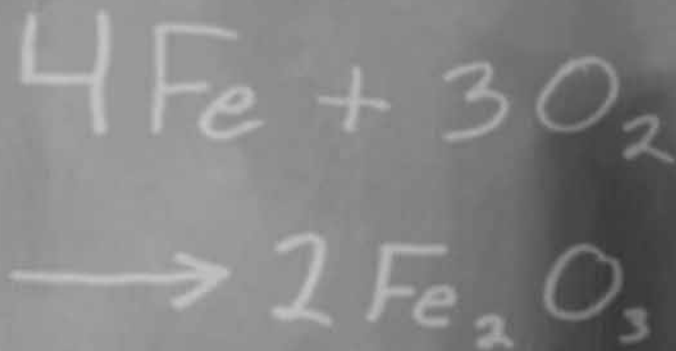
Cliff Braam, PE traffic safety specialist, Traffic Safety Unit, North Carolina Department of Transportation, Raleigh, North Carolina; Highway Safety Research Center, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Acknowledgment

Potential conflicts of interest. All authors have no relevant conflicts of interest.

References

1. National Highway Traffic Safety Administration. Traffic Safety Facts 2009: A Compilation of Motor Vehicle Crash Data from the Fatality Analysis Reporting System and the General Estimates System. Washington, DC: National Highway Traffic Safety Administration; 2011:164. Publication no. 811402. <http://www-nrd.nhtsa.dot.gov/Pubs/811402.pdf>. Accessed May 24, 2012.
2. Stutts JC, Hunter WW. Police-reporting of pedestrians and bicyclists treated in hospital emergency rooms. *Transportation Research Record*. 1998;1(1635):88-92. http://katana.hsrrc.unc.edu/cms/downloads/PoliceReporting_PedBikeHospital1998.pdf. Accessed May 24, 2012.
3. State and County Quick Facts. US Census Bureau Web site. <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>. Accessed July 24, 2012.
4. Campbell B, Zegeer CV, Huang H, Cynecki M; Federal Highway Administration. A review of pedestrian safety research in the US and abroad. http://www.walkinginfo.org/pdf/PedSynth/Ped_Synthesis_Report.pdf. Published January 2004. Accessed July 24, 2012.



Is
**chemical
safety**
part of the
equation?

Learn how your organization can work with schools to protect kids from chemical accidents.

Visit the Schools Chemical Cleanout Campaign at www.epa.gov/SC3.



Philanthropy Profile

Building Healthier Communities to Support Healthier Individuals

At the Blue Cross and Blue Shield of North Carolina (BCBSNC) Foundation, our mission is to improve the health and well-being of North Carolinians. Recognizing that we cannot have healthy people if they do not live in healthy places, BCBSNC Foundation's Healthy Active Communities seeks to create a North Carolina where everyone, everywhere, has access to healthy, local food and safe places to play and be active. To achieve this vision, our investments reach beyond the bounds of health and health care, just as our partners in the Healthy Environments Collaborative (a coalition of the following state agencies: Health and Human Services, Transportation, Commerce, and Environment and Natural Resources discussed in the issue brief by Petersen) have stepped out of their respective departments to focus on issues that aim to achieve healthy outcomes for all.

A new way of looking at health is to look at the external factors that can determine health for a community, not just for the individual. While there is a role for interventions and education focused on individual behavior change, the lack of basic infrastructure in many communities may make it almost impossible for individuals to act in accordance with recommendations and guidelines for optimal health.

Lack of access to the basic infrastructure of a healthy community—parks, playgrounds, stores selling healthy food, clean air, good schools, community services, safe streets, and pedestrian accessibility—is more than an inconvenience; it can have severe negative health implications at the population level, as noted by Science Daily, and cited in Bell and Lee: [1]

A recent analysis of the medical records of more than a half-million Americans found that, regardless of what they eat, how active they are, and other personal factors, residents of poor neighborhoods generally die earlier than people living in wealthier communities.

Thus, looking at individual health in the context of communities and “changing the structural and cultural components of a place can help more than one person or one family. It can also improve the life trajectory for a generation” [1].

As the BCBSNC Foundation seeks to invest in projects working to change North Carolina at both the state and the community level, we are joining with nontraditional partners that seek to attain cross-sectional outcomes of improving individual health, community health, and community vitality. At the same time, we are finding new ways to define the terms health and healthy. The following projects are examples of what can be put in place to improve community health with investments in nontraditional partners at the organizational, community, and state levels.

Within organizations, specifically those offering child care, BCBSNC Foundation has been investing in Preventing Obesity by Design (POD), a program of the Natural Learning Initiative from North Carolina State University's College of Design [2]. POD redesigns the outdoor learning environments in early childhood settings to increase physical activity and active play, and to connect children to nature and edible landscapes. This effort brings together landscape designers, child care center directors and teachers, Smart Start leaders, parents, and local health leaders to impact children's earliest environments for movement and healthy food. Results from POD across North Carolina have shown an increase in active play while outdoors, an increase in time that teachers take children outdoors, a decrease in behavioral issues,

Electronically published August 10, 2012.

Address correspondence to Ms. Kathy Higgins, Blue Cross and Blue Shield of North Carolina Foundation, PO Box 2291, Durham, NC 27702 (kathy.higgins@bcbsnc.com).

N C Med J. 2012;73(4):321-322. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved.
0029-2559/2012/73420

and an increase in the consumption of healthy food. This project demonstrates that, on the micro level, planning, design, and access can improve healthy behaviors for these critical developmental years and can help establish a lifetime of healthy behaviors.

At the local level, BCBSNC Foundation made its initial investments to change physical activity in rural communities through the Fit Together initiative, a partnership with Active Living By Design (ALBD). This program used ALBD's 5P Community Action Model to address planning, partnerships, promotion, programs, and policy in 5 rural North Carolina counties (Camden, Chatham, Jackson, Pitt, and Stokes) [3]. An example is the Fit Together project in Camden County, which was led by the county planning department in 2006. Over the course of 3 years, the project led to the development of a community park, started a county parks and recreation department, led to the development of joint use agreements to maximize the use of recreational facilities, and developed a checklist with Smart Growth indicators, which are measurements used to determine impacts of specific actions on land use goals and can include categories such as population, environment, economy, land preservation, infrastructure, transportation, and housing. These indicators will be included in the county's residential development application to encourage walkability and open spaces in new neighborhoods. These community changes resulted in increased physical activity for Camden County residents during the project, and have also created ongoing opportunities for healthy living in the county far beyond the scope of the grant.

However, increasing access to places for physical activity is only half of the equation; places to access healthy, local food are just as critical to community health. To increase access to healthy local food, it is necessary to address the systems that produce, distribute, and serve or sell that food. In July 2011, BCBSNC Foundation issued a Healthy Food System RFP with a focus on developing or enhancing local sustainable food systems that benefit growers, consumers, and the range of intermediaries. Four grantees (Appalachian Sustainable Agriculture Project, Southeastern North Carolina Food Systems Project, UNC Center for Health Promotion and Disease Prevention, and Warren County Cooperative Extension) have initiated work that will result in

increased food production, better alignment of transportation and distribution, increased institutional procurement, increased consumer demand, increased access and, ultimately, increased consumption of healthy local food.

At the state level, BCBSNC Foundation recently supported the North Carolina Department of Transportation as it embarked, in partnership with BCBSNC Foundation and the Healthy Environments Collaborative, on developing a statewide comprehensive bicycle and pedestrian plan, including an integrated health impact assessment. This project will result in a tangible product to guide the design of our communities at the state and local levels for the next decade, with considerations for alternative modes of transportation, economic development, environmental stewardship, and health. North Carolina is leading the nation through this innovative partnership, which is the result of open, forward thinking by diverse leadership across many sectors.

BCBSNC Foundation has had the opportunity to be nimble in its grant-making over the course of time, making new, innovative investments that change as the art and science of improving community health changes. BCBSNC Foundation will continue to seek out new ways to forge partnerships and support initiatives that result in tangible changes to communities and community health. It is exciting to work in our state, where collaborations such as the Healthy Environments Collaborative cannot only exist and function, but can truly bring decision makers together, ultimately achieving the collective goal of a healthier North Carolina. NCMJ

Kathy Higgins, MS president, Blue Cross and Blue Shield of North Carolina Foundation, Chapel Hill, North Carolina.

Jennifer MacDougall, MS senior program officer, Blue Cross and Blue Shield of North Carolina Foundation, Chapel Hill, North Carolina.

Acknowledgment

Potential conflicts of interest. K.H. and J.M. have no relevant conflicts of interest.

References

1. Bell J, Lee MM. Why Place and Race Matter. Executive Summary. Oakland, CA: PolicyLink; 2011.
2. Natural Learning Initiative. Preventing Obesity by Design (POD). NC State University Web site. <http://www.naturallearning.org/content/preventing-obesity-design-pod>. Accessed May 25, 2012.
3. Active Living By Design. Communities on the Move: Improving Active Life in Rural North Carolina. Chapel Hill, NC: Blue Cross and Blue Shield of North Carolina Foundation. <http://www.activelivingbydesign.org/sites/default/files/FitTogetherReport.WEB.pdf>. Accessed May 25, 2012.

**TAKING YOUR KIDS TO THE
PLAYGROUND IS EVEN MORE SATISFYING
WHEN YOU HELPED BUILD IT.**



PLAYGROUNDS DON'T BUILD THEMSELVES.

By speaking out, you can help your community be built in a way that encourages physical activity.

Call your representative. Write a letter to the editor. Start an online petition. You can improve the health and wellness of your children and everyone in your neighborhood.

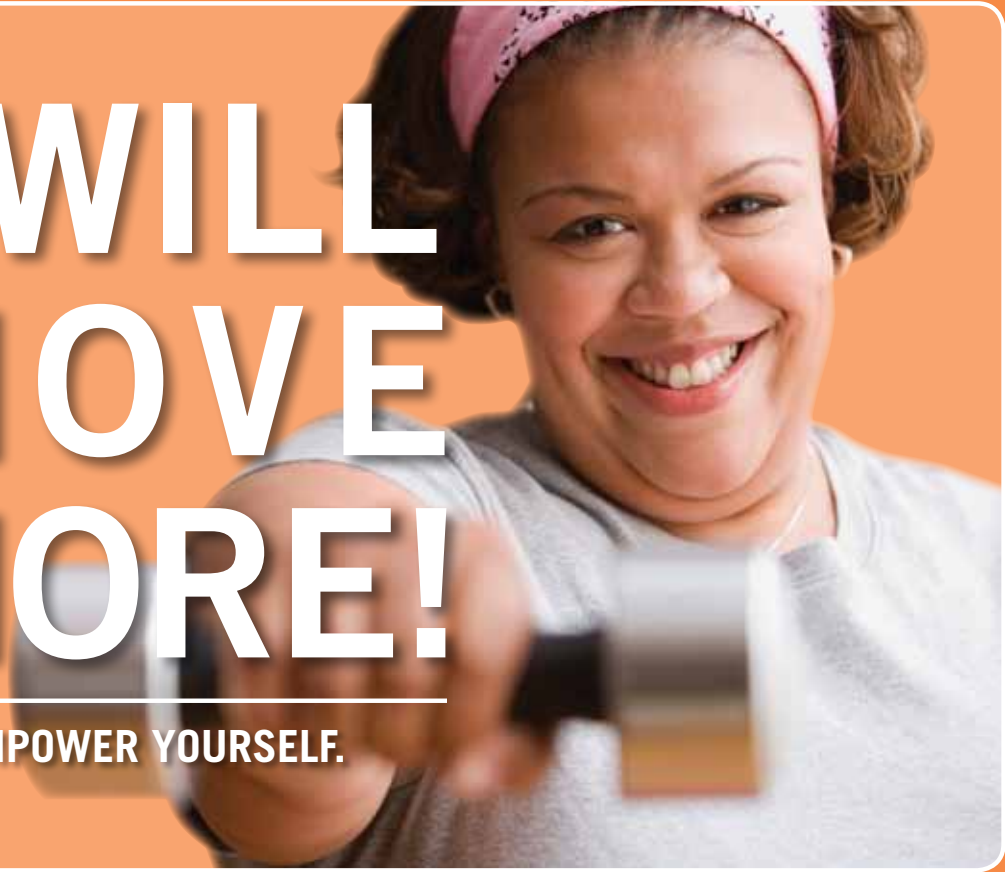
To learn how others who care about parks and green spaces are getting involved,

visit ShapeYourWorldNC.com.

**SHAPE
YOUR WORLD™**
CREATING HEALTHIER BUILT ENVIRONMENTS FOR A BETTER NC

I WILL MOVE MORE!

EMPOWER YOURSELF.



Don't sweat it – you can do it!

Break a sweat and get your heart pumping by walking, jogging or even playing with the kids at least 30 minutes a day. Can't squeeze in 30 minutes?

Break it up into 10 minute intervals, 3 times a day to fit your schedule better. Then twice a week, add muscle strengthening activities like weight lifting or push-ups – different activities bring different benefits.

Remember: 30 minutes a day is all it takes. So start today!

For more ways to get and stay active, visit:

www.MyEatSmartMoveMore.com



RIGHT SIZE
YOUR
PORTIONS

MOVE
MORE

WATCH
LESS TV

EAT MORE
FRUITS
& VEGGIES

PREPARE
MORE MEALS
AT HOME

DRINK MORE
WATER

Tar Heel Footprints in Health Care

*A periodic feature that recognizes individuals whose efforts—
often unsung—enhance the health of North Carolinians*

Jo Morgan



Jo Morgan understands the importance of living in a community environment that enables and promotes, rather than hinders healthy lifestyle choices. As the health education director at the Pitt County Health Department, where she has worked the last 30 years, Morgan strives to make the healthy choice the easy choice for Pitt County Residents.

In 2010, Pitt County was one of two communities in North Carolina to receive Communities Putting Prevention to Work (CPPW) grant funds to focus their public health efforts on tackling obesity and tobacco use by enhancing the built environment and developing policies to make healthy living easier. The health department engaged numerous partners to tackle the complex work. Morgan says, "Pitt has a rich tradition of collaboration, it's become an expectation that they have of each other."

In addition to traditional health partners such as East Carolina University's Brody School of Medicine and Vidant Medical Center, Morgan enrolled non-traditional partners including local planners, representatives from chambers of commerce, cooperative extension agents, and law enforcement members. She facilitated new collaborative partnerships and educated partners and local decision makers on both the interconnections and health impact of their work. Though partners may have differing goals, Morgan often sees the intersection and brings community members together around common strategies.

Colleagues speak highly of Morgan's behind the scenes work on the grant and with the partners. James Rhodes, the Pitt County Planning and Development director says of Morgan, "She is passionate about her local community and excellent at using the available resources and experts to get the work done. CPPW is a great example of the long working relationships she has developed throughout her career." When possible, Morgan and other Pitt County Health Department staff look for opportunities to contract with other local

departments, utilize community experts, and expand existing efforts. John Morrow, MD, MPH, the Pitt County health director, says, "After a long career as a health educator, Jo has a very clear understanding of the role of the local health department as a catalyst to help create improvements in health status while building collaborative relationships among varied partners in a community. With CPPW, she has orchestrated the collaboration of many partners throughout Pitt County and has built lasting relationships between all of them that will continue to pay benefits to our public for years to come. In my opinion, Jo Morgan is the consummate health educator."

Through these collaborations, Pitt County has established a new community garden and farmer's markets, increased physical activity in after-school programs, and made healthy food more accessible in convenience stores. Cathy Thomas, MAEd, CHES, head of the Physical Activity and Nutrition Branch, Division of Public Health, North Carolina Department of Health and Human Services, praises Morgan's work saying, "The list is long of what Pitt County has done in the last 2 years in terms of healthy eating and active living. They have transformed the community, and if they don't watch out, we're all going to want to move there."

According to Morgan, there is still a long way to go and she is already looking ahead and reaching out to regional partners for the Community Transformation Grant (CTG) which uses Affordable Care Act funds to support community efforts to reduce chronic disease by promoting healthy lifestyles. But she says the buzz, desire, and excitement are there in Pitt County to move the work forward. And thanks to Morgan, the collaborations will be in place. **NCMJ**

Electronically published August 10, 2012.

Address correspondence to Ms. Anne M. Williams, North Carolina Institute of Medicine, 630 Davis Dr, Ste 100, Morrisville, NC 27560 (anne_williams@nciom.org).

N C Med J. 2012;73(4):325. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved.

0029-2559/2012/73423

Choose Your Words Carefully, Please

S. Dean Stacy

To the Editor—I enjoy the NCMJ for the insights it provides for our region and read a considerable amount of each issue. However, I would like to express my concern with some terminology that is unfortunate, as well as inappropriate, that seems to be creeping into the literature, so as to protect our nomenclature from cultural bias.

Specifically, in the case of the article, Drug Use Trends for Arthritis and Other Rheumatic Conditions and Effect of Patient's Age on Treatment Choice (November/December 2011), the designation of "...adults (19-64 years) and the elderly (≥ 65 years)..." found on page 433 in the last paragraph of the introductory section is representative of a disturbing trend of ageism in our culture. I suspect it was an innocent error.

I have worked many years with older adults and have found that a disturbing percentage of the general public, as well as health care providers, treat the "elderly" as less than adults. When we proceed to label older adults as less than adults, by referring to them as "elderly" and omitting the word "adult" altogether, it follows that they will be at risk of being treated as less than adults. Eventually, the general

public as a whole acquires our descriptors and the mold is cast.

It would be more appropriate to use the age descriptors alone, rather than implying that our "elderly" must be less than "adults" since that word was not used in the title to describe them.

I used the word "creeping" in the second paragraph on purpose. It takes only a disregard of this minor infraction to allow growth to the larger harmful event.

Thank you for providing an avenue that the authors of this study and others use to share their knowledge. **NCMJ**

S. Dean Stacy, DDS Boone, North Carolina

Acknowledgment

Potential conflicts of interest. S.D.S. has no relevant conflicts of interest.

Electronically published August 10, 2012.

Address correspondence to Dr. S. Dean Stacy, 383 Church Hollow Rd, Boone, NC 28607 (blueridgedean@skybest.com).

N C Med J. 2012;73(4):326. ©2012 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2012/73421



Watch for people getting off the bus.

If you see a bus pull over, slow down and look out for people crossing the street.

WATCH FOR ME - NC

WatchForMeNC.org

The Watch For Me campaign is federally funded.

Classified Advertisements

USA (NC) - born, educated, trained, board-certified gastroenterologist available for locum tenens. 919.791.8371 (leave message).

PHYSICIAN OPENING AT THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

Campus Health Services at the University of North Carolina at Chapel Hill is currently seeking a dynamic staff physician to join the Clinical Medicine Section of a multidisciplinary facility serving the needs of a student and post-doctoral population of over 29,000. An interest and enthusiasm in the care of young adults is essential.

Successful applicant must be board certified in a related primary care specialty (pediatrics, internal medicine, or family practice). North Carolina medical license required. Position is to start September 1, 2012 or as soon as possible. Review of applications will begin immediately and continue until the position is filled.

Applications will only be accepted online. To apply, visit <http://unc.peopleadmin.com/postings/5528>. Please attach a letter of interest, curriculum vitae and the names and contact information for no more than three current references. Only Microsoft Word documents and PDF file attachments will be accepted. The University of North Carolina at Chapel Hill is an Equal Opportunity Employer.

Is Your Practice Looking for a Physician?

The NCMJ classified section is one of the few channels that reaches large numbers of North Carolina physicians with information about professional opportunities. More than 20,000 physicians now receive the NCMJ.

Our classified ads can help your practice find the right physician as well as help physicians find compatible career opportunities.

Upcoming Issues

73(5) Social determinants of health

73(6) Heart disease and stroke

NCMJ

NORTH CAROLINA MEDICAL JOURNAL

CLASSIFIED ADS: RATES AND SPECIFICATIONS

The NCMJ welcomes classified advertisements but reserves the right to refuse inappropriate subject matter. Cost per placement is \$60 for the first 25 words and \$1.00/word thereafter.

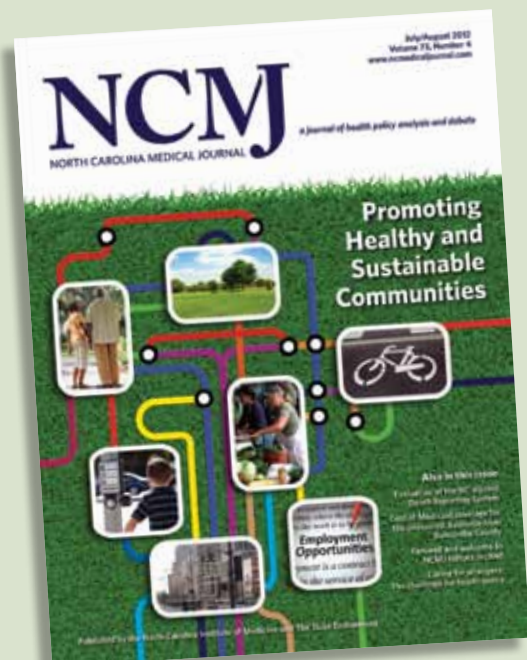
SUBMIT COPY TO:

e-mail: ncmedj@nciom.org; fax: 919.401.6899

post: NCMJ, 630 Davis Drive, Suite 100, Morrisville, NC 27560.

Include phone number and billing address, and indicate number of placements, if known.

A Great Advertising Investment!



Contact Phyllis Blackwell, assistant managing editor
phyllis_blackwell@nciom.org or 919.401.6599 ext. 27.

Advertiser Index

American Council on Exercise	296	NC Department of Transportation	250, 328
American Public Transportation Association	277	Shape Your World.....	323, IBC
Arthritis Foundation.....	252	US Department of Housing and Urban Development.....	285
Carolinas HealthCare System.....	IFC	US Environmental Protection Agency	320
Eat Smart Move More.....	300, 324	Vidant Health	249
Feeding America	309	Walker Allen Grice Ammons & Foy.....	BC
LRC Opportunity Fund, LLC	252	WatchForMeNC.org.....	256, 314, 326

Is everybody buckled?



**BEFORE A PLACE CAN FEEL LIKE HOME,
IT FIRST HAS TO FEEL SAFE.**



SIMPLE CHANGES START WITH YOU.

It's easy to look around town and identify areas that could be safer: the intersection without a crosswalk, a poorly lit street, roads without bike lanes.

Now, finding the resources to improve these places is just as simple. It starts on our website, where you'll find information about planning boards, helpful links and tips for making your neighborhood brighter, friendlier and safer for everyone.

Transform the place you live into the place you call home at ShapeYourWorldNC.com.



We speak jury...
fluently.



WALKER ALLEN
TRIAL ATTORNEYS

Walker, Allen, Grice, Ammons & Foy, L.L.P.
1407 West Grantham Street
Post Office Box 2047
Goldsboro, North Carolina 27533-2047
Telephone: 919.734.6565
Facsimile: 919.734.6720
www.nctrilattorneys.com