November/December 2010
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a journal of health policy analysis and debate

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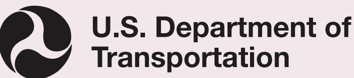

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Tar Heel Footprints in Health Care

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

Rebecca Socolar, MD

Rebecca Socolar was a tireless advocate for children and families, with a particular interest in improving the lives of people affected by personal violence, interfamilial violence, and child maltreatment.

Socolar was a high school valedictorian and graduated magna cum laude from Bryn Mawr College before earning her medical degree from the University of North Carolina (UNC)–Chapel Hill School of Medicine. She worked in private practice for a few years after completing the pediatrics residency program at The Children's Hospital of Philadelphia (Philadelphia, PA). Later, a fellowship at the Albert Einstein College of Medicine (Bronx, NY) and coursework in public health cultivated an interest in multidisciplinary approaches to addressing child maltreatment. As Socolar's husband Joshua reflected, "All the way through, she saw her particular contributions as part of a larger—not just medical—effort to give all kids a fair chance at a good life."

A deep understanding of the complexity of child abuse meant that no aspect of child maltreatment was neglected in Socolar's efforts. "She worked to develop interventions that would break the cycle of abuse," according to Helen Snow, director of health affairs at the UNC Office of University Development. "She sought to help children survive abuse and then to help prevent them from later becoming abusers. Her work was about including the whole family in these efforts." Socolar led the push to start the UNC Hospitals' Beacon Program for Families and Children, which provides evaluation, counseling, and coordinated care for people who have experienced fear, physical danger, or abuse. A one-time codirector of the Beacon Program, she also served as director of the North Carolina Child Medical Evaluation Program, a cooperative effort of the School of Medicine's Department of Pediatrics, the North Carolina legislature, state and local departments of social services, and health care professionals, which provides diagnostic assessments of children suspected to be victims of child abuse. Socolar and colleagues founded the North Carolina Child Treatment Program, supported by The Duke Endowment, the Kate B. Reynolds Charitable Trust, and the Governor's Crime Commission, on recognition of the need for evidence-based mental health treatment among sexually abused children and their nonoffending caregivers, particularly in North Carolina's underserved northeastern counties.

Socolar's kind, yet resolute disposition contributed to the effectiveness of her efforts. "Rebecca was visionary and absolutely dedicated...and had a quiet and deliberate way about her that always inspired confidence," said Snow. "Rebecca was known for her enormously big laugh," remarked Dana Hagele, a colleague and mentee of Socolar's. "But she was super tough when it came to advocating for families and children. A few months before she died, Socolar got out of bed and drove herself to Raleigh to present before the General Assembly. She was exhausted and in pain but felt in obligation to ask for funds to provide treatment for children who had experienced abuse and neglect."

continued on page 510

November/December 2010
Volume 71, Number 6
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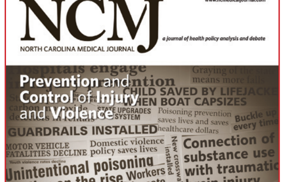

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Original Articles

511 Attitudes Toward Smoking Restrictions in Work Sites, Restaurants, and Bars Among North Carolinians
Rachel Loflin Maguire, Jason Brinkley, Christopher Mansfield

519 Suicide and Homicide in North Carolina: Initial Findings From the North Carolina Violent Death Reporting System, 2004-2007
Sandra L. Martin, Scott Proescholdbell, Tammy Norwood, Lawrence L. Kupper

Policy Forum

Prevention and Control of Injury and Violence

INTRODUCTION
526 Prevention and Control of Injury and Violence
Thomas C. Ricketts III

ISSUE BRIEF
527 Positioning North Carolina for Leadership in Injury Control: A Call to Action
Carol W. Runyan

INVITED COMMENTARIES AND SIDEBARS
531 Injury Prevention: North Carolina's Challenge and Capacity to Respond
Sharon Baker Rhyne, Sharon Schiro

534 Injury Prevention: Aspects of the Legislative Response
Tom Vitaglione

537 Epidemiology of Injury and Violence in North Carolina
Scott Proescholdbell, Katherine J. Harmon

540 Interest and Need Greatly Outpace Resources for Youth Suicide Prevention
Sherry Lehman, Jane Ann Miller

542 Unintentional Poisoning in North Carolina: An Emerging Public Health Problem
Marsha D. Ford

547 Addressing the Escalating Public Health Issue of Falls Among Older Adults
Ellen Caylor Schneider, Tiffany E. Shubert, Katherine J. Harmon

550 The North Carolina Falls Prevention Coalition
Sharon Baker Rhyne, Ellen Caylor Schneider

553 Preventing Child Maltreatment in North Carolina
Adam J. Zolotor

556 Violence Against Women in North Carolina
Rebecca J. Macy

557 Primary Prevention of Sexual Violence in North Carolina: A Public Health Approach
Brenda Linton, Catherine Guerrero, Jen Przewoznik

561 Is Fatality-Free Travel on North Carolina's Streets and Highways Feasible? It's Time to Think the Unthinkable
Herbert G. Garrison, Jennifer L. Smith

565 Fatal and Nonfatal Firearm Injuries in North Carolina
Tamera Coyne-Beasley, Abigail C. Lees

569 Occupational Injury in North Carolina
Dawn N. Castillo, Sheila Higgins

574 Trauma Systems: Improving Trauma Outcomes in North Carolina
Robert D. Becher, J. Wayne Meredith

DEPARTMENTS
508 Tar Heel Footprints in Health Care
579 Spotlight on the Safety Net
581 Running the Numbers
584 Philanthropy Profile

Health Reform in North Carolina

587 Health Reform From the Perspective of a Small and Rural Hospital
Laura J. Easton

590 Health Care Reform: What It Means for North Carolina's Hospitals
Michael C. Tarwater

From the NCIOM

593 Short- and Long-Term Solutions for Co-Location in Adult and Family Care Homes

Correspondence

598 Improving Youths' Health Through School-Based Health Centers
Genie Komives

Reader Services

599 Classified Advertisements
600 Advertiser Index

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

continued from page 508

Her research and policy activities were complemented by her passion for mentoring junior faculty working in the area of child maltreatment. Socolar was a posthumous recipient of the Kimberly Crews Award from the North Carolina Professional Society on the Abuse of Children, for providing significant support to other professionals working to detect and treat child maltreatment. She was also a founding member of the Ray Helfer Society, an honorary society that promotes education and training on child abuse and neglect, endeavors to improve research and clinical practice in the area of child maltreatment, and heightens awareness of the field of child abuse and neglect.

Socolar had many roles in her personal life and career—wife, mother, and friend, and physician, mentor, and advocate—and fulfilled each with compassion, understanding, and dedication. In 2009, during her professional prime, she died after a battle with cancer. Her contributions continue to influence policies and programs that promote the well-being of North Carolina's children. **NCMJ**

Contributed by Anna Bauer, MPH candidate, Department of Maternal and Child Health, Gillings School of Global Public Health, University of North Carolina–Chapel Hill, Chapel Hill, North Carolina (abauer@email.unc.edu).

ORIGINAL ARTICLE

Attitudes Toward Smoking Restrictions in Work Sites, Restaurants, and Bars Among North Carolinians

Rachel Loflin Maguire, Jason Brinkley, Christopher Mansfield

Abstract

Background Public support for smoking restrictions has increased in recent years, but support varies among groups and according to where restrictions should apply. National studies show that Americans are less likely to favor smoking restrictions in restaurants and bars than at other work sites but that the support varies across segments of the population. A full examination of the changes and status of attitudes toward smoking restrictions by site and across subgroups in North Carolina has not been undertaken.

Methods Data from US Census Bureau Current Population Surveys conducted during 2001-2002 and 2006-2007 were analyzed. Trends in attitudes toward smoke-free policies at indoor work sites, restaurants, and bars are presented overall and by occupation, smoking status, income, race/ethnicity, workplace smoking policy, age, sex, and education. Logistic regression was used to identify key factors predicting support for smoke-free policies at work sites.

Results Support for smoke-free policies increased by at least 7.4 percentage points at each venue between 2001-2002 and 2006-2007. In 2006-2007, the strongest public support for smoking restrictions was reported for work sites (69.6%), followed by restaurants (52.3%) and bars (36.1%). Whether a person smokes is the strongest predictor of their attitude about smoking restrictions in indoor work sites.

Limitations Data are self-reported, from independent samples, and lack county identifiers.

Conclusions There is substantial and increasing public support for smoke-free policies in North Carolina. These findings show extensive support for extending smoking bans to all indoor work sites, with nearly 70% of respondents in 2006-2007 favoring smoke-free work sites.

Secondhand-smoke exposure has numerous negative health effects, and a recent report of the US Surgeon General advises that no level of exposure to secondhand smoke is safe [1]. Increasingly, this risk is recognized by the public, and studies report strong public support for smoking bans in workplaces, restaurants, and bars. In national studies, public support for smoking bans varies according to the venue affected and who is asked [2-5]. Current smokers and men are less likely to support smoking restrictions, and work-site restrictions are more strongly supported than are those applying to bars or restaurants. Recent polls conducted by Elon College in 2006, 2007, and 2009 indicated that 62%-67% of North Carolinians support state laws that would ban smoking in all public places [6-8]. Public support for smoking bans by venue, important demographic characteristics, and changes over time have not fully been explored in North Carolina.

With increasing public support for smoking bans, legal protection against secondhand smoke is beginning to emerge. The North Carolina General Assembly has gone from prohibiting local units of government from restricting smoking in public places, in 1993, to banning smoking in state government buildings and allowing local governments to do likewise in their buildings, in 2007 [9]. In 2008, state-owned vehicles were included in the smoking ban [10]. Most recently, the 2009 session enacted a state law, which took effect in January 2010, that bans smoking in restaurants and bars in North Carolina [11]. Although this protects custom-

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ers and employees at these sites, the law will not protect those at other workplaces.

This timely study describes attitudes in North Carolina toward smoking restrictions in indoor work sites, bars, and restaurants with respect to the following key independent variables: occupation, smoking status, income, age, sex, race/ethnicity, education, and workplace smoking policy. It also documents changes in attitudes toward smoking restrictions over a 5-year period and identifies the key predictors of attitudes.

On the basis of national trends, it was expected that an increase in support for smoking restrictions in North Carolina would be seen over time [3]. It was hypothesized that blue-collar workers, smokers, and people in younger age groups would report less-positive attitudes toward smoking restrictions, compared with other groups [2-5]. Stronger support was expected among females, people in the highest education and income groups, and Hispanics [2-5]. Lastly, it was anticipated that attitudes toward restrictions in restaurants would be less positive than those toward restrictions in work sites and that the least support would be for restrictions in bars [3].

Methods

Participants. The target population for this study was North Carolinians, represented by 2 independent, random samples of North Carolina residents surveyed as part of the Current Population Survey (CPS) during 2 periods, 5 years apart. Surveys conducted during each period also included questions from the Tobacco Use Supplement (TUS). The 2001-2002 sample included 3,835 self-responding individuals residing in North Carolina. Their responses were compared to responses from a sample of 2,766 in 2006-2007, the most recent period for which TUS data were available. The individual was the unit of analysis. The study was approved by the East Carolina University and Medical Center Institutional Review Board.

Data collection. The CPS has been conducted monthly by the US Census Bureau since 1940 to provide estimates for labor statistics and update demographic information between the decennial censuses. Respondents to the CPS are also given the option of responding to the TUS. The TUS was introduced in 1992 and is typically conducted in 2-year cycles. The TUS is given in conjunction with the regular CPS for 3 months out of each 2-year cycle. It includes questions related to tobacco, including questions on tobacco use, smoking policies at work, and attitudes toward smoking policies. Although the CPS allows proxy respondents, an effort is made to collect data from self-respondents for the TUS, since many of the responses would be unknown to proxies [12, 13]. For this analysis, only self-responses were used.

Measures. The 3 dependent variables in this study are attitude about smoking in indoor workplaces, attitude about smoking in restaurants, and attitude about smoking in bars or cocktail lounges (hereafter collectively referred to as bars). In the CPS-TUS, each question measuring an attitude toward smoking asked, "In [indoor work areas, restaurants, bars/cocktail lounges], do you think smoking should be allowed in all areas, allowed in some areas, or not allowed at all?" Responses indicating "all areas" and "some areas" were combined to create a dichotomous variable relative to each site, classified as either should be smoke-free or should not be smoke-free. The 3 venues are mutually exclusive.

It was hypothesized that 8 independent variables affect an individual's attitude (ie, preference that a venue be smoke-free). The independent variables are smoking status, occupation, income, age, sex, race/ethnicity, education, and type of workplace smoking policy. Each of these variables was coded into either nominal or ordinal groupings, as shown in the results (Tables 1 and 2).

Values for the independent variable type of workplace smoking policy (ie, smoke-free vs not smoke-free) were computed from questions that asked about the smoking policy for work and common/public areas separately. Respondents could report that smoking was allowed in all, some, or no areas, for both items. If a respondent reported that smoking was not allowed at all in both work and public areas, their workplace smoking policy was classified as smoke-free in the analysis. Questions about smoking policies were asked only of currently employed indoor workers who reported some form of a smoking policy (ie, their workplace had a formal policy, regardless of whether it restricted smoking). Data for respondents who did not know whether their work site had a policy or said their workplace did not have a policy were coded as missing for this item.

Occupation groupings were created using census codes for each respondent's primary job. The categories generally followed those used by the Census Bureau (Table 3). Occupation codes were not collected for respondents not in the workforce (ie, for those who were retired, disabled, or other reason) or for those who were unemployed. Complete information for each census code and all of the questions used in this study can be found in the technical documentation for the CPS [12, 13].

Data analysis. The data were read, managed, and analyzed using SAS, version 9.2 (SAS Institute), by R.L.M., with input from the other authors. A supplemental weight developed by the Census Bureau was used to adjust for nonresponse and use of self-response only. Descriptive statistics (eg, percentages of respondents reporting different attitudes toward smoking policies) were reported by the independent variables and overall for both periods. A weighted, pooled t test was used to calculate the 95% confidence interval (CI) for the difference between the 2 periods and to provide P values indicating statistically significant (defined as a P value of $<.05$) and insignificant differences between the 2 periods.

Logistic regression was used to identify the most important factors predicting attitudes toward smoking restrictions in indoor workplaces. Respondents with unexplained miss-

Table 1.
Comparison of Preferences for Smoke-Free Venues, by Key Independent Variables, Among Respondents to Census Bureau Current Population Surveys, 2001-2002 and 2006-2007

	Indoor work sites				Restaurants				Bars			
Characteristic	2006-2007 (N = 2,671)	2001-2002 (N = 3,722)	Δ[a]	P	2006-2007 (N = 2,673)	2001-2002 (N = 3,732)	Δ[a]	P	2006-2007 (N = 2,616)	2001-2002 (N = 3,591)	Δ[a]	P
Overall	69.6	62.2	7.4	<.001	52.3	44.7	7.6	<.001	36.1	27.6	8.5	<.001
Smoking status												
Nonsmoker	76.4	69.0	7.4	<.001	60.2	52.8	7.4	<.001	42.6	34.5	8.1	<.001
Smoker	44.5	41.8	2.7	.316	22.8	20.1	2.7	.229	12.6	7.4	5.2	.001
Sex												
Male	64.7	58.7	6.0	.001	48.2	43.3	4.9	.011	32.0	25.0	7.0	<.001
Female	74.3	65.3	9.0	<.001	56.1	45.9	10.2	<.001	40.2	30.1	10.1	<.001
Education												
High school or less	58.3	54.5	3.8	.031	44.0	39.8	4.2	.016	31.4	26.7	4.7	.004
At least some college	80.4	71.0	9.4	<.001	60.2	50.3	9.9	<.001	40.6	28.7	11.9	<.001
Race/ethnicity												
White, non-Hispanic	69.8	60.6	9.2	<.001	52.0	42.7	9.3	<.001	35.8	25.9	9.9	<.001
Black, non-Hispanic	68.7	64.9	3.8	.159	51.4	47.6	3.8	.188	34.8	29.6	5.2	.057
Hispanic	72.3	76.9	-4.6	.418	61.1	62.4	-1.3	.841	42.7	49.4	-6.7	.305
Other	68.9	62.2	6.7	.279	50.5	45.7	4.8	.456	40.2	25.5	14.7	.016
Workplace smoking policy[b]												
Smoke-free	84.6	72.7	11.9	<.001	61.7	48.8	12.9	<.001	40.9	28.9	12.0	<.001
Not smoke-free	65.6	59.6	6.0	.179	45.3	35.2	10.1	.023	28.1	18.5	9.6	.015

Note. Unless otherwise indicated, data are percentage of respondents who prefer smoke-free venues. Percentages do not include respondents for whom data on variables were missing.
[a]Values denote the difference between 2006-2007 percentages and 2001-2002 percentages.
[b]Data include indoor workers with any type of smoking policy and exclude those not in the labor force.

ing data were excluded from the logistic model (649 respondents [16.8%] were excluded from the 2001-2002 group, and 451 respondents [16.3%] were excluded from the 2006-2007 group). For occupation and workplace smoking policy, some respondents were included despite missing data, since the missing information could be explained. For the logistic regression, these groups were included in the analysis but coded as missing. Occupation was not recorded for respondents who were retired, disabled, or not in the workforce. Smoking policy at work was not recorded for respondents who worked outdoors or whose work site did not have any type of official smoking policy. It is likely that many of the workers in this category were regularly exposed to smoke at work, since they either worked outside (where smoking policies are rarely in effect) or worked at a site that lacked a formal smoking policy.

Results

The sample was generally representative of the North Carolina population but contained a greater percentage of females (57.8% in the sample vs 51.1% in the population) and white, non-Hispanic respondents (73.4% vs 67.5%) [14]. It is significant to note that 79.6% of respondents in the recent, 2006-2007 sample were nonsmokers, an increase of 4.6% over the previous period. Nearly 80% of respondents working indoors at a workplace with a smoking policy reported that their workplace was smoke-free in 2006-2007.

As expected, there was a general trend toward increased support for smoke-free polices between 2001-2002 and 2006-2007. Preference for all areas to be smoke-free increased for all 3 venues (Figure 1). Table 1 shows that the proportion of respondents supporting smoke-free policies in work sites, restaurants, and bars increased by 7.4 percentage points (95% CI, 5.1-9.8; $P < .001$), 7.6 percentage points (95% CI, 5.1-10.0; $P < .001$), and 8.5 percentage points (95% CI, 6.2-10.8; $P < .001$), respectively. As hypothesized, support for smoke-free policies in 2006-2007 was the highest for work sites (69.6% [95% CI, 67.7%-71.5%]), the lowest for bars (36.1% [95% CI, 34.2%-38.1%]), and between the other values for restaurants (52.3% [95% CI, 50.2%-54.3%]) (Figure 1 and Table 1).

Support for smoking restrictions increased across nearly every subgroup, with the majority of differences being statistically significant. Nonsmokers reported the highest degrees of support for smoke-free policies across all 3 venues in 2006-2007, and their support increased significantly and substantially over the 5-year period. A total of 76.4%

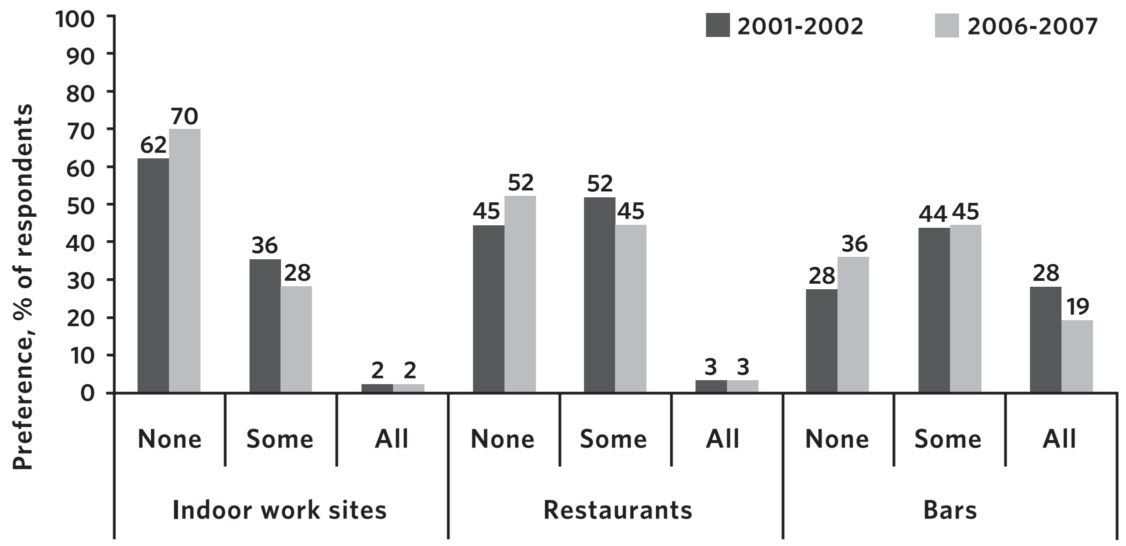
of nonsmokers thought indoor work sites should be smoke-free, an increase of 10.7% from 2001-2002 (*P* < .001); 60.2% thought restaurants should be smoke-free, an increase of 14% (*P* < .001); and 42.6% thought bars should be smoke-free, an increase of 23.4% (*P* < .001). A decline in support for restrictions among Hispanics (for all venues) was suggested by the data; workers at sites that were typically outdoors, such as construction and forestry workers (for indoor

Table 2.
Findings of Logistic Regression to Predict Preferences for Smoke-Free Indoor Work Areas Among Respondents to Census Bureau Current Population Surveys, 2001-2002 and 2006-2007

	2001-2002			2006-2007		
Characteristic	**OR (95% CI)**	χ^2_{df}	***P***	**OR (95% CI)**	χ^2_{df}	***P***
Smoking status		104.5_1	<.001		88.8_1	<.001
Smoker	Reference			Reference		
Nonsmoker	2.6 (2.2-3.1)			3.2 (2.5-4.0)		
Occupation		28.2_5	<.001		22.6_5	<.001
Construction, extraction, installation, maintenance, repair, farming, fishing, forestry	Reference			Reference		
Service	1.7 (1.2-2.5)			1.4 (0.9-2.4)		
Manufacturing, production, transportation	1.5 (1.1-2.2)			1.4 (0.9-2.3)		
Administrative support, sales	2.0 (1.4-2.7)			2.5 (1.6-4.1)		
Management, business, financial, professional specialty	2.3 (1.7-3.3)			2.2 (1.4-3.5)		
Missing[a]	1.8 (1.4-2.4)			2.1 (1.4-3.1)		
Annual income		4.4_3	.226		18.2_3	<.001
Low (<$25,000)	Reference			Reference		
Middle ($25,000 to <$50,000)	1.0 (0.9-1.3)			1.1 (0.8-1.4)		
Upper middle ($50,000 to <$75,000)	1.3 (1.0-1.6)			2.0 (1.4-2.8)		
High (≥$75,000)	1.2 (0.9-1.6)			1.3 (0.9-1.8)		
Education		24.5_1	<.001		35.0_1	<.001
High school graduate or less	Reference			Reference		
At least some college	1.6 (1.3-1.9)			2.0 (1.6-2.6)		
Race/ethnicity		30.9_3	<.001		5.3_3	.149
White, non-Hispanic	Reference			Reference		
Black, non-Hispanic	1.4 (1.1-1.7)			1.1 (0.9-1.5)		
Hispanic	3.4 (2.1-5.6)			1.7 (1.0-2.9)		
Other	1.1 (0.7-1.8)			1.6 (0.8-2.9)		
Workplace smoking policy		15.9_2	<.001		29.9_2	<.001
Not smoke free	Reference			Reference		
Smoke free	1.4 (1.0-2.0)			2.1 (1.3-3.3)		
Missing[b]	0.9 (0.7-1.3)			0.9 (0.6-1.4)		

Note. Missing data on occupation and/or workplace smoking policy were determined not to be missing at random, and respondents for whom these data were missing were thus included in the analysis. For 2001-2002, 649 respondents were excluded because of missing data (N = 3,186). For 2006-2007, 451 respondents were excluded because of missing data (N = 2,359). CI, confidence interval; df, degrees of freedom; OR, odds ratio.
[a]Most respondents considered to have missing data were not in the labor force (ie, retired, disabled, other, or unemployed).
[b]Most respondents considered to have missing data worked outdoors or for a company with no smoking policy in place.

Figure 1.
Smoking Preferences at Indoor Work Sites, Restaurants, and Bars Among Respondents to Census Bureau Current Population Surveys, 2001-2002 and 2006-2007



Note. Sample sizes for 2001-2002 and 2006-2007 surveys were 3,722 and 2,671 responses, respectively, for indoor work sites; 3,732 and 2,673, respectively, for restaurants; and 3,591 and 2,616, respectively, for bars.

work areas and bars); and the youngest age group (for bars). However, none of these differences were significant.

In general, in 2006-2007, the groups with the most support for smoke-free policies at the 3 sites were nonsmokers, females, respondents with at least some college, white-collar or office-type workers, higher-income groups, and respondents with a smoke-free policy at work. Conversely, less support for restrictions was generally seen among workers in traditionally blue-collar fields (eg, construction, manufacturing, and service workers), smokers, the lowest income group, the youngest age group, males, respondents with a high school education or less, and respondents without a smoke-free policy at work.

In the logistic regression, several factors were statistically significant predictors of support for a smoke-free policy at work sites (Table 2). For both 2001-2002 and 2006-2007, smoking status, occupation, education, and workplace smoking policy were significant. In both periods, smoking status was clearly identified as the strongest predictor. In 2006-2007, the odds among nonsmokers of supporting a smoke-free policy were more than 3 times the odds among smokers. The ratio of the odds of support by nonsmokers to the odds of support by smokers increased from 2.6 in 2001-2002 to 3.2 in 2006-2007. The odds of support were also higher for respondents with more education and for respondents with smoke-free policies at work, with the odds among both groups approximately 2 times those of their counterparts. In 2001-2002, the odds of support among Hispanics were more than 3 times those among white, non-Hispanics; however, race/ethnicity was not a significant characteristic in the 2006-2007 model. Income was not significant in 2001-2002, but in 2006-2007 the odds of support in the upper-middle income group were nearly 2 times the odds in the lowest income group.

Discussion

As was expected, the percentage of North Carolinians supporting smoke-free policies in workplaces, restaurants, and bars was much higher for 2001-2002 and 2006-2007 than for 1995-1996, according to the CPS-TUS. In 1995-1996, only 48.1% of North Carolinians supported smoke-free policies for workplaces, compared with 62.2% (95% CI, 60.5%-63.8%) in 2001-2002 and 69.6% (95% CI, 67.7%-71.5%) in 2006-2007. For restaurants, support among North Carolinians for smoke-free policies was 33.5% in 1995-1996, compared with 44.7% (95% CI, 43.0%-46.4%) in 2001-2002 and 52.3% (95% CI, 50.2%-54.3%) in 2006-2007. For bars, support among North Carolinians was 21.5% in 1995-1996, compared with 27.6% (95% CI, 26.1%-29.2%) in 2001-2002 and 36.1% (95% CI, 34.2%-38.1%) in 2006-2007 [3]. In each case, the general trend in the current and previous research has been for public support of smoke-free policies to increase.

Differences by smoking status found in this study were in line with those found in previous surveys. Smoking status has always been associated with the level of support

Table 3.
Census Bureau Occupation Codes and Definitions, 2001-2002 and 2006-2007

Period, occupation code(s)	Occupation(s)
2001-2002	
000-235	Management, business, financial, professional
403-469	Service
243-389	Administrative support, sales
473-617, 864-889	Construction, extraction, installation, maintenance, repair, farming, fishing, forestry
628-859	Manufacturing, production, transportation
2006-2007	
0010-3650	Management, business, financial, professional
3700-4650	Service
4700-5930	Administrative support, sales
6000-7620	Construction, extraction, installation, maintenance, repair, farming, fishing, forestry
7700-9750	Manufacturing, production, transportation

for smoking restrictions. Nonsmokers have reliably had the most support for restrictions, whereas smokers have unfailingly had much less support for restrictions [2, 3].

Variation in attitudes toward smoking restrictions by occupation had not been fully explored before this study. Previous studies have shown that blue-collar workers in North Carolina are less frequently covered by smoke-free policies, but their attitudes toward smoking policies were not examined [15]. Feigelman and Lee [2] found food-service workers nationally were less likely to support smoking restrictions than were all other occupations. The current study expanded upon these findings by looking at North Carolina and using more occupation categories. As was expected, blue-collar and service workers displayed less support for smoke-free policies than did white-collar and office workers.

Many of the variables describing North Carolinians were given little research attention in previous reports from the CPS-TUS, but they line up well with results from the North Carolina Behavioral Risk Factor Surveillance System (BRFSS). As found in the BRFSS, females, people with the most education, and Hispanics had the highest support for restrictions. Also similar was the finding that the youngest age group had the lowest support for restrictions. Differences by income were somewhat different from what has been reported in the BRFSS, in that the upper-middle income group had support that tied or even surpassed that of the highest income group [4, 5].

The current research addresses several questions that have previously not been explored. Foremost, it provides a more up-to-date examination of attitudes toward smoking restrictions in North Carolina. It also investigates attitudes by various characteristics, including occupation, sex, race/ethnicity, age, education, income, and smoking policy at work. Each of these items has previously been only partially examined, if at all, in formal research. This study confirms the importance of smoking status in predicting and explaining attitudes toward smoking restrictions and describes the additional influence of occupation, income, education, and smoking policy at work. Perhaps most importantly, it shows a substantial trend in support for smoking restrictions across all 3 venues.

One of the strengths of this study is the source of the data, which were collected by the US Census Bureau as part of a survey that is the primary source for official government estimates of labor statistics [12]. In addition, weights are included, to weight the sample to the population characteristics and account for nonrespondents and the use of self-response only. The data were regularly collected by a respected agency, using techniques to make the sample as representative as possible. In addition, the sample was larger than one that could easily be collected otherwise.

Although the use of secondary data provides strength to this research, the survey did not request data on some important factors, such as place of residence and support for a law banning smoking in each location. We would like to know how support for specific regulations varies across urban versus rural regions, as well as across counties dependent or not on tobacco growing, tobacco industry employment, and tourism. Also, despite the large overall sample size, some subgroups were smaller than necessary to obtain stable percentages. Finally, although the data represent the most recent release of the TUS and the current research provides a more up-to-date examination of the issue at hand than does previously discussed research, the data are still slightly dated, owing to delays in the release of data by the Census Bureau.

The current research has brought to light several issues

that would be good to explore in future studies. Contrary to expectations, the data suggested a decline of support among Hispanics between 2001-2001 and 2006-2007; however, the declines were not significant. Data on Hispanics are unclear, probably because of the low sample size in this subgroup, which did not allow sufficient power to detect differences. It may be useful to explore this issue further, to capture a larger sample of this population, and to determine whether there are differences in support by other characteristics. If future research confirms a decline in support for smoking restrictions among Hispanics, then factors such as increased acculturation should be explored as a potential cause.

It would also be informative to examine support by geographic area in North Carolina. Do certain parts of the state have significantly higher or lower support for restrictions? If so, education and policy efforts could be more finely focused.

Although the models generated in the current research are a large step forward in understanding attitudes toward smoking restrictions, they are not strong enough to be used for predicting attitudes toward smoking restrictions for many groups of interest. Perhaps the addition of acculturation and geographic areas within North Carolina would strengthen the models proposed in the current research. If these variables can be adequately measured, the model will provide a more precise prediction of attitudes and will allow the crafting of policy most likely to be preferred by affected citizens and employees, as well as by patrons of workplaces.

The last potential area of future research is simply to reexamine this issue in a few years. On the basis of previous trends, it is expected that support will continue to increase for the next few years. In addition, there might be dramatic increases in support after the law banning smoking in restaurants and bars goes into effect, as has been seen in other areas where smoking bans have been implemented [2, 16].

The current study provides confirmation of growing public support for smoking restrictions similar to those imposed by the law recently passed in the North Carolina legislature, which bans smoking in all restaurants and bars. Support for restrictions has consistently grown over the past 5 years and will likely continue to increase. In 2006-2007, just over half of respondents supported a smoke-free policy in restaurants. Among nonsmokers, more than 60% would like to see all restaurants smoke-free. Although the overall support for smoke-free policies at bars is lower (36.1% of respondents), support among nonsmokers, a substantial segment of potential patrons, is approaching 50% (42.6%). In addition, overall support has increased dramatically, by 8.5 percentage points (relative increase, 30.8%), in just 5 years.

The current research shows very strong support for banning smoking in all indoor workplaces, which goes beyond the legislation that has already been passed. Nearly 70% of respondents in 2006-2007 supported smoke-free work sites, up from 62.2% in 2001-2002. In several subgroups, support nears or surpasses 80%. Even among smokers, who consistently show the lowest support for any restrictions, 44.5% favor smoke-free policies for indoor work sites. Clearly, the public is supportive of making all indoor workplaces smoke-free. As a result, both the state and the local legislative bodies would have strong reason for further extending smoking restrictions to all indoor workplaces.

Health professionals can be reassured by the information that the public is getting the message about the effects of secondhand smoke. They can know from this that people want to avoid exposure in the place where they spend the most time—the workplace. Although the policy on smoking in bars and restaurants is health promoting, advocacy for smoke-free workplaces may have a greater effect. **NCMJ**

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ORIGINAL ARTICLE

Suicide and Homicide in North Carolina:
Initial Findings From the North Carolina Violent Death Reporting System, 2004-2007

Sandra L. Martin, Scott Proescholdbell, Tammy Norwood, Lawrence L. Kupper

Abstract

Background Research concerning suicide and homicide in North Carolina is needed so that medical providers and others who develop and implement preventive and therapeutic interventions related to violence have an empirical base from which to work.

Methods North Carolina Violent Death Reporting System data composed of death certificates, medical examiner reports, and law enforcement reports were analyzed to examine the prevalence of suicide and homicide in North Carolina during 2004-2007 and to describe the sociodemographic characteristics of suicide and homicide victims.

Results Suicides and homicides accounted for 2.3% of all North Carolina deaths during 2004-2007. There were 12.0 suicides (95% confidence interval [CI], 11.7-12.4) and 7.2 homicides (95% CI, 6.9-7.4) per 100,000 North Carolina residents. Suicide rates were higher among men and boys, whites, non-Hispanics, and persons aged ≥35 years. Homicide rates were higher among men and boys, American Indians, blacks, Hispanics, and persons aged ≤24 years. Firearms were the most common method used to commit suicide and homicide, accounting for 59.5% of suicides and 67.0% of homicides.

Conclusions Every day in North Carolina, approximately 3 persons kill themselves and approximately 2 persons are killed by others. Suicide and homicide inflict a high level of preventable mortality in North Carolina. Learning more about these violent deaths will help to inform the development of effective violence-prevention interventions.

Violence is an important public health problem that results in high morbidity and mortality worldwide [1], including the United States. It has been estimated that more than 50,000 persons in the United States die from violence each year [2]. Not only do these deaths cause a high burden of suffering, they also cost the United States more than $52 billion annually in medical care and lost productivity [3].

Suicide and homicide are the leading causes of violent death in the United States and together comprise approximately one-third of all injury-related deaths [4]. Although suicide and homicide rates have changed over time, the rate of suicide has consistently remained higher than the rate of homicide [4, 5]. Given the high prevalence of such deaths in the United States and the need to learn more about these deaths so that effective violence prevention activities can be designed and put into place, the Centers for Disease Control and Prevention (CDC) received funding in 2002 to initiate the National Violent Death Reporting System (NVDRS) [3].

The NVDRS is a surveillance system that collects data on violent deaths (including suicide and homicide), using standardized data-collection and coding procedures. It incorporates information from multiple sources, including death certificates, medical examiner reports, and law enforcement reports. Initially, 6 states received funding through cooperative agreements with the CDC to participate in the NVDRS. Currently, 18 states participate in the NVDRS, including North Carolina, host of the North Carolina Violent Death Reporting System (NC-VDRS), which is administered

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within the North Carolina Department of Health and Human Services by the Injury and Violence Prevention Branch of the Division of Public Health. Key partners and collaborators in the state include the North Carolina State Center for Health Statistics Vital Statistics Office, the Office of the Chief Medical Examiner, the State Bureau of Investigation, and local law enforcement departments.

The NC-VDRS is an incident-based, relational database that collects detailed information from death certificates, medical examiner records, law enforcement reports, and reports from the North Carolina State Bureau of Investigation on all deaths from violence that occur in North Carolina, including homicides, suicides, deaths of undetermined intent, unintentional firearm-related deaths, and deaths due to legal intervention. Before the development of the NC-VDRS, each data source was disparate; even though there were data points common to all 3 sources, unique data existed in each that would help provide a more detailed account of each violent death. Any single source had limitations, and public health organizations had been limited in gaining the insight needed for potential prevention practices. For example, death certificates contain demographic information but no forensic, toxicological, or circumstantial information, such as that provided in medical examiner and law enforcement records. Because the NC-VDRS reports data from multiple sources, it provides a more robust examination of violent deaths than was available in the past or through any single reporting source.

This study is one of the first comprehensive examinations of multiyear NC-VDRS data. Analysis of these data, collected during the 4-year period from 2004 through 2007, was performed to address the following questions: What percentages of deaths in North Carolina are due to suicide and homicide? What are the rates of suicide and homicide in North Carolina? What are the sociodemographic characteristics (including sex, race/ethnicity, and age) of North Carolina suicide and homicide victims? How do North Carolina suicide and homicide rates differ by victims' sociodemographic characteristics? How do suicides and homicides vary by location? What are the methods used to commit suicide and homicide in North Carolina (eg, the use of firearms or sharp instruments)? and What are the most common suicide and homicide circumstances in North Carolina?

Methods

Data source and sample. NC-VDRS data were used to identify suicide and homicide deaths that occurred in North Carolina during the period from 2004 (the first year of the system) through 2007. Several variables from the NC-VDRS were examined in this research. Some of these variables describe the sociodemographic characteristics of suicide and or homicide victims, documenting their sex (male or female), race (American Indian, Asian, black, or white), Hispanic ethnicity (yes or no), age, and/or region in which they resided. NC-VDRS information also was used to describe the manner of death, in particular, the method used to commit the suicide or homicide and the circumstances of the death.

The North Carolina State Center for Health Statistics specified the total number of deaths in the North Carolina population during the study period, which was used as the denominator in the calculation of the percentage of all deaths in North Carolina that were attributed to suicide and homicide. In addition, the center specified the number of North Carolina residents with discrete sociodemographic characteristics (sex, race, Hispanic ethnicity, and age) during the study period; these data were used for the computation of suicide and homicide rates within specific subgroups.

The present study was reviewed and approved by the North Carolina Department of Health and Human Services Institutional Review Board.

Analysis. The percentages of North Carolina deaths during the 4-year study period that were due to suicide and homicide were computed by dividing the number of deaths from suicides and homicides per year by the total number of deaths. Suicide and homicide rates per 100,000 North Carolina residents were computed, along with associated 95% confidence intervals (CIs). A rate ratio and 95% CI were computed to compare the North Carolina suicide rate to the North Carolina homicide rate. Descriptive statistics were used to examine the percentages of suicide and homicide victims with respect to particular sociodemographic characteristics, including sex, race, Hispanic ethnicity, and age. The number of suicides and homicides per 100,000 North Carolina residents (and associated 95% CIs), stratified by sociodemographic characteristics, were computed. Regional data were compiled on the basis of the county of residence of each decedent. Descriptive statistics were used to examine the percentages of suicide and homicide victims who died from particular methods (eg, the percentage who died from firearm injuries). Data from the NC-VDRS and the NVDRS are available for researchers to conduct additional analyses.

Results

In North Carolina, there were 4,218 suicide deaths (1,017 during 2004, 1,009 during 2005, 1,107 during 2006, and 1,085 during 2007) and 2,511 homicide deaths (585 during 2004, 645 during 2005, 605 during 2006, and 676 during 2007). These 6,729 deaths—63% of which were due to suicide and 37% of which were due to homicide—accounted for 2% of the 296,789 deaths in North Carolina during these 4 years but represented a disproportionate percentage of deaths within certain age groups. During the 4-year study period, there were 12.0 suicides per 100,000 residents (95% CI, 11.7-12.4) and 7.1 homicides per 100,000 residents (95% CI, 6.9-7.4), for a rate ratio of 1.7 (95% CI, 1.6-1.8).

Table 1 presents sociodemographic characteristics of suicide and homicide victims. Approximately three-quarters of

Table 1.
Sociodemographic Characteristics Associated With 4,218 Suicide Deaths and 2,511 Homicide Deaths Among North Carolina Residents, 2004-2007

Characteristic	No. (%), by cause		No. per 100,000 (95% CI), by cause	
	Suicide	Homicide	Suicide	Homicide
Sex				
Male	3,242 (76.9)	1,927 (76.7)	18.9 (18.2-19.5)	11.2 (10.7-11.7)
Female	976 (23.1)	584 (23.3)	5.4 (5.1-5.8)	3.3 (3.0-3.5)
Race				
White	3,769 (89.4)	1,089 (43.4)	14.4 (13.9-14.8)	4.2 (3.9-4.4)
Black	377 (8.9)	1,299 (51.7)	4.9 (4.4-5.4)	16.8 (15.9-17.8)
American Indian	39 (0.9)	88 (3.5)	8.5 (5.8-11.1)	19.1 (15.1-23.1)
Asian	28 (0.7)	22 (0.9)	4.1 (2.6-5.6)	3.2 (1.9-4.5)
Unknown/other	5 (0.1)	13 (0.5)	...	...
Hispanic				
No	4,121 (97.7)	2,258 (89.9)	12.6 (12.2-13.0)	6.9 (6.6-7.2)
Yes	97 (2.3)	253 (10.1)	4.2 (3.4-5.1)	11.1 (9.7-12.4)
Age, years[a]				
<1	...	63 (2.5)	...	12.6 (9.5-15.7)
1-4	...	47 (1.9)	...	2.4 (1.7-3.1)
5-9	...	14 (0.6)	...	0.6 (0.3-0.9)
10-14	30 (0.7)	37 (1.5)	1.3 (0.8-1.7)	1.6 (1.1-2.1)
15-19	174 (4.1)	210 (8.4)	7.3 (6.2-8.4)	8.8 (7.6-10.0)
20-24	340 (8.1)	434 (17.3)	14.2 (12.6-15.7)	18.1 (16.4-19.8)
25-34	633 (15.0)	642 (25.6)	13.1 (12.0-14.1)	13.3 (12.2-14.3)
35-44	902 (21.4)	479 (19.1)	17.2 (16.0-18.3)	9.1 (8.3-9.9)
45-54	882 (20.9)	308 (12.3)	17.7 (16.5-18.8)	6.2 (5.5-6.9)
55-64	560 (13.3)	148 (5.9)	14.7 (13.5-15.9)	3.9 (3.3-4.5)
65-74	361 (8.6)	77 (3.1)	15.9 (14.2-17.5)	3.4 (2.6-4.1)
75-84	248 (5.9)	44 (1.8)	17.0 (14.9-19.1)	3.0 (2.1-3.9)
≥85	88 (2.1)	8 (0.3)	16.6 (13.2-20.1)	1.5 (0.5-2.6)

Note. Data are from the North Carolina Violent Death Reporting System. CI, confidence interval.
[a]By Centers for Disease Control and Prevention National Violent Death Reporting System protocol, suicide data are not included for persons aged <10 years.

suicide and homicide victims were male (76.9% of suicide victims and 76.7% of homicide victims). The majority of suicide victims (89.4%) were white, 8.9% were black, 0.9% were American Indian, 0.6% were Asian, and 0.1% were of unknown race. In contrast, 51.7% of homicide victims were black, 43.4% were white, 3.5% were American Indian, 1.0% were Asian, and 0.4% were of unknown race. The majority of suicide and homicide victims (97.7% and 89.9%, respectively) were non-Hispanic. The age distribution of suicide and homicide victims differed dramatically, with suicide victims tending to be older and homicide victims tending to be younger. More specifically, there were smaller percentages of suicide victims than homicide victims for every age group younger than 35 years, approximately equal percentages of suicide and homicide victims for the group aged 35-44 years, and greater percentages of suicide victims than homicide victims for every age group older than 44 years.

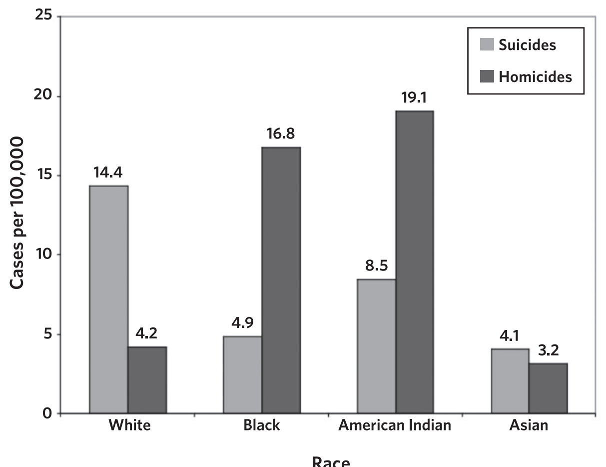
Table 1 also presents suicide and homicide deaths per 100,000 residents, stratified by sociodemographic characteristics. The suicide rate was greater among men and boys than among women and girls (18.9 vs 5.4 cases per 100,000), as was the homicide rate (11.2 vs 3.3 per 100,000). The suicide rate was greatest among whites (14.4 cases per 100,000), followed by American Indians (8.5 per 100,000),

blacks (4.9 per 100,000), and Asians (4.1 per 100,000). In contrast, the homicide rate was greatest among American Indians (19.1 cases per 100,000), followed by blacks (16.8 per 100,000), whites (4.2 per 100,000), and Asians (3.2 per 100,000) (Figure 1). The suicide rate among Hispanics was lower than the suicide rate among non-Hispanics (4.2 vs 12.6 cases per 100,000), but the homicide rate was greater among Hispanics than among non-Hispanics (11.1 vs 6.9 per 100,000). Suicide rates were greater than homicide rates among persons aged 35 years or older, but homicide rates were higher than suicide rates among persons younger than 35 years. It is noteworthy that the third-highest homicide rate (12.6 cases per 100,000) occurred within an age group spanning up to 1 year, namely, infants aged 1 year or younger.

Figures 2 and 3, available only in the online edition of the NCMJ, show deaths per 100,000 residents, stratified by North Carolina county, for suicide and homicide. For suicides, the western counties had higher rates, compared with the rest of the state. Conversely, for homicides eastern counties had the highest rates. Violent deaths did not occur exclusively in any specific region in North Carolina, although certain counties had higher rates for each category. During the 4 years examined, every county in the state had at least 1 violent death.

Table 2 shows that firearms were used in the majority of suicides (59.5% of cases) and homicides (67.0%). Other leading methods of committing suicide included poisoning (19.5% of cases) and hanging, strangulation, or suffocation (16.3%). Other leading methods for committing homicide included the use of sharp instruments (14.1% of cases), the use of blunt instruments (6.4%), and unarmed assault (5.0%).

Figure 1.
Suicide and Homicide Deaths per 100,000 North Carolina Residents, by Race, 2004-2007



Note. Data are from the North Carolina Violent Death Reporting System.

Figure 2.
Suicide Deaths Among North Carolina Residents, by County, 2004-2007

This figure is available in its entirety in the online edition of the *NCMJ*.

Note. Data are from the North Carolina Violent Death Reporting System. Asterisks denote that data are considered unreliable because they are based on <20 deaths.

Because the NC-VDRS uses multiple sources of data, it can describe the circumstances of the suicide or homicide in cases in which information is known. Tables 3 and 4 show the most common circumstances for suicides and homicides. For suicides, the most common circumstances were current depressed mood (48.2% of cases), current and prior mental health problems (47.4% and 46.3%, respectively), current treatment for mental health (42.5%), and crisis in the past 2 weeks (35.4%). The most common circumstances for homicides included argument, abuse, or conflict (46.8% of cases); instigation by another crime (34.0%); intimate partner violence (18.2%); and drug involvement (12.8%).

Discussion

Every day in North Carolina, approximately 3 people kill themselves and approximately 2 people are killed by others. Data from the NC-VDRS show that there were more than 6,700 deaths from violence in North Carolina during 2004-2007, accounting for 2.3% of all deaths in the state. North Carolina death rates ranked 24th in the nation for suicide (12.0 cases per 100,000) and 39th for homicide (7.2 per 100,000) during this period. The state with lowest rate of suicide was New York (6.58 cases per 100,000), and the state with the lowest rate of homicide was New Hampshire (1.4 per 100,000). The state with the highest rate of suicide was Alaska (21.21 cases per 100,000), and the state with the highest rate of homicide was Louisiana (13.4 per 100,000). More than 50,000 violent deaths occur each year in the United States. Every one of these deaths is preventable.

Men, who were much more likely than women to die from violence, accounted for three-quarters of both suicide and homicide victims. This sex-linked disparity suggests that violence prevention practitioners may wish to focus on the development of sex-specific violence prevention programs for implementation in North Carolina communities. Prevention research has yielded few evidence-based sex-specific interventions to date. Programs such as Men Stopping Violence, based in Atlanta, Georgia, could serve as useful models. In addition, research funding to address this gap may be beneficial.

The present study also documented differences in suicide and homicide rates by race/ethnicity, with whites having the highest suicide rates and American Indians and blacks having the highest homicide rates. Research should

examine the significantly higher rates among these groups to delineate contributing causes. Moreover, protective factors that have kept the rates low for other ethnic groups also warrant study. Hispanics have smaller suicide rates but greater homicide rates than non-Hispanics. In light of these differences, North Carolina violence-prevention practitioners are encouraged to assure that their violence prevention interventions are culturally appropriate for the target audience. *Saving Tomorrows Today: The North Carolina Plan to Prevent Youth Suicide* [7] is an example of an approach that has been implemented in North Carolina school settings among students.

Table 2.
Methods Used to Commit Suicide and Homicide in North Carolina, 2004-2007

	Deaths, no. (%), by cause	
Method	**Suicide (N = 4,218)**	**Homicide (N = 2,511)**
Firearm use	2,510 (59.5)	1,683 (67.0)
Poisoning	821 (19.5)	7 (0.3)
Hanging, strangling, or suffocation	686 (16.3)	85 (3.4)
Sharp-instrument use	59 (1.4)	355 (14.1)
Blunt-instrument use	0 (0)	160 (6.4)
Unarmed assault	Not applicable	126 (5.0)
Other/multiple	138 (3.3)	74 (3.0)
Unknown/missing	4 (0.1)	21 (0.2)

Note. Data are from the North Carolina Violent Death Reporting System.

Even though suicide was more common than homicide, homicide still inflicted a very high toll in terms of the number of potential years of life lost, given that homicides were more likely than suicides to occur within younger age groups, including infants. The North Carolina Child Fatality Task Force has been working to address mortality among children in the state by implementing and recommending evidence-based public health policies and by serving as a direct liaison with state policymakers who are focusing in these areas. Furthermore, efforts have been made to better understand the extent of child maltreatment in North Carolina. Enhanced surveillance of child maltreatment achieved via the linking of data from multiple agencies would be an important first step in support of this effort. Home visitation programs such as the nurse-family partnership program can also have a tremendous impact on reducing child maltreatment. In addition, the North Carolina Institute of Medicine Task Force on Prevention and Task Force on Adolescent Health have addressed the complex issue of family violence [8, 9].

Although homicide was more likely than suicide to occur among young persons in North Carolina, suicide still inflicted preventable deaths among North Carolina youths. North Carolina has recently been awarded funds from the Lee Garrett Smith Memorial Act, administrated by the federal Substance Abuse and Mental Health Services Administration, to address suicide among young people in the state and to implement the statewide youth suicide plan.

Figure 3.
Homicide Deaths Among North Carolina Residents, by County, 2004-2007

This figure is available in its entirety in the online edition of the *NCMJ*.

Note. Data are from the North Carolina Violent Death Reporting System. Asterisks denote that data are considered unreliable because they are based on <20 deaths.

Although suicide cases were distributed across the state, western counties had higher rates of suicide than did eastern counties. However, western counties also tended to have a higher percentage of white residents, relative to eastern counties. In contrast, the counties with the highest homicide rates were in the eastern part of the state. Interestingly, the I-95 corridor runs north and south through the counties with the highest numbers of homicide deaths in North Carolina. Although the number of violent deaths was greatest in this geographic area, every county in the state had at least 1 violent death during the 4-year study period. Although there may be pockets of violent activity in certain counties, where prevention efforts could be best focused, this study did not evaluate violent deaths at that level. Nevertheless, prevention groups and practitioners are encouraged to seek local data and address violent deaths in their communities. The NC-VDRS might be a valuable resource to local communities for this purpose.

American Indians had high rates of suicide and homicide, indicating that partnerships with and among American Indians to decrease violent deaths should be a priority. Involvement of tribal groups and officials (eg, the North Carolina Commission on Indian Affairs) and attention to culture are important factors to consider in the attempt to lower these rates.

The present study found that firearms were used to commit the majority of suicides and homicides. State and local health initiatives have taken active steps to reduce gun violence. Thirty-two percent of North Carolina parents with children in the household report that firearms are stored unlocked; storing firearms safely (locked and

unloaded) is paramount [10]. In 1999, the Durham County Health Department created a Gun Safety Team made up of community partners and members such as Safe Kids, the Durham Partnership for Health, the Religious Coalition for a Nonviolent Durham, and North Carolinians Against Gun Violence. The Gun Safety Team works with sport and game associations and hosts events to ensure that all firearms are safely stored and locked. They train pediatricians in medical practices to identify whether firearms are in their patients' homes and to discuss with patients' families ways to secure them. Winston-Salem State University's Center for Community Safety has been working with community members for the past decade to reduce the toll of violence in their community.

Finally, this research found several circumstances associated with suicides and homicides. Circumstances associated with suicides involved mental health characteristics and life stressors. The fact that 22.9% of people who committed suicide disclosed their intent to commit suicide should give practitioners pause. Efforts to make mental health treatment more effective and available should be considered. Many of the documented circumstances associated with North Carolina homicides revolved around arguments, abuse, and conflicts or were precipitated by another crime. More than 18% of homicides were related to violence between intimate partners. Groups such as the North Carolina Coalition Against Domestic Violence and the North Carolina Coalition Against Sexual Assault have been working to better understand and intervene in these situations before they escalate. Local health departments and community groups can help by coordinating and partnering with these statewide organizations.

Table 3.
Most Common Circumstances Associated With Suicide Deaths in North Carolina, 2004-2007

Circumstance	Suicide deaths, % (N = 3,909)
Current depressed mood	48.2
Current mental health problem	47.4
Prior mental health problem	46.3
Current treatment for mental health	42.5
Crisis in past 2 weeks	35.4
Person left a suicide note	27.9
Intimate partner problem	26.5
Disclosed intent to commit suicide	22.9
Physical health problem	20.2

Note. Data are from the North Carolina Violent Death Reporting System. More than 1 circumstance can be attributed to each case. A total of 92.7% of 4,218 suicide deaths had circumstance data available. Full definitions of circumstances are provided in [6].

Table 4.
Most Common Circumstances Associated With Homicide Deaths in North Carolina, 2004-2007

Circumstance	Homicide deaths, % (N = 2,107)
Argument, abuse, or conflict	46.8
Precipitated by another crime	34.0
Intimate partner violence	18.2
Drug involvement	12.8
Victim used a weapon	10.2
Gang related	3.8
Argument over money	3.8
Jealousy	2.5

Note. Data are from the North Carolina Violent Death Reporting System. More than 1 circumstance can be attributed to each case. A total of 83.9% of 2,511 homicide deaths had circumstance data available. Full definitions of circumstances are provided in [6].

The present study has several methodological strengths, as well as some limitations. One strength is that the study examined statewide data from multiple years that were collected via a surveillance system that employs standard and consistent definitions and case-finding methods for all deaths from violence and incorporates multiple sources of information (including death certificate information, medical examiner information, and police report information) [6]. No single data source contains all the relevant information about a given incident. Data quality is enhanced because the Office of the Chief Medical Examiner oversees a statewide system of medical examiners trained to investigate all nonnatural deaths, to complete most sections of the death certificate, and to complete a standardized field investigation report that is reviewed by a pathologist. All violent deaths in North Carolina require investigation by a medical examiner. These data, along with other critical information, are abstracted from the file and are included as part of the data collection for the NC-VDRS. Moreover, almost all North Carolina law enforcement agencies provide incident reports to the NC-VDRS. In 2007, more than 70% of cases included law enforcement data. The NC-VDRS relies on data from existing records; thus, the accuracy and completeness of the NC-VDRS data is limited by the accuracy and depth of detail recorded by each of the information sources (ie, death certificates, medical examiner records, and law enforcement reports).

The NC-VDRS provides the state with a more comprehensive understanding of deaths from violence by documenting the number of deaths due to suicide and homicide and information concerning the characteristics of these deaths. It is hoped that information from this surveillance system will be helpful to medical practitioners and others

in their design and implementation of evidence-based preventive and therapeutic interventions to decrease violence-associated mortality in North Carolina. Additional data or a de-identified data set can be requested through a standard data agreement. NCMJ

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POLICY FORUM

Prevention and Control of Injury and Violence

Introduction

Injury and violence are all too common in our world. There remain too many hazards where we work and play and too many opportunities for harmful events, stresses, and conflicts among and between people to expect a peaceful and harmonious society. We move too fast, pay less attention than we should, and let hazards go unrecognized for too long to avoid real harm to ourselves. We harm each other far too often, as well.

Even without external provocations, humans remain subject to impulses and behaviors that bring harm to others. "Violence is as American as cherry pie" is how H. Rap Brown put it, speaking at a time when violent conflicts were becoming far too common. But we endure perhaps more-personal violence within families and among close partners. Violence and conscious and unconscious harms are born of many causes and occur in many places. The toll of violence is calculable in terms of injuries and deaths, which occur with such frequency that we can easily assign violent harm to the list of leading public health problems for the nation, as well as for North Carolina and its communities.

The policy forum of this issue addresses injury and violence in terms of victims, mechanisms, and preventive solutions. This taxonomy is necessary to help reduce the incidence of harmful events. The problem is not a unitary one that invites a single society-wide solution; rather, it represents a multifaceted flaw in the human condition and the ways in which we structure our environment that requires that we learn the nuances and brutal reality of the many manifestations of harm.

It may be easy to recognize that violent deaths from motor-vehicle crashes are preventable by changing the behavior of drivers, but the extent to which we need to change the physical structures that protect pedestrians from the deadly kinetic force of vehicles is less obvious. Devices can cause harm by their misuse. Guns are a device of sorts: they have a deadly purpose, but they can also serve as a deeply political symbol or a pragmatic instrument of protection. Again, behavioral change is necessary to reduce harms, but structural protections are equally necessary to prevent injury or death.

Our social institutions have evolved to protect and build society. Humans are social beings who live in families and groups to fulfill their lives. These joint lives are often stressful, and the power and strength of the participants is not equally shared. This can create the opportunity for harms and injuries that are not always viewed as avertable or even unjust. Partner violence and violence against women are no longer subjects to be ignored in their physical and psychological manifestations. The lonely psychology of suicide presents another challenge as we reflect on how to make people aware of the reality of mortal threats while supporting their place and purpose in life.

It is this last paradox that makes injury and violence due to nonbiological events a challenge to unite as a topic. We must increase awareness about injury and violence, to help people avoid the harmful consequences of these threats. At the same time, we must work to eliminate injury and violence, which decrease awareness of their existence.

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

ISSUE BRIEF

Positioning North Carolina for Leadership in Injury Control:
A Call to Action

Carol W. Runyan

For most types of injury and violence, mortality and morbidity rates in North Carolina are worse than those of the nation. The costs in lives and dollars are enormous. The state has not provided the necessary resources for tackling the problem, devoting barely $6 per death to preventive efforts and failing to ensure that the public health workforce is adequately trained. At the same time, North Carolina has numerous excellent academic and community-based resources that can enable further capacity development. This article suggests the following 6 key steps for moving the state forward to prevent injury: making a serious financial commitment, training practitioners, supporting safety-promotion initiatives, creating a stronger culture of safety, addressing disparities, and improving data systems.

People with fewer resources are likely to live in less safe homes, to drive cars with fewer safety features, and to accept more-hazardous jobs, while also having more limited access to health care. As our population ages, injuries create new challenges; older persons have higher case-fatality ratios than younger persons, given the same severity and type of injury.

North Carolina has higher fatality rates than the nation overall for most types of injury (Table 1) [1, 2]. There are many hazards that are exacerbated by rural living, including the risks associated with agricultural work, travel on rural roadways, and distance from trauma care centers. North Carolina also has the 15th largest percentage of residents who are living below the federal poverty level [3].

The problem of falls, as discussed in the policy forum contributions by Schneider and colleagues [4] and Proescholdbell and Harmon [5], is substantial in North Carolina and could increase as the population ages. Although information on injury problems within the state's growing Latino population is hard to discern, this population, like other minority groups, faces multiple health disparities, including special challenges associated with language barriers (eg, a large number of workers whose native language is not English work in construction, which is one of the most dangerous occupations).

At the same time as North Carolina exhibits mortality and morbidity levels above the national averages, the state has unusual capacity to address injury prevention and control, as discussed in the policy forum of this issue of the *NCMJ*. But to produce positive outcomes, action must be taken to marshal these resources. Some of the many resources available in the state are listed in Table 2. They include the University of North Carolina (UNC) Injury Prevention Research Center, one of 11 centers of excellence in injury control funded by the Centers for Disease Control and Prevention and one of only two that have been continuously supported since 1987. UNC is also home to the Highway Safety Research Center,

Table 1.
Fatality Rates in North Carolina and the United States, by Select Injury-Related Cause or Intent, 2007

	Deaths per 100,000	
Cause or intent	**North Carolina**	**United States**
Motor-vehicle event	19.92	14.63
Firearm	12.31	10.35
Suicide	11.88	11.47
Unintentional poisoning	10.08	9.90
Homicide	7.44	6.09
Fall	6.99	7.77
Fire and burn	1.79	1.25
Drowning	1.08	1.14
Occupational event[a]	4.2	3.8

Note. All data are per 100,000 population and from [1], unless otherwise indicated.
[a]Data are per 100,000 workers and from [2]

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Table 2.
Select North Carolina Resources for Addressing Injury and Violence Prevention

Affiliation, organization	Web site	Major activities
University		
UNC Injury Prevention Research Center	http://www.iprc.unc.edu	Research (violence, sports/recreation injury, occupational safety, home safety), training of professionals, program and policy evaluation
UNC Highway Safety Research Center	http://www.hsrc.unc.edu	Research, program and policy evaluation
Division of Occupational and Environmental Medicine, Duke University School of Medicine	http://dukeoccmed.mc.duke.edu	Research, training professionals
Injury Prevention Program, East Carolina University	http://www.ecu.edu/cs-dhs/ecuem/ECIPP.cfm	Research, community-based programs
Department of Emergency Medicine, UNC School of Medicine (NC DETECT)	http://www.ncdetect.org	Surveillance of emergency department visits
State of North Carolina		
Injury and Violence Prevention Branch, Division of Public Health	http://www.injuryfreenc.ncdhhs.gov	Coordination of state injury efforts, surveillance, program and policy development, technical assistance
Office of the Chief Medical Examiner and Child Death Review	http://www.ocme.unc.edu	Child death review, technical assistance in development of prevention efforts
Department of Labor	http://www.nclabor.com	Education and enforcement of labor safety standards, including OSHA and child labor protections
Office of EMS	http://www.ncems.org	Oversight of state trauma registry and EMS data, coordination of emergency medical services and trauma system
Department of Insurance	http://www.ncdoi.com	Oversight of Safe Kids program, development of building codes, oversight of the fire service
Department of Mental Health, Developmental Disabilities, and Substance Abuse Services	http://www.ncdhhs.gov/mhddsas/	Maintain controlled substances reporting system, oversee state epidemiological workgroup on substance abuse
Other		
North Carolina Child Fatality Task Force	http://www.ncleg.net/DocumentSites/Committees/NCCFTF/Homepage/	Policy development and advocacy
Prevent Child Abuse–North Carolina	http://www.preventchildabusenc.org	Training of professionals, program and policy development, advocacy
Carolinas Poison Control Center	http://www.ncpoisoncenter.org	Clinical service, public and professional education

Note. EMS, emergency medical services; NC DETECT, North Carolina Disease Event Tracking and Epidemiologic Collection Tool; OSHA, Occupational Safety and Health Administration; UNC, University of North Carolina.

which has led research and intervention development in road safety for more than 3 decades. Researchers are conducting nationally recognized work on injury control, not only at UNC–Chapel Hill, but also at North Carolina State University, East Carolina University, UNC-Greensboro, Duke University, and Wake Forest University.

The state health department has a strong tradition of attention to injury control, having developed its agenda in the late 1980s in response to a report of the Governor's Task Force on Injury Prevention and Control. In addition, North Carolina is a leader in tracking data on injury. The North Carolina State Center for Health Statistics and the Injury Epidemiology and Surveillance Unit in the North Carolina Division of Public Health have been generating injury-related data for many years. The state Office of the Chief Medical Examiner has an exemplary system of gathering and using death data for research, and it oversees the child fatality review process statewide. North Carolina is one of 18 states participating in the National Violent Death Reporting System, and the North Carolina Disease Event Tracking and Epidemiologic Collection Tool, operated by the Department of Emergency Medicine at the UNC–Chapel Hill School of Medicine, provides data on visits to emergency care, allowing rapid identification of case clusters. In addition, the North Carolina trauma registry has been in operation for more than 20 years, collecting standard data from trauma centers statewide [6]. North Carolina has a regional poison-control center at Carolinas Medical Center [7] and has strong partnerships that address child maltreatment [8] and violence against women [9].

Numerous other state and local agencies and organizations have played important roles in promoting safety. For example, North Carolina has a statewide Safe Kids network that organizes community efforts to reduce the incidence of unintentional injury among children, a dedicated fire service, and numerous nonprofit organizations that address injury problems such as intimate-partner violence and rape. The Child Fatality Task Force has a long tradition of advocacy for safety policies [10], and a recent report by the North Carolina Institute of Medicine (NCIOM) Task Force on Prevention outlined key areas for attention [11]. North Carolina has made considerable progress in recent decades, but there is much left to do.

Call to Action

First and foremost, the state must make a commitment to ensure that its infrastructure is adequate to address injury and violence prevention. While some states have annual appropriations for their state health department injury program, North Carolina does not. In fact, data from a recent year suggested that the funds devoted by the Division of Public Health to injury prevention in North Carolina totaled less than $6 per injury-related death [12]—barely more than the price of a latte at a local coffee shop. Although resources are limited, the cost of *not* preventing injury is enormous. In the United States, the lifetime cost of injuries occurring over a single year total $406 billion, with medical expenditures in 2006 topping $68.1 billion, a figure exceeded only by the expenditures for heart disease [13].

Second, as part of infrastructure development, North Carolina needs to ensure that practitioners throughout the state are properly trained in principles of injury prevention. Imagine a cardiac surgeon without formal training in surgery or anatomy, or a pediatrician not schooled in the principles of child development! Yet, professionals throughout the state who should be tackling injury prevention have had inadequate opportunities to receive training in the principles of injury prevention. We need to ensure adequate training of professionals in public health and other health-related fields. These training efforts can be innovative and cost relatively little. One example is the PREVENT program (available at: http://www.prevent.unc.edu), which has focused on moving prevention into the work of clinical and service professionals. Initiated in 2003, PREVENT is a national training program operated by the Injury Prevention Research Center that has already trained more than 900 practitioners to engage in the primary prevention of injury and violence. This type of training, as recommended for funding by the NCIOM Task Force on Prevention [14], will help practitioners use scarce resources wisely by relying on evidence-based strategies and or by using rigorous evaluations to create new evidence.

Third, the state must continue to support strong legislation that promotes safety on North Carolina roads and in workplaces, homes, schools, and health care facilities. It is not enough to rely on the education of individuals, with the hope that they will be able to individually prevent injuries. As with most public health issues, injury and violence solutions need to rely on policy change, regulatory approaches, and environmental modifications to achieve population-level change. These include policies that ensure safe environments. Examples include limits on child participation in farm labor, various traffic-safety measures cited in the commentary by Garrison and Smith [15], and building codes that promote fire safety and reduce risks of carbon monoxide poisoning. In the promotion of safety, increases in taxes have been shown to have positive effects. For example, the NCIOM Task Force on Prevention recommended increased taxes on alcohol sales as one means of reducing the toll of multiple mental health, injury, and violence problems, ranging from assault to motor-vehicle crashes, that are closely related to alcohol consumption [14].

Fourth, there is a need to foster cultures of safety in workplaces, schools, and health care facilities. Measures for achieving this objective include reducing inappropriate prescriptions of narcotics, ensuring that school athletic programs use proper techniques in returning concussed athletes to play, and implementing firearm safety practices, such as those outlined by Coyne-Beasley and Lees [16] in their policy forum contribution.

Fifth, ethnic and racial disparities in injury risk must be

addressed, and the cultural appropriateness of strategies for prevention must be ensured. For example, young parents living far from their families must have adequate support in learning how to practice positive parenting skills that enable safe disciplinary practices, and they must have access to quality child care facilities [8]. Plus, it is important to ensure that businesses employing immigrants follow safety procedures in construction and agriculture, two of the state's most dangerous industries [17].

Sixth, there must be continuous improvement in the state's ability to monitor progress, with good public health surveillance systems and close integration of surveillance and prevention efforts throughout the numerous sectors responsible for injury control (eg, public health, law enforcement, labor, education, health care, emergency and disaster response, traffic safety, fire protection, social services, and insurance). The formation of the Injury and Violence Prevention State Advisory Council by the Division of Public Health is an important step forward [11]. It is also time to reconsider the creation of a legislative or governor's task force to ensure multisectoral attention to injury control in North Carolina at the highest levels. The main objectives of the task force should involve reviewing progress on injury control efforts and building on the state's tremendous potential to improve the quality of life among all residents, including those born and raised in North Carolina, those arriving as immigrants, and those passing through while serving at one of the state's military bases.

Conclusion

North Carolina has excellent capacity to reduce the major burden of injury and violence but, to achieve this public health goal, needs to fully mobilize this capacity through a coordinated effort. We must acknowledge that, as a discipline, public health must often rely on policy and regulatory measures to protect the whole population. North Carolina is home to one of the first systems of county health departments in the country. Let's use and expand that infrastructure to rejuvenate our attention to the health problem that robs our population of more years of potential life than heart disease and cancer combined. We have the capacity to be the most forward-looking and progressive state in reducing the terrible toll that injury and violence take on our citizens. To do so, we must demonstrate the political will to engage in bold preventive measures, especially in these difficult financial times, to achieve the payoffs for our populace. **NCMJ**

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Injury Prevention:
North Carolina's Challenge and Capacity to Respond

Sharon Baker Rhyne, Sharon Schiro

North Carolina has worked to develop an infrastructure and identify priorities to reduce the high morbidity and mortality from injuries. Findings of the North Carolina Institute of Medicine (NCIOM) Task Force on Adolescent Health and the NCIOM Task Force on Prevention, combined with the North Carolina Division of Public Health strategic plan and the Injury and Violence Prevention State Advisory Council, have laid the path toward this goal.

Each year, thousands of North Carolinians are disabled by or die of intentional and unintentional injuries. Unintentional injuries, most of which result from motor-vehicle collisions, falls, and unintentional poisonings, are the leading cause of death for North Carolinians across all age groups [1]. Intentional injuries, such as homicide and suicide, are among the 5 leading causes of injury-related death across all age groups. Among young children, intentional injuries are commonly due to assault; however, in every age group, starting with individuals aged 10-14 years, suicide is among the top 5 leading causes of death. Many groups in North Carolina, including state, university, hospital, and nonprofit organizations, are working to reduce the occurrence of injuries and to minimize the morbidity and mortality of injuries that have not been prevented. The designation of a central coordinating agency, the development of a multiyear strategic plan involving multiple partners, and the emphasis on evidence-based practices should increase the impact of efforts to prevent injury.

The Challenge

Motor-vehicle collisions are the leading cause of death due to unintentional injury in North Carolina. Many motor-vehicle collisions are the result of speeding, not wearing a seat belt, and/or driving while impaired (DWI), and many involve motorcyclists. The 2009 report by the North Carolina Institute of Medicine (NCIOM) Task Force on Prevention included several recommendations that focus on these causes, including enhancing surveillance and enforcement of traffic laws, ensuring training and licensure of all motorcycle drivers, enacting a primary belt use law for rear-seat occupants of vehicles, and requiring breath alcohol ignition interlock devices for drivers with a previous DWI offense [2]. The 2009 report from the NCIOM Task Force on Adolescent Health addressed the causes of motor vehicle–related injuries that are more prevalent among children and adolescents aged 10-20 years than among individuals in other age groups [3]. Adolescence is a period of great change in all aspects of development and a time when many behaviors are learned or tested that will significantly impact the rest of one's life. Thus, interventions that reduce risk-taking behavior during adolescence can reduce youths' immediate risk for, and long-term consequences of, serious injury. North Carolina has adopted many evidence-based strategies to reduce the occurrence of motor vehicle–related death and injury, such as a graduated driver-licensing system and mandatory seat belt use. However, motor vehicle–related deaths and injuries could be additionally reduced through greater enforcement of existing laws, improvements in driver education, a primary belt law that applies to all vehicle occupants, and increased fines associated with noncompliance with seatbelt and DWI laws.

Falls are a leading cause of injury in North Carolina, predominantly affecting people older than 65 years [4]. Falls can result in serious injuries, such as hip and pelvic fractures and traumatic brain injuries, that may lead to lifelong disability or death. As the populations of North Carolina counties shift toward greater percentages of residents older than 65 years, the number of people affected by fall-related injuries and the associated health care costs will dramatically increase in the absence of interventions. Falls are also addressed in the report by the prevention task force, with recommendations to increase funding for implementation of evidence-based falls prevention programs and injury surveillance, to coordinate existing prevention efforts in the state, and to improve housing conditions and thereby ensure healthy and safe homes [2].

Deaths from unintentional poisoning are increasing significantly in number, and unintentional poisoning is the second leading cause of unintentional injury in North Carolina. During 1999-2007, deaths due to unintentional poisoning increased from 3.5 to 9.9 cases per 100,000 population—an

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increase of 183% [5]. The majority of these deaths (75%) were due to use of prescription and over-the-counter drugs, especially methadone and other narcotics. Twenty-three percent of the remaining deaths were due to use of illicit drugs, primarily cocaine. Death occurred most frequently among people aged 35-54 years. Because behaviors that begin during adolescence tend to carry over into adulthood, addressing substance-abuse behaviors among adolescents is crucial to reducing the overall burden of this type of injury. To this end, the Task Force on Adolescent Health recommended increased screening and treatment of substance abuse and mental health problems and maintaining the drinking age at 21 years [3]. The Task Force on Prevention report also made several recommendations to reduce the occurrence of unintentional poisoning, such as safe storage of hazardous substances, including prescription drugs [2].

The NCIOM Task Force on Child Abuse Prevention, which convened during 2004, focused on an aspect of intentional injuries, namely, childhood injuries due to violence and neglect [6]. Abuse and neglect affect thousands of children in North Carolina each year and can result in long-term emotional, cognitive, and physical disability. To date, prevention efforts in this area have been fragmented, with limited coordination at the state level, limited funding, and limited surveillance. The statewide strategic plan developed by the Task Force on Child Abuse Prevention set forth 37 recommendations to address the prevention of child maltreatment and abuse. Specific recommendations included focusing on prevention instead of reporting, development of a new state structure to coordinate prevention efforts, promotion of collaboration among prevention agencies and the state, promotion of the use of evidence-based prevention practices, and development of a child maltreatment surveillance system [6].

To reduce morbidity and mortality from injury, there is a need for a strong state infrastructure to provide the leadership, funding, and data required to support injury surveillance and prevention, as well as for recognition by the public and the government that injury is a significant public health problem. Several recommendations reflecting these issues were common among the 3 injury-related reports by the NCIOM task forces and included the recognition of injury as a significant public health problem and prevention as an essential public health service, the development of infrastructure to support injury surveillance and prevention activities, and the need to change social norms and everyday behavior to promote injury prevention.

The Capacity to Respond

The state has vast experience to confront the challenges presented by the injury and violence prevention recommendations. Over the years, numerous state agencies, such as the Department of Health and Human Services, the Division of Mental Health, Developmental Disabilities and Substance Abuse Services, the Department of Insurance, the Department of Transportation, and the Governor's Highway Safety Program, and a number of universities, private organizations, and hospitals have demonstrated a strong commitment to, and provided expertise in, injury and violence prevention, including related research. In 1991, the North Carolina General Assembly established the Child Fatality Task Force to respond to the public's concern about preventable deaths among children. Soon thereafter, the state became nationally recognized for several successful injury prevention campaigns that continue today, such as Click It or Ticket, a campaign begun in 1993 to encourage compliance with state seat belt laws, and Booze It & Lose It, a DWI-specific enforcement and education campaign started in 1996. More-recent initiatives include the Period of PURPLE Crying, the largest and most comprehensive program in the country aimed at prevention of shaken baby syndrome.

Despite this work, for a long time the state lacked a coordinating entity—an agency clearly vested with broad responsibility for injury and violence surveillance and the conceptualization of a statewide injury plan with related oversight and evaluation of efforts. Finally, in 2007, the General Assembly passed legislation that designated the Division of Public Health as the lead state agency for the broad spectrum of injury and violence prevention activities in North Carolina. Within the division, the Injury and Violence Prevention (IVP) Branch was established in 1989 and willingly took on this charge, knowing it could depend on the support and assistance from a vast array of partners who were equally vested in cutting the state's injury morbidity and mortality numbers.

After the legislation was passed, the mission of the IVP Branch was adapted to include facilitating development and implementation of a statewide strategic plan for injury and violence prevention; facilitating a comprehensive, statewide approach to injury and violence prevention through collaboration; and maintaining a statewide injury prevention program that includes data collection, surveillance, education, and effective prevention strategies.

The IVP Branch brought approximately 60 stakeholders together during 2008-2009 to develop a vision, consisting of goals, specific objectives, and action steps, for an injury and violence prevention plan. Input from approximately 40 additional stakeholders was sought throughout the writing process. The goal was not to replace the individual plans and goals of the many partners, but to build upon these goals, providing a common road map for a stronger state infrastructure to support injury and violence prevention efforts.

At about the same time as the effort led by the IVP Branch got underway, the NCIOM convened the Task Force on Adolescent Health and Task Force on Prevention. Although issues related to injury and violence were not included in the initial agenda of the Task Force on Prevention, the IVP Branch, in its capacity as the state's lead agency on this issue, advocated strongly for a change. As the NCIOM task forces examined factors (and their underlying causes)

associated with the greatest morbidity and mortality at the population level, it became clear that inclusion of injury and violence prevention strategies in their agendas was necessary. The parallel work of the IVP Branch and the NCIOM task forces was mutually beneficial, as the individual efforts of each group enhanced the recommendations and plans of the other groups. Relevant recommendations were subsequently incorporated into the state's Healthy People 2020 agenda.

The state plan, complete with data testifying to the burden of injuries and violence in North Carolina, was finally set forth in 2010 [7]. The plan provides a blueprint for building and strengthening injury and violence prevention efforts in North Carolina through a systems-level approach. The following goal areas, each with an associated work group, were identified: (1) data and surveillance; (2) research and evaluation; (3) messaging, policy, and environmental change; (4) saving lives; (5) building the injury prevention community; and (6) workforce development.

The fourth goal, saving lives, focuses on reducing the rate of morbidity (and, thus, mortality) due to injury and violence by implementing prioritized, data-driven strategies and programs, policies, and innovative and tested practices. Data from 1999 through 2007 provided solid evidence that the leading causes of unintentional injuries (ie, motor-vehicle crashes, poisonings, and falls) and intentional injuries (ie, suicide and assault/homicide) had to be the primary focus of any efforts if the state was to reach its goal of cutting the overall rate of injury-associated morbidity by 15% in 5 years [7]. Most importantly, any agency or group at the state or local level can draw on the data and priorities of the state plan to make informed decisions that maximize the limited resources available to combat this major public health problem.

As the state plan neared publication, the IVP Branch worked with the state health director to identify a core of 25 injury and violence prevention partners, who met in August 2009 to form the first Injury and Violence Prevention State Advisory Council (IVP-SAC). In April 2010, the IVP-SAC sponsored North Carolina's first Injury and Violence Prevention Day. The event at the state legislature focused on the release of the state's first strategic injury and violence prevention plan and formal recognition of the many partners who were instrumental in the plan's formation and committed to its execution. Other related activities included speakers from across North Carolina, who addressed topics about injury and violence prevention to the advocates, legislators, and citizens in attendance.

Prevention of morbidity and mortality due to injury will require multiple resources, including funding, innovative ideas, continuous surveillance, excellent evaluation, and the assistance of a cadre of partners committed to the shared vision of a North Carolina free from injuries and violence. For the first time, a robust, statewide framework is in place to help ensure the success of these injury prevention efforts. **NCMJ**

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Injury Prevention:
Aspects of the Legislative Response

Tom Vitaglione

Injury is the leading cause of death among children aged 2-17 years. A legislative study commission—the North Carolina Child Fatality Task Force—was established in 1991 to study the causes of child deaths and to make recommendations to prevent future deaths. Aspects of the legislative response are presented here.

The lead article in this policy forum makes it clear that injuries result in enormous human and fiscal costs, affecting not only individuals and families, but also society as a whole [1]. Thus, it should come as no surprise that injuries receive considerable public attention that is spread across much of state government.

The North Carolina Department of Health and Human Services has a specific branch dedicated to injury prevention. The state's Department of Labor and Department of Agriculture devote considerable energy and funding specifically toward the prevention of injuries in the workplace. The North Carolina Department of Insurance focuses on injury prevention as a way to reduce insurance costs, and the University of North Carolina Injury Prevention Center provides a research basis that informs injury-prevention efforts in North Carolina and beyond.

The North Carolina General Assembly considers injury issues in an array of committees and joint oversight groups. There is, however, one legislative study commission, the North Carolina Child Fatality Task Force, that spends much of its time on the study and prevention of injury fatality and serious morbidity.

Approximately two-thirds of deaths among children younger than 18 years occur in the first year of life, and the task force spends a significant amount of its time on the prevention of infant mortality. However, injury is the primary cause of death among children aged 2-17 years. Although the task force's mandate restricts its attention to children, it has accumulated a lot of experience on the many legislative aspects of injury prevention.

Targeting Personal Behaviors Versus Products

Legislative interventions to prevent injuries basically fall into 2 categories: those affecting personal behaviors and those affecting products in the marketplace (or, in some instances, both). The environment for legislative action in these 2 categories is quite different. Proposals to affect personal behaviors, such as requiring the use of seat belts, receive broad but often diffuse opposition because they raise the basic issue of government intrusion into personal and family life. When a proposal is put forward to restrict or eliminate a product from the marketplace, such as banning novelty lighters, which have inadvertently led to human and property loss, the opposition is usually more narrow but deeper because manufacturers and retailers are financially affected and have extensive lobbying capacities.

Legislation as a Last Resort

The American tradition is steeped in individualism and capitalism. Thus, any legislation that restricts behavior or freedom of choice is usually considered intrusive. Each of the 50 states has developed its own tolerance level for such intrusion, with the southern states, including our beloved home, having, perhaps, the lowest tolerance levels. Thus, legislative proposals, including those made by a legislative study commission, must meet the standard of "last resort," which means that it must be clear that all other forms of intervention considered have been deemed inadequate.

The standard also has other criteria to be considered: How often does the problem (injury, in this case) occur? Is the proposed intervention evidence based, in terms of reducing the occurrence of injury? What fiscal costs are involved?

Education as the First Option

Even when the standard for legislative involvement is met, the first option considered is education. The voluntary change in behaviors through awareness campaigns avoids allegations of intrusion and is obviously appealing to legislators. A good example is the ongoing state-funded Safe Sleep Campaign to make new parents aware of the risk indicators for sudden infant death syndrome. Research has produced several evidence-based ways to reduce the occurrence of these deaths. Versions of the campaign have been in place for a decade, and the number of such deaths has declined significantly.

Providing state funding is not an easy decision at any time, and it is particularly difficult during the current recession. From a legislator's perspective, it would be best for

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funds to come from another source (eg, federal agencies and foundations). When no such source can be identified, securing state funding is easiest when the intervention is education and is evidence based.

Education Through Legislative Action

There are times when legislators agree that more than education is needed to get the attention necessary to change behaviors. At this level, penalties for risky behaviors are usually very mild. However, simply adopting a legislative requirement will often significantly increase compliance. For example, when legislation some years ago required that certain child car passengers be secured in booster seats, the compliance rate spiked even though the penalty for noncompliance is only $25 (which can be forgiven if a booster seat is soon purchased). This supports the hypothesis that parents are looking for guidance about child safety, and the imprimatur of the North Carolina General Assembly is quite powerful in this regard.

Punitive legislation. There are also times when the legislative message is delivered with heavy penalties, usually because the risk to others is greater and the community is very interested in controlling the offending behavior. A primary example is driving while impaired, which includes stiff monetary penalties, insurance penalties, and restrictions in driving privileges for a period. Even here, however, legislators wrestle with the issue of punishment, noting that heavy fines are disproportionately onerous on low-income folks.

Standards for children versus those for adults. Just as families place a priority on the protection of children, so the legislature seems to be more receptive to proposals to protect children, who presumably might not know any better or be unable to fend for themselves. (Perhaps this should not be surprising, since virtually all the members of North Carolina's citizen legislature are parents or grandparents of young children.) Thus, only children younger than 16 years are required to wear helmets while bicycling, and only children younger than 12 years are banned from riding in the open bed of a pickup truck. A classic example of the "adult/child phenomenon" is the case of all-terrain vehicle (ATV) regulations. All ATV operators are required to wear protective gear. However, operators younger than 16 years are restricted to lower-powered ATVs, and children younger than 8 years are banned from operating any ATV.

Finally, by far the most successful application of this line of thought is the graduated licensing system for drivers. While the legislature continues to agree that licensees aged 18 years and older should be allowed to operate a car without restrictions, North Carolina was one of the first states to adopt a system that includes restrictions for licensees younger than 18 years (who are not permitted to drive alone, or at night, or with multiple passengers) that, with good driving behavior, are eased in stages as the driver approaches 18 years of age. Restrictions include a ban on the use of a cell phone while driving, a proposal that has been a nonstarter when considered for adults.

The agricultural exemption. North Carolina as a state pays great deference to agriculture and its traditions. This likely stems from times when agriculture formed almost the entire base of the economy and most farms were family run. Although these times are in the past, the legislature remains prone to exempting agriculture from many statutes, and injury prevention is a prime example. Thus, the ATV regulations cited above do not apply to machines operated for agricultural purposes. Children of any age can ride in the open bed of a pickup truck if the vehicle is being used on a farm.

For child-safety advocates, perhaps the most worrisome agricultural exemption is for child-labor regulations, almost all of which are waived if the child is working on a farm. Not only are regulations on hours and work conditions waived, but regulations on the operation of machinery are waived, as well. Thus, a teen employed at a large hardware store is prohibited from operating most machinery at the store but is allowed to operate any machinery on a farm. It is no surprise to learn that child-labor injuries occur a lot more frequently on farms than in other workplaces. Yet the time-honored tradition of the agricultural exemption remains essentially unchallenged.

Children as property. Another American tradition, variably applied by the 50 state subcultures, is the consideration of children as the property of the family. Thus, to the extent that the public ethic is to avoid intrusion into family matters, children are subject to the behaviors of adult family members. When there are specific statutory protections, such as safety requirements for child passengers, there are fines for noncompliance, but the adults who allow a child to go unprotected have traditionally not been held accountable in the legal sense.

Three years ago, North Carolina adopted a "child-endangerment" statute. The intent of such statutes is to make it a crime to put a child at serious risk of injury, with escalated charges if the child is seriously hurt or dies. The fact that North Carolina was one of the last states to enact such protection for children speaks to many of the issues presented above. It will be very informative to monitor how the child-endangerment statute is applied over time. Situations in which this statute has been enforced include driving while impaired with a child passenger in the car and leaving a young child unsupervised in a locked car. The extent to which this statute will enhance the protection of children from injury will be an issue of concern for child advocates for some time to come.

Conclusion

Children will continue to be risk takers, and it is most likely that injury will continue indefinitely to be the leading cause of death in children older than 1 year. While parents are the primary protectors of children, government can play

an important supporting role. Finding the balance between support and intrusion remains a challenge—a critical challenge that must be addressed if we wish to reduce child deaths. There can be no greater calling. NCMJ

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lol. cul8r. @wrk. ttyl. Texting has its own language. We use that language as a life line to connect to our friends, family and co-workers. We send pictures. We chat. We text.

Epidemiology of Injury and Violence in North Carolina

Scott Proescholdbell, Katherine J. Harmon

Injury and violence are significant public health problems in the state, on par with other leading causes of deaths. This article reviews the leading causes of injury-associated deaths, hospitalizations, and emergency department visits for North Carolina residents; outlines data resources and policy implications; and facilitates further discussion on injury epidemiology and surveillance needs.

Every day in North Carolina, 17 people die as a result of an unintentional injury or an act of violence (North Carolina State Center for Health Statistics [SCHS], unpublished data, 2010). Injury and violence are significant public health problems in the state, on par with other leading causes of deaths. Moreover, hospitalizations and emergency department (ED) visits related to injury and violence represent a significant number of admissions to health care facilities each day in North Carolina (SCHS, unpublished data, 2010; North Carolina Disease Event Tracking and Epidemiologic Collection Tool [NC DETECT], unpublished data, 2010). It is estimated that 1 in 4 Americans visit their physician each year for an injury-related event [1]. Yet, injury and violence seem to lack the public recognition that these significant numbers would seem to garner.

This article reviews the leading causes of injury-associated deaths, hospitalizations, and ED visits for North Carolina residents; outlines data resources and policy implications; and facilitates further discussion on injury epidemiology and surveillance needs. Unless otherwise indicated, data are from the SCHS (unpublished, 2010).

The greatest burden of injuries falls on younger people. Unintentional injuries are, collectively, the leading cause of death among people aged 1-44 years in both the nation and North Carolina. Analyses that account for years of potential life lost reveal that injury and violence lead the state by a wide margin, with nearly 20 years of potential life lost on average (Table 1) [2]. Furthermore, when unintentional injuries are combined with violence-related events, they are the third leading cause of death among all North Carolinians, after cancer and heart disease.

There are common misconceptions that injuries are "random," "accidents," "acts of nature or god," "unexplained," or "destined to occur." However, when carefully and closely examined, the vast majority of injuries have predictable patterns, have known risk factors, and affect specific populations, thus providing opportunities for intervention and

Table 1.
Leading Causes of Death in North Carolina

		Years of potential life lost[a]	
Cause(s)	**Deaths, no.**	**Per death, mean**	**Total**
Cancer	**17,476**	3.46	60,420
Heart disease	17,133	2.70	46,269
Injury, violence	6,074	**19.29**	**117,143**
Stroke	4,391	1.96	8,602
Chronic lower respiratory disease[b]	4,324	1.31	5,646
Alzheimer disease	2,645	0.04	112
Diabetes mellitus	2,107	3.40	7,165
Hypertension	796	2.40	1,912
Atherosclerosis	215	0.78	168
Any	76,948	5.06	389,358
Chronic disease only	51,846	2.73	141,294

Note. Values in boldface represent the peak in each column. Data are from [2].
[a]Based on deaths that occurred prior to age 65 years.
[b]Defined as asthma or chronic obstructive pulmonary disease.

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prevention. Injury and violence cover a broad array of subjects and overlap many disciplines. The injury and violence umbrella is diverse; topics range from car seat use to homicides, and disciplines include public health, public safety, and transportation. To a certain extent, this breadth and crossover create challenges to defining the field and performing comprehensive surveillance.

Intention is a fundamental construct in the injury and violence field. Injuries are divided largely between intentional events and unintentional events. Intentional acts are defined as active, deliberate uses of force against oneself (eg, suicide or attempted suicide) or another person (eg, assault or homicide), whereas unintentional acts are defined as events in which a harmful outcome was not sought and the injury occurs within a short time frame (eg, injury due to motor vehicle traffic [MVT] crash, injury, falls, and poisoning). Fundamentally, injuries are categorized by intent. Clearly, in terms of prevention and intervention, this distinction is critical. Injuries whose intents are unknown or whose data coding is incomplete are counted differently or not at all. Completeness of coding for injury and violence is an important issue for accurate and comprehensive surveillance. North Carolina is fortunate to have many surveillance systems in place that are high quality and readily available for public health use. For example, the SCHS maintains death certificates and hospital-discharge data. The department of emergency medicine at the University of North Carolina School of Medicine, in conjunction with the North Carolina Division of Public Health, maintains the NC DETECT (available at: http://www.ncdtect.org), a statewide syndromic-surveillance system of data from EDs and other sources.

The ultimate goal of injury epidemiology and surveillance is to provide meaningful information that can direct actions to prevent morbidity and early death. A focus on preventing morbidity and early death is especially pertinent to younger populations, because they experience the greatest injury burden and have the potential to lose the greatest number of productive years of life. Data-driven programs and interventions can lead to the reduction and prevention of injuries. It is hoped that increased understanding of the scope and burden of injuries can significantly decrease early deaths, injuries, and injury-related disabilities, thereby allowing people to live their lives to the fullest potential.

Overall, injury and violence resulted in more than 6,000 deaths among North Carolina residents in 2009 (Figure 1). In 2009, 68% of injuries were unintentional, 28% were intentional, and 4% were undetermined, due to legal intervention, or due to other intents. Sixty-seven percent of deaths involved males, and 33% involved females. A total of 76% of deaths occurred among residents aged 25 years or older. Whites (79%) and blacks (18%) had the largest percentage of deaths, but adjustment for population size yielded percentages that were very similar to the state's overall demographic composition. However, in specific injury areas (eg, unintentional poisoning and homicide), the number of injury-associated deaths per 100,000 persons varied significantly.

Figure 1 also highlights several limitations in surveillance data. For example, the number of outpatient visits associated with injuries, as well as the number of North Carolina residents with an injury that was medically unattended, were unknown for 2009. In addition to the limitations highlighted in Figure 1, there are further constraints on the injury surveillance data in North Carolina. Currently, Hispanic ethnicity and race are specified on death certificates; however, this information is unavailable for hospitalization and ED data.

Figure 1.
Injury and Violence Iceberg for North Carolina, 2008 and 2009

Note. Data on hospitalizations are from 2008 (North Carolina State Center for Health Statistics [SCHS]; unpublished, 2010), and data on deaths (SCHS, unpublished, 2010), emergency medical services (EMS; North Carolina Office of EMS, unpublished, 2010), and emergency department (ED) visits (North Carolina Disease Event Tracking and Epidemiologic Collection Tool, unpublished, 2010) are from 2009.

Also, many counties have so few deaths in a given year that their mortality rates are considered statistically unrepresentative and unreliable.

The 3 leading causes of death due to unintentional injury in 2009 were MVT crashes (1,342 deaths), poisoning (1,036 deaths), and falls (837 deaths) (Figure 2). Suicide (1,161 deaths) and homicide (826 deaths) were the leading causes of deaths due to intentional injury. Combined, these 5 causes accounted for more than 75% of deaths in 2009, similar to past years. Decreases or increases in these areas will measurably impact the overall toll of injury and violence in the state. Consideration of the mechanism of injury, regardless of intention, reveals that MVT crashes (1,342 deaths), poisoning (1,308 deaths), and firearms (1,109 deaths) were associated with a significant proportion (62%) of deaths.

Although the number of deaths related to MVT crashes decreased by 400 from the 10-year peak of 1,742 deaths observed in 2006, MVT crashes were still the leading cause of injury-related death in the state during 2009. The age-adjusted rate of death due to MVT crash–related injuries during this period was 14.1 deaths/100,000 persons. Males were more than twice as likely as females to die of injuries due to MVT crashes (20.3 vs 8.4 deaths/100,000 persons).

Poisoning was the second-leading cause of death due to unintentional injury during 2009, and the rate of poisoning-related death increased by more than 210% since 1999. There were 1,036 deaths due to unintentional poisoning (11.1 deaths/100,000 persons) in 2009, for an average of 3 poisoning-related deaths per day. Poisoning rates tended to be higher in the western region of the state.

The third-leading cause of death due to unintentional injury during 2009 was falls. Death due to injuries associated with falls increased from 5.3 to 8.8 cases/100,000 persons between 1999 and 2009, a difference of almost 70%. Rates were slightly higher among males, compared with females, and among whites, compared with other racial groups.

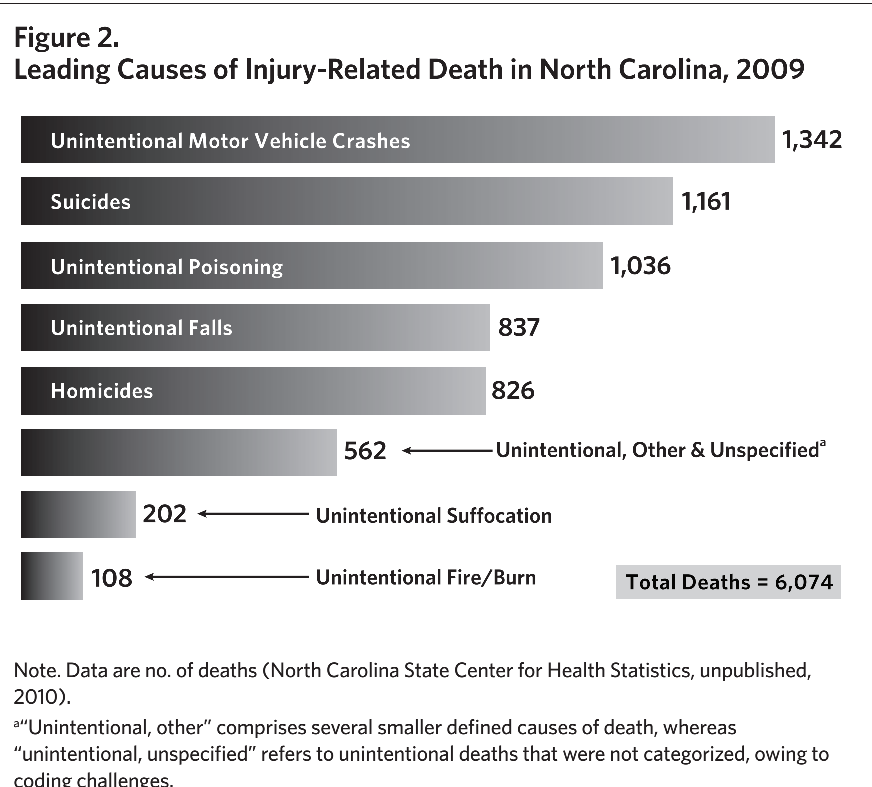
In 2009, suicide was the leading cause of death due to intentional injury in North Carolina and the second-leading cause of death due to any injury, after MVT crash–related injury. The age-adjusted rate of suicide-related death was 12.2 cases/100,000 persons. Rates of suicide were highest among males and whites. Homicide was the second-leading cause of death from intentional injury in North Carolina during this period. The rate decreased by approximately 30% since 1999, to 6.0 deaths/100,000 persons. Suicide and homicide rates among males were over 3 times the rates among females, and rates among African Americans and American Indians were approximately 4 times the rates among whites. For both suicide and homicide, firearms were the leading mechanism of death.

In 2008, there were nearly 160,000 hospitalizations for treatment of an injury or violence-related event. Of the 119,431 hospitalizations for which the intent was coded, 46% involved an unintentional event, and 8% involved an intentional event. It should be noted that nearly 25% of hospitalizations resulting from injury or violence (40,214) were missing external cause of injury codes (E-codes), which are used to code intention. Females represented 52% of admissions, whereas males represented 48%. More than 84% of admissions related to injury or violence involved people aged 35 years or older. Although there were some regional variations, by and large the state trends held true at the county level for the vast majority of hospitalizations related to injury or violence.

In 2008, the leading cause of hospitalization due to unintentional injury was falls. The age-adjusted rate of hospitalization due to an unintentional fall was 280.5 hospitalizations/100,000 persons. The rate increased with age and peaked at 4,645.6 hospitalizations/100,000 persons for individuals older than 84 years. The rates for MVT crash–related injury and poisoning were 77.2 and 39.6 hospitalizations/100,000 persons, respectively.

In 2008, 70.8 hospitalizations/100,000 persons occurred because of self-inflicted injury. Although the mortality rate due

Figure 2.
Leading Causes of Injury-Related Death in North Carolina, 2009



Note. Data are no. of deaths (North Carolina State Center for Health Statistics, unpublished, 2010).

[a]"Unintentional, other" comprises several smaller defined causes of death, whereas "unintentional, unspecified" refers to unintentional deaths that were not categorized, owing to coding challenges.

Interest and Need Greatly Outpace Resources for Youth Suicide Prevention

Sherry Lehman, Jane Ann Miller

The North Carolina Division of Public Health's Injury and Violence Prevention Branch was awarded the Garrett Lee Smith Memorial Suicide Prevention Grant in 2008. The intent of the grant was to provide suicide prevention strategies to youths in school systems across the state. The need for this funding has long been apparent on the basis of youth suicide statistics, but no one expected the overwhelming support and desire for training that school staff expressed.

Trainees included school nurses, social workers, teachers, principals, and other school administrators. Trainings were held in 8 regions across the state, covering 30 school systems. Through a partnership with the North Carolina Comprehensive School Health Training Center (NCCSHTC), a total of 9 Applied Suicide Intervention Skills Training (ASIST) sessions, 11 safeTALK training sessions, and 6 Lifelines training sessions were held. All 3 trainings are evidence based. As a result of these activities, 409 school personnel were trained in how to recognize the signs and symptoms of suicide among youths. To date, 68 students have been identified as at risk for suicide; 61 were referred for services, of whom 10 were younger than 10 years.

Recent attention on suicide among military personnel has emphasized the need to strengthen suicide prevention for service members. The Garrett Lee Smith funding has allowed prevention efforts to go one step further by inviting staff at schools with a high percentage of students whose parents are in the military to participate in the Lifelines curriculum trainings. Personnel at Fort Bragg, Camp Lejeune, and other military bases have capitalized on the opportunity.

This winter, youth suicide education will continue for public school staff, with additional ASIST and safeTALK trainings. The scope of the grant will expand to involve institutions of higher education across the state. Ten regional trainings will be offered to staff of community colleges, as well as staff at the University of North Carolina (UNC)–Chapel Hill and North Carolina State University. To complete the full range of suicide education services, a training on postvention response will be offered to the NCCSHTC training cadre. Postvention curricula are used to teach people how to respond to individuals, families, and friends of a person who has attempted or completed a suicide. Following the postvention training of trainers, 6 regional workshops will be offered for staff at the public schools.

The Injury Prevention Research Center at UNC–Chapel Hill is evaluating the effectiveness of the ASIST and safeTALK trainings. Training participants were given a pretest before the workshop, to measure knowledge and skills, and a posttest after the workshop, to measure any differences. Analyses of the test results indicated positive findings for multiple learning objectives.

Personal responses from the participants have been encouraging. Paulina Etzold, from Burnsville, North Carolina, commented, "Thanks for such an excellent training. I am weary of so many mediocre workshops/trainings/meetings and greatly appreciate attending events that matter." One participant had her new skills reinforced through practice. Bill McCullough, from the Cleveland County school system, reported that during the week after a staff member attended the training, the individual saved a student's life by preventing a suicide attempt. Dr. Antonio Blow, from the Greene County school system, requested that we return to his system and train every school counselor in the county's schools.

During 1999-2006, North Carolina lost almost 1,100 young people 10-24 years old to suicide. This number reflects an average of 135 deaths per year, making it the third-leading cause of death among individuals aged 10-24 years. These numbers do not have to repeat themselves every year: suicide is a preventable public health problem. For more information about suicide prevention, please visit the Injury and Violence Prevention Branch Web site (available at: http://www.injuryfreenc.ncdhhs.gov). NCMJ

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to self-inflicted injury (ie, suicide) was higher among males, the rate of hospitalization was higher among females (82.8 vs 59.1 hospitalizations/100,000 persons). Poisoning was the leading mechanism of self-inflicted injury and accounted for 81% of all related hospitalizations.

A total of 30.1 hospitalizations/100,000 persons occurred during 2008 because of assault-associated injuries. The most common assault-associated cause of hospitalization involved being struck by a person or object (27% of cases), followed closely by firearms (23% of cases).

There were more than 860,000 ED visits in North Carolina associated with injury or violence during 2009. Of the visits for which an intent was coded, unintentional injuries accounted for the vast majority (88%), whereas intentional, undetermined, and other intent were associated with only 12%. More than 20% of ED visits were missing E-codes. Males and females were equally likely to visit the ED because of injury or violence. A total of 51% of ED visits occurred among people aged 20-64 years, with the remaining visits occurring among people aged younger than 20 years or older than 64 years.

In 2009, more than 182,000 (21.2%) of ED visits were related to unintentional falls (NC DETECT, unpublished data, 2010). The rate of ED visits related to unintentional falls was 1,947.8 visits/100,000 persons. Unlike the mortality rate for unintentional falls, the rate of ED visits was greater among females than among males (2,093.0 vs 1,740.9 visits/100,000 persons). MVT crash–related injury was the cause of an additional 88,842 ED visits (956.6 visits/100,000 persons). The rate of ED visits associated with MVT crash–related injury was considerably higher among individuals aged 15-24 years (ie, 1,905.3 visits/100,000 persons) than among those in other age groups. Compared with other types of injury, the number of ED visits due to unintentional poisoning was relatively low (101.3 visits/100,000 persons).

In 2009, there were more ED visits related to assault (31,386 visits) than to self-inflicted injury (9,830 visits) (NC DETECT, unpublished data, 2010). The rate of ED visits due to assault was 341.9 visits/100,000 persons. Among ED visits, the most commonly cited cause of an assault-related injury was being struck (52% of cases). The ED visitation rate for self-inflicted injury was 106.5 visits/100,000 persons. The most frequently specified mechanism of self-inflicted injury that yielded an ED visit was poisoning (69% of cases).

Policy Implications

Given the scope and range of injury and violence, timely, regular, and comprehensive data are essential for the creation of public policy. Moreover, for prevention programs to be successful, it is imperative that they decrease morbidity and mortality over the long term. We need to move from data collection to supporting the creation of evidence-based prevention programs and to translating these programs into successful community interventions. For successful translation and dissemination to occur, we need to maintain and improve our data sources and to develop new sources to address existing data gaps. With high-quality data, targeted and specific interventions will reduce the toll of injury and violence in communities across North Carolina. As the body of evidence around injury and violence grows, data will play an even greater role in the public policy arena in shaping and informing public policy decisions.

Discussion

Injury and violence wreak a tremendous toll on the health and well-being of North Carolinians. As surveillance systems improve, programs will benefit by becoming more data driven. As the need to evaluate strategies and interventions grows, data systems and prevention programs will improve. An important but often neglected area is the development of partnerships among key data stakeholders. Developing ongoing relationships with the agencies and people who manage data sources can be beneficial. A growing area for opportunity involves linking disparate data systems. These linkage projects have provided a wealth of information that any one system alone cannot provide. Two of the best examples in the areas of injury and violence are the North Carolina Violent Death Reporting System (NC VDRS) and the Fatal Analysis Reporting System (FARS) for MVT crashes, injuries, and fatalities. The NC VDRS works to link medical examiner reports, vital records, and law enforcement data to better understand homicide, suicide, and other types of violent deaths. FARS links MVT crash information with injury-related events and deaths. These linkages enable programs to use variables gathered for one specific purpose or perspective to examine a wide range of variables used for other purposes. For example, the ability to combine basic demographic characteristics with circumstances leading to the violent death is possible only because of the NC VDRS. North Carolina must continue to improve the data systems that are used for injury and violence and to expand them where needed. As previously mentioned, E-coding continues to be problematic for both hospital-discharge and ED-visitation data. Completeness of E-coding is critical in order to fully understand the scope and burden of injury and violence in the state. Efforts to improve E-coding have been implemented at the national level, but efforts still need state input and consideration. North Carolina has a strong history of data collaboration and partnership. When data are safeguarded from abuse and used appropriately, they can have a tremendous impact on state and local programs. Reductions in injury and violence can be one of the major public health accomplishments of the 21st century if these areas are given the level of attention their burden merits. NCMJ

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

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Unintentional Poisoning in North Carolina:
An Emerging Public Health Problem

Marsha D. Ford

Unintentional poisoning is a fast-growing public health problem that once evoked an image of a street denizen injecting heroin or snorting cocaine. Today's victim is white, male, and middle-aged—and the drugs are prescribed. In North Carolina, unintentional poisoning is the second-leading cause of death due to unintentional injury, and injuries due to any cause are the leading cause of potential years of life lost. Comprehensive prevention measures are needed now to stem this burgeoning problem.

Unintentional poisoning is the second-leading cause of unintentional death due to injury in North Carolina and the leading cause among adults aged 35-54 years. Unintentional poisoning occurs accidentally, when no harm is intended, and can result from misuse and abuse of prescription and recreational drugs, overuse of drugs prescribed for medical reasons, and exposure to chemicals, gases, vapors, venoms, biological toxins (such as foodborne toxins), and other substances [1]. In the past decade, these deaths have nearly quadrupled in number in the state, affecting all areas, but especially the western and southeastern counties (Figure 1). In recent years, substantially larger numbers of patients have required medical care and advice in hospitals, in emergency departments, and by calling the Carolinas Poison Center (Charlotte, NC), the poison center for North Carolina. Unintentional poisoning is a growing and significant cause of death and injury, but it is largely preventable. Public health, regulatory, and legislative strategies are needed to address the root causes of this emerging epidemic.

The Problem

Recognition of the growing problem of poisoning in North Carolina began in 2002, when a pronounced spike in poisoning-related deaths was noted by state health officials. A subsequent Centers for Disease Control and Prevention Epidemic Intelligence Service investigation of 1,096 cases of unintentional poisoning that occurred between 1997 and 2001 documented the causal role of prescription opioids [2]. Subsequently, the Task Force to Prevent Deaths from Unintentional Drug Overdoses was convened to examine this problem and recommend interventions. Since that

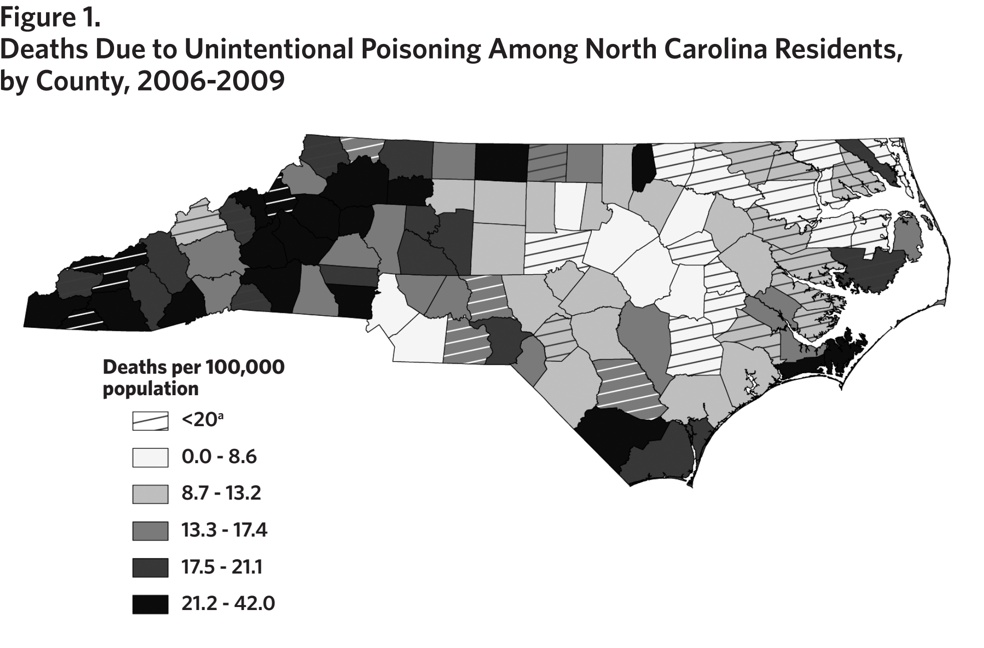

Figure 1.
Deaths Due to Unintentional Poisoning Among North Carolina Residents, by County, 2006-2009

Note. Data are no. of deaths per 100,000 persons (statewide rate, 11.0 deaths per 100,000 population). Data are from the North Carolina State Center for Health Statistics (unpublished, 2010). Analysis was performed by the Injury Epidemiology and Surveillance Unit, North Carolina Division of Public Health.
[a]Rates based on <20 deaths are considered statistically unreliable.

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time, despite the adoption of some task force recommendations, the increase in deaths from unintentional poisoning has accelerated. Between 1999 and 2009, the rate of death (defined as the number of deaths per 100,000 persons) due to unintentional poisoning increased by 212.7%. In comparison, the rate of death due to motor-vehicle accidents—the leading cause of injury-related deaths in North Carolina—decreased by 28.8% (Figure 2) (North Carolina State Center for Health Statistics, unpublished data, 2010).

Unintentional poisoning is one of several types of unintentional injury and can be fatal or nonfatal. In 2008, injuries were the third-leading cause of death among North Carolina residents, with 6,275 injury-related deaths; the first- and second-leading causes of death were diseases of the heart (17,417 deaths) and cancer (17,403 deaths), respectively. More importantly, among persons aged 65 years and younger, the average potential years of life lost due to unintentional poisonings was 9 times the average years of life lost due to chronic diseases, such as heart disease, cancer, and diabetes mellitus. This reflects the fact that injuries, including unintentional poisonings, occur in younger patients [3].

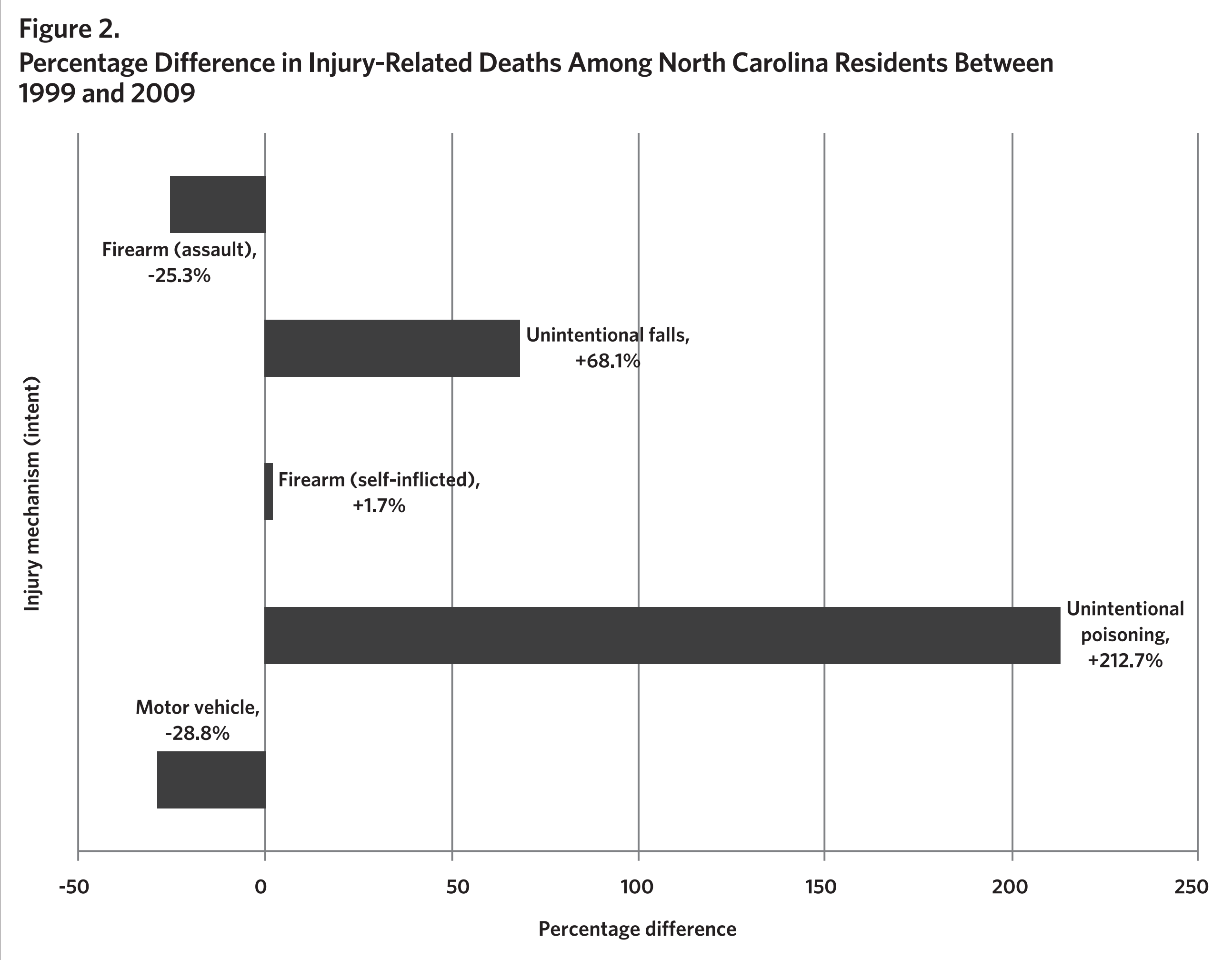
Although deaths due to unintentional poisoning in North Carolina are concerning, the number of deaths is smaller than the number of injuries requiring medical treatment in hospitals or triage and management by the Carolinas Poison Center. In 2007, unintentional poisonings were responsible for 3,445 hospital discharges, 8,696 emergency department visits, and 63,412 calls to the poison center (Table 1). In relative terms, in 2007, North Carolina residents were "four times more likely to be hospitalized, 10 times more likely to seek treatment from an [emergency department], and 52 times more likely to call the [Carolinas Poison Center] than to die from [an] unintentional poisoning" [4p12]. The economic burden is substantial. On a national level, Finkelstein and colleagues [5] estimated that, in 2000, the total lifetime

Table 1.
Demographic Characteristics Associated With Unintentional Poisoning Among North Carolina Residents, by Select Outcomes, 2007

	Hospital discharge, no.[a]		ED visit, no.[b]		Carolinas Poison Center call, no.[c]	
Characteristic	**Overall**	**Per 100,000**	**Overall**	**Per 100,000**	**Overall**	**Per 100,000**
Sex						
Male	1,618	36.5	4,105	92.7	31,442	710.1
Female	1,827	39.4	4,591	99.1	31,970	690.0
Total	3,445	38.0	8,696	96.0	63,412	699.8
Age, years						
≤4	149	23.4	1,823	285.9	37,059	5,811.7
5-9	22	3.5	294	48.1	5,075	795.9
10-14	19	ND[d]	203	34.2	2,131	359.0
15-19	118	19.0	594	95.8	1,627	262.4
20-24	163	26.7	598	98.0	1,900	311.4
25-34	356	29.2	1,091	89.5	3,520	288.7
35-44	584	43.5	1,232	91.9	3,441	256.5
45-54	725	55.7	1,181	90.8	2,929	225.2
55-64	527	51.5	733	71.6	2,375	232.1
65-74	399	67.4	466	78.7	1,598	270.0
75-84	278	75.4	331	89.7	1,117	302.8
≥85	105	73.6	150	105.2	525	368.1
Total	3,445	37.9	8,696	96.0	63,297	696.5

Note. Analysis was performed by the Injury Epidemiology and Surveillance Unit, North Carolina Division of Public Health, unless otherwise indicated. ED, emergency department.
[a]Data are from the North Carolina State Center for Health Statistics (unpublished, 2010).
[b]Data are from the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (unpublished, 2010).
[c]Data are from the Carolinas Poison Center (unpublished, 2010). Analysis was performed by the Carolinas Poison Center.
[d]No data (ND) are specified because the rate is based on <20 deaths and is considered statistically unreliable.

Figure 2.
Percentage Difference in Injury-Related Deaths Among North Carolina Residents Between 1999 and 2009



Note. Data are percentage differences in the no. of deaths per 100,000 persons. Data are from the North Carolina State Center for Health Statistics (unpublished, 2010). Analysis was performed by the Injury Epidemiology and Surveillance Unit, North Carolina Division of Public Health.

costs of poisonings resulting in death were $23 billion, the total lifetime costs of poisonings resulting in hospitalization with survival were $2 billion, and the total lifetime costs of poisonings requiring medical care without hospitalization were $1 billion (all values are 2000 dollars).

Prescription and recreational drugs are most commonly involved; they were listed as the primary cause in 92.8% of deaths from unintentional poisoning in North Carolina in 2008. These results mirror national data showing that drugs were involved in 92% of all poisoning-related deaths in 2005-2006 [6]. Prescription medications are responsible for substantially more deaths than are illegal drugs. The increase in deaths due to opioid analgesic drugs (ie, natural and synthetic pain medications, such as hydrocodone, oxycodone, fentanyl, and propoxyphene) is significantly greater than the increase due to illegal drugs, which are more readily perceived as dangerous [7]. Narcotics (ie, opioid analgesic drugs and illegal drugs, such as opium, heroin, and cocaine) were the primary causal factor in 72% of deaths due to prescription and recreational drugs in North Carolina in 2008. Among fatalities occurring in 2008 in which drugs were mentioned as the primary cause, methadone and other opioid analgesics were listed as the primary cause in 59%, whereas cocaine and heroin were mentioned as the primary cause in only 19%. Thus, needed interventions must primarily address the problems arising from use and misuse of prescription pain medications.

Substances responsible for the remaining unintentional poisoning deaths (28%) in 2008 also deserve attention. Responsible agents included antiepileptic and sedative hypnotic drugs; nonopioid analgesics, such as aspirin and acetaminophen; drugs acting on the nervous system, such as antidepressants and antipsychotics; alcohol; other gases; solvents; pesticides; and other/unspecified drugs and chemicals. Root causes and interventions must also be determined to decrease deaths due to these substances.

Current Initiatives

A number of individual activities and tactics are currently being promoted by interested organizations and agencies that function separately, albeit with ongoing intergroup communications for many activities. Two major initiatives with promise of unifying these activities are underway.

The Injury and Violence Prevention Branch of the North Carolina Division of Public Health has formed an Unintentional Poisonings Subgroup as part of its Strategic Advisory Council, which was created to address injury and violence statewide. This subgroup is tasked with monitoring poisoning rates and trends, investigating methods to improve data coding and collection, identifying promising practices or evidence-based approaches to decrease poisoning rates, and increasing education and awareness around unintentional poisonings to physicians and other health care professionals, consumers, and makers of public policy.

The North Carolina Institute of Medicine (NCIOM) issued, in 2009, a prevention action plan, the culmination of a series of issue-focused meetings on determinants of death and disability statewide [8]. The action plan contains evidence and consensus-based recommendations to decrease risk factors for preventable causes of the most significant diseases and health conditions, including injuries due to unintentional poisonings. The plan served as a foundation for the state's health objectives for 2020 [9].

Several other statewide and local activities are notable. The Carolinas Poison Center is working with the North Carolina Division of Medical Assistance and a social-marketing consultant from the Division of Public Health to create a social-marketing program designed to reduce rates of death and hospitalization due to unintentional poisoning due to opioid analgesics. This project will initially target a high-risk population of Medicaid recipients, identifying behavioral determinants and then assessing and developing strategies to change behaviors in the high-risk population.

Project Lazarus, a nonprofit community-based program, is focused on decreasing deaths due to prescription opioid medications. Based in Wilkes County, the project serves the western part of North Carolina, using a community-coalition model to educate medical care professionals, patients, and community members and to provide free rescue kits that include physician-prescribed naloxone (an antidote), to reverse an opioid overdose.

The Division of Medical Assistance has implemented a Recipient Management Lock-In Program for Medicaid recipients who meet high-use specifications for analgesic and antianxiety medications. These recipients will be limited to 1 prescriber and 1 pharmacy for obtaining controlled substances, such as opioid analgesics (eg, oxycodone and hydrocodone) and antianxiety medications (eg, benzodiazepines). Claims not meeting these specifications will be denied.

The Controlled Substances Reporting System maintains a record of every outpatient prescription for all schedule II-V controlled substances dispensed by North Carolina retail outpatient pharmacies [10]. Prescribers can access this password-protected database to ascertain a patient's history of these prescription medications. The Controlled Substances Reporting System, created under North Carolina General Statute 90-113.70-76, is managed by the North Carolina Division of Mental Health, Developmental Disabilities, and Substance Abuse Services.

Operation Medicine Drop, sponsored by Safe Kids North Carolina and state law-enforcement agencies, is a prescription take-back program designed to remove unused medications from homes. Individuals voluntarily drop off these medicines at specific collection sites during Poison Prevention Week, held annually during the third week of March.

The Governor's Institute on Alcohol and Substance Abuse is conducting Safer Opioid Prescribing events for physicians, nurses, and other health care professionals across the state. These educational sessions focus on pain management, addiction, and safer prescribing of opioid analgesic medications.

Opportunities and Challenges

The work done by the Task Force to Prevent Deaths from Unintentional Drug Overdoses and recommendations in the NCIOM's prevention action plan provide a strong foundation to develop a comprehensive plan for decreasing unintentional poisonings. To emphasize the problem, the NCIOM has chosen reduction of mortality due to unintentional poisoning as the key indicator by which to measure the success of injury prevention measures specified in the state's 2020 health objectives. To ensure a comprehensive and effective response to this growing public health problem, the North Carolina General Assembly should amend the Public Health Act §130A-1.1 to include injury and violence prevention as an essential public health service; create a permanent injury and violence prevention task force, whose charter will be to prevent and reduce injury and violence, with an emphasis on unintentional poisonings, by enhancing coding, collection, and examination of data, as well as by recommending evidence-based policies and programs, monitoring implementation, and examining outcomes; and appropriate funds, beginning in state fiscal year 2011, to implement pilot programs and other community-based activities to prevent unintentional poisoning, using evidence-based interventions or best practices [8].

In addition to the legislative actions listed above, several activities should also be fully funded and enacted. First, the Division of Public Health should create a leadership structure to oversee a coordinated public health response to the problem of fatal and nonfatal unintentional poisonings. This group would work closely with the permanent injury and violence prevention task force [11]. Second, the Carolinas Poison

Center should be promoted among North Carolina residents and health care professionals as the primary information source for appropriate responses to poisonings. The center provides immediate access to rapid assessment and triage advice for residents, as well as the only real-time access to a board-certified medical toxicologist for most physicians in the state. Third, a linked injury surveillance system should be created by the State Center for Health Statistics, in collaboration with numerous state data partners and stakeholders. This system should link to the electronic health records of the relevant data partners. Enhanced training in medical record coding should be provided, with emphasis on poisonings, using *International Classification of Diseases (ICD), Ninth Revision (ICD-9)* and *ICD-10* external cause of injury codes (ie, E-codes) [8].

Conclusion

Funding new initiatives in this area will be challenging, given the current economic downturn, but the costs of not acting will be significant. The task is made more urgent due to the increasing numbers of deaths and hospitalizations and the associated costs of medical care and loss of life. Adoption of these recommendations will begin the work needed to reverse this rapidly escalating health epidemic. **NCMJ**

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Potential conflicts of interest. M.D.F. has no relevant conflicts of interest.

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Addressing the Escalating Public Health Issue of Falls Among Older Adults

Ellen Caylor Schneider, Tiffany E. Shubert, Katherine J. Harmon

The rate of older adult falls has increased dramatically in North Carolina. With screening and intervention, many falls can be prevented. To improve best practices, the Carolina Geriatric Education Consortium and other members of the North Carolina Falls Prevention Coalition have committed resources to train health care professionals in screening and assessment and to develop infrastructure to disseminate evidence-based interventions.

Falls are not an inevitable part of getting older, and many falls are preventable. As the leading cause of both fatal and nonfatal injuries for older adults, falls are one of the most common and significant health issues facing people aged 65 years or older [1]. In the United States, more than 1 in 3 people in this age group fall each year. As people age, falling becomes more prevalent, with 50% of adults aged 80 years or more falling annually [2].

During the past decade, rates of fatal and nonfatal falls have increased considerably in both the United States and North Carolina. In North Carolina between 2000 and 2009, the age-adjusted mortality rate increased by nearly 60% for adults aged 65 years or older (Figure 1) (North Carolina State Center for Health Statistics [NC SCHS], unpublished data, 2010). Hospitalization and emergency department visits have also increased, although not to the same degree as fatalities (NC SCHS, unpublished data, 2010; North Carolina Disease Event Tracking and Epidemiologic Collection Tool [NC DETECT], unpublished data, 2010). In 2008 alone, there were 627 deaths, 18,588 hospitalizations, and 40,686 emergency department visits for North Carolinians aged 65 years or older in which a fall was the primary cause of injury. On average, there were 30 hospitalizations and 65 emergency department visits for each death; however, there were an untold number of injuries in which individuals used outpatient care or did not seek medical attention (NC SCHS, unpublished data, 2010; NC DETECT, unpublished data, 2010).

In 2006, more than 177,000 North Carolinians aged 65 years or older reported a fall, of which one-third sustained an injury [3]. Falls are the leading cause of emergency department visits due to injuries among older adults in the state and the nation and, in 2009, accounted for 27% of all injury-related emergency department visits in North Carolina in which a cause of injury was specified (NC DETECT, unpublished data, 2010) [4]. Although the majority of older adults who visit the emergency department for treatment of fall-related injuries are discharged home after treatment, of those who are admitted to the hospital because of fall-related injury, one-half die within 1 year (NC DETECT, unpublished data, 2010) [5]. Of older adults who are hospitalized, approximately 40% are released to a nursing facility (Figure 2) (NC DETECT, unpublished data, 2010). This finding is worrisome because adults in these institutions have higher rates of falls and tend to have falls that result in more-serious complications, compared with the general population [5].

Fall-related injuries create a significant financial burden for the nation's health care system, recently accounting for 6% of all medical expenditures for persons aged 65 years or older [6]. In 2000, the estimated direct medical care cost for fall-related injuries among older adults in the United States was $19 billion [7]. As baby boomers eventually swell the older adult population and the overall life expectancy increases, these costs may exceed $54 billion by 2020 (adjusted to 2007 dollars) [8]. In 2008, the North Carolina hospital discharge costs for falls among older adults were greater than $461 million, with a median cost of $20,000 per discharge, a 10% increase since 2004 (adjusted to 2008 dollars) (NC SCHS, unpublished data, 2010). Fall-related injuries are also costly in terms of quality of life issues, such as loss of independence, decreased mobility, and early admission to a nursing home. Fear of falling can cause people to limit their activities, which can increase the risk of falling, owing to reduced mobility and physical fitness [9].

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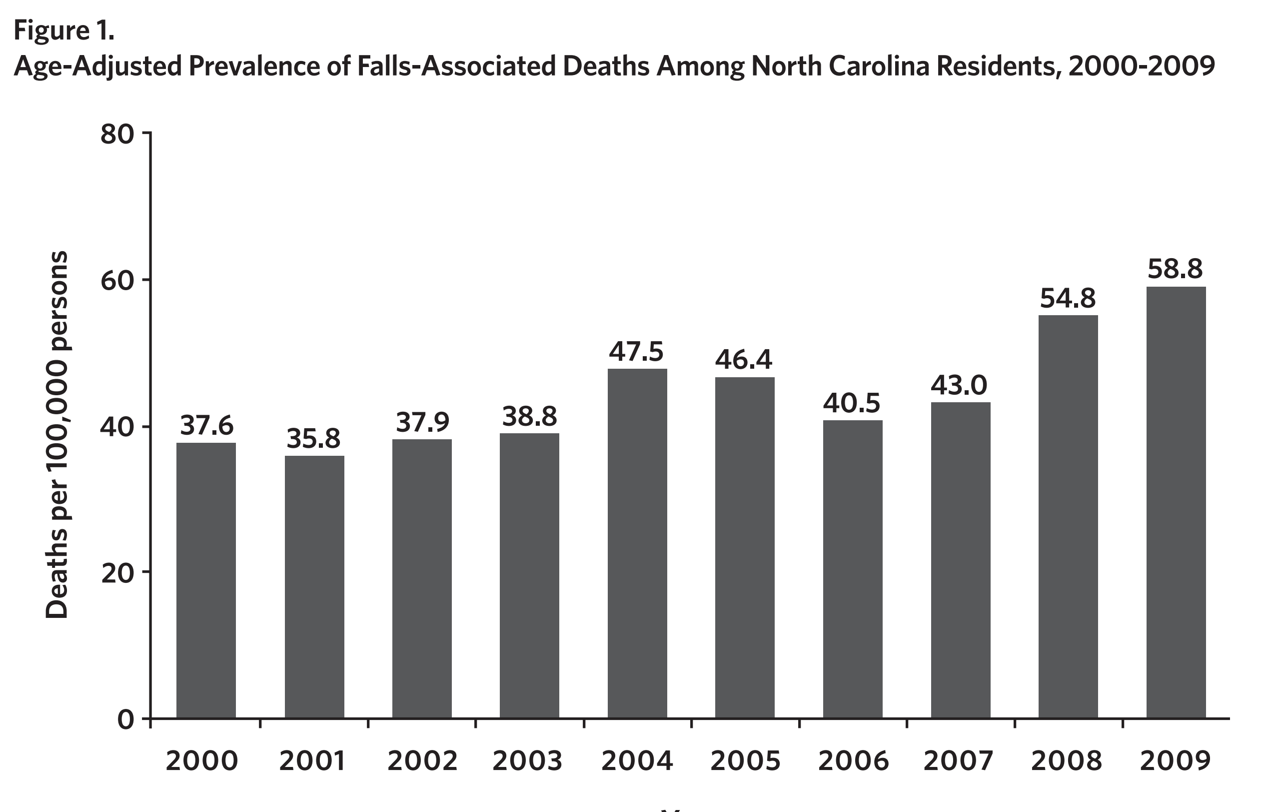

Figure 1.
Age-Adjusted Prevalence of Falls-Associated Deaths Among North Carolina Residents, 2000-2009

Note. Data are from the North Carolina State Center for Health Statistics (unpublished, 2010). Analysis was performed by the North Carolina Injury and Violence Epidemiology and Surveillance Unit.

Falls occur for complex reasons and typically result from multiple, interacting risk factors that differ from case to case. The primary risk factors that can lead to a fall, along with their associated risk ratios, are shown in Table 1. Several risk factors can be addressed with appropriate interventions. Modifiable risk factors for falls include muscle weakness, walking and balance problems, poor vision, use of 4 or more medications or any inappropriate or psychoactive medications, orthostatic hypotension, use of an assistive device, and home and environmental hazards [3]. Risk factors that cannot be modified but can be managed to an extent include an age of more than 80 years, female sex, a past history of falls, cognitive impairment, depression, arthritis, and difficulties or inability to perform activities of daily living (eg, bathing, dressing, transferring, eating, toileting, and maintaining continence) [2]. The more risk factors that are present, the greater the risk a person has of falling and sustaining an injury from a fall [1, 4, 6].

The American Geriatrics Society (AGS) developed clinical practice guidelines in 2010 to help health care professionals identify people most at risk for falls [10]. The recommended guidelines state that all people aged 65 years or older should be screened for falls risk. If the screening results indicate that the patient is at risk for falls, the clinician should perform a comprehensive falls-risk assessment. The screening includes 3 questions. First, has the patient fallen in the past year? Patients who state that they have experienced 2 or more falls or have sustained an injury from a fall are considered to be at high risk for another fall. Second, has the patient visited because of an acute fall? Patients who come to the visit because of a fall are considered to be at high risk for another fall. Third, does the patient demonstrate difficulty with walking or balance? Difficulties with walking indicate an increased risk of falling. To assess balance and walking, the clinician must observe the patient performing simple balance assessments. The AGS guidelines recommend use of the "Up and Go" test [11]. This requires the patient to rise from a standard-height chair, walk 10 feet, turn and walk back to the chair, and sit. Patients who have difficulty with any part of this task or appear to complete the task significantly more slowly than their peers are considered to be at risk of falling [11].

The falls-risk screen does not need to be administered by a physician. Any licensed health care professional or trained personnel, including technicians or aides, can administer the screen and identify an older adult at risk of falling. Currently, Lori Schrodt at Western Carolina University (Cullowhee) and Kathie Garbe at the University of North Carolina (UNC)–Asheville (Asheville) are conducting pilot studies in the western part of the state to determine whether

Figure 2.
Disposition of Hospitalizations for Treatment of Falls Among North Carolina Residents, 2008

Note. Data are from the North Carolina State Center for Health Statistics (unpublished, 2010). Analysis was performed by the North Carolina Injury and Violence Epidemiology and Surveillance Unit. "Nursing facility" is defined as skilled nursing facilities, intermediate care facilities, long-term care facilities, and nursing homes. "Other" is defined as discharge to specialized department, psychiatric department, or another institution. AMA, against medical advice.

lay personnel can administer this screen at senior centers, churches, senior housing facilities, and YMCAs. A training manual and presentation resulting from this work will be posted on the North Carolina Falls Prevention Coalition Web site (available at: http://www.ncfallsprevention.org) in early 2011. Organizations interested in training personnel to conduct falls-risk screens can access the training materials and will have the opportunity to consult with the falls coalition speakers panel for free.

If an older adult has positive results of a falls-risk screen, a physician should perform a comprehensive risk assessment for falls. The assessment includes a focused falls history, a medication review, and detailed assessments of mobility and balance, visual acuity, neurologic health, muscle strength, heart rate and rhythm, postural hypotension, feet and footwear, and environmental hazards. For each risk factor identified, the appropriate intervention should be prescribed and followed up by the physician to ensure compliance by the patient.

There are several gaps in the availability of appropriate interventions. Exercise is one of the most effective interventions for community-dwelling older adults, decreasing the rate of falls by 35%-40% [12]. For individuals with a greater number of medical risk factors and lower levels of function, exercise may not be the appropriate intervention and may actually increase the risk of falls [13]. These people will benefit from a treatment program that addresses the medical risk factors first; after they are more stable on their feet, such patients can begin an appropriate exercise program.

Health care professionals are necessary members of the multidisciplinary team required to manage falls risk. Physical therapists play a key role in establishing appropriate exercise programs to improve balance, with the ultimate goal of discharging a patient to an evidence-based falls prevention program in the community. Occupational therapists can evaluate a home environment, teach individuals with poor vision appropriate strategies, and assist with depression management. Pharmacists are key in managing medication. Social workers can assist with providing services for patients who are no longer safe to ambulate in the community, and audiologists, ophthalmologists, and others all play important roles, depending on the patient's needs.

The North Carolina Falls Prevention Coalition

Sharon Baker Rhyne, Ellen Caylor Schneider

Early 2007 found the North Carolina Division of Public Health (DPH) and the North Carolina Division of Aging and Adult Services working closely together on a number of chronic disease and aging-related grants. As a next step in acknowledgment of this successful partnership, the 2 divisions entered into a written memorandum of agreement, formalizing their respective commitments to each other, as well as their intent to work together on future projects. At the time, both were also working with the University of North Carolina (UNC)–Chapel Hill Institute on Aging.

As a result of ensuing dialogue between all 3 agencies, they quickly recognized their shared concerns over the high morbidity and mortality associated with falls in the older adult population that would likely, without significant intervention, continue at an alarming rate as baby boomers, a notably large generation, aged into their 60s. All 3 agencies took interest in falls prevention awareness generated on the national level, because falls were then, and still are, the leading cause of fatal injuries and the second leading cause of nonfatal injuries for people aged 65 years or older in North Carolina.

The agencies enhanced their efforts by gaining the support of the Carolina Geriatric Education Center, which provided a strong core group with diverse strengths, funding sources, and networks that combined into a successful steering committee for the first North Carolina Falls Prevention Coalition meeting that convened in April 2008. The coalition brought together major leaders and stakeholders who represented researchers, planners, health care professionals, housing specialists, aging-services professionals, and many others focused on the need to reduce the number of falls and fall-related injuries occurring among North Carolinians.

Objectives, desired outcomes, and multiple strategies to reach various goals were identified by the coalition in the ensuing months. Six workgroups evolved to address the following issues: infrastructure development and maintenance, community awareness and education, health care professional education, risk assessment and behavioral intervention, surveillance and evaluation, and advocacy for supportive policies and environments.

Despite minimal funding, coalition growth has remained steady since that time, and falls prevention activities have increased, with the state coalition currently consisting of approximately 65 member organizations and 7 regional coalitions. Much of this work has already resulted in increased attention to falls. In 2008, the North Carolina Institute of Medicine, in collaboration with the DPH, convened a task force to develop a prevention action plan for the state. Falls prevention was a key topic addressed by the plan, because unintentional injuries and intentional injuries are, when considered together, among the top 10 preventable risk factors contributing to the leading causes of death and disability in the state. The DPH Injury and Violence Prevention Branch also identified falls as one of its 3 unintentional-injury priorities for 2009-2014 [1].

Evidence-based falls management programs in the community should be considered when referring older persons to appropriate programs and resources. Unfortunately, few programs are available at this time for widespread dissemination. The Centers for Disease Control and Prevention is currently conducting several dissemination projects for 3 programs, including Stepping On, a behavioral change program; Tai Chi, Moving for Better Balance, a class-based exercise program for community-dwelling older adults; and The Otago Exercise Program, a home-based exercise program for community-dwelling older adults who have lower levels of function. These programs should become more prevalent in the community during the next few years. One evidence-based program for behavior change, A Matter of Balance: Managing Concerns About Falls, is widely available throughout North Carolina. This program is designed to improve an individual's confidence in his or her balance and minimize fear of falling. It is delivered through a peer-led model and has demonstrated significantly improved self-management and self-efficacy outcomes. Persons interested in learning where the program is offered can visit the North Carolina Healthy Aging Roadmap Web site (available at: http://ncroadmap.org/bin/view), or they can contact their local Area Agency on Aging office. Tiffany Shubert is the leader of this project to develop and support falls prevention efforts throughout the state.

Table 1.
Risk Factors Commonly Associated With Falls

Risk factor	RR or OR
Muscle weakness	4.4
History of falls	3.0
Gait deficit	2.9
Balance deficit	2.9
Use of an assistive device	2.6
Visual impairment	2.5
Arthritis	2.4
Impaired activity of daily living	2.3
Depression	2.2
Orthostatic hypotension	1.9
Cognitive impairment	1.8
Age >80 years	1.7

Note. Data are from [5, 6, 10]. OR, odds ratio; RR, relative risk.

Governor Beverly Perdue, in both 2009 and 2010, issued proclamations to officially designate observance of a Falls Prevention Awareness Week, with communities holding a number of events to call attention to the potential for falls and related falls prevention strategies. A Matter of Balance: Managing Concerns About Falls, an evidence-based program to address fear of falling, is being disseminated in all 17 of the state's Area Agencies on Aging.

Coalition work during the past year also included 4 workshops in the spring of 2010 that were held across the state to raise awareness of the growing falls problem, educate targeted audiences on falls prevention strategies, develop partnerships with key stakeholders in falls prevention, and build capacity to address prevention of falls among older adults. The workshops generated a groundswell of new community involvement in Greensboro, Winston-Salem, the northwest and southwest quadrants of the state, and the greater Charlotte area, while strengthening and increasing participation in falls prevention coalitions already present in Asheville and Greenville. Follow-up workshops on falls policy were held in the autumn of 2010. In addition, the coalition sponsored a capstone project for graduate students from UNC–Chapel Hill, who conducted 5 focus groups with diverse groups of older persons to explore core beliefs about falling and to understand and influence behaviors related to falls and falls prevention. The students used this input to create social marketing materials for falls prevention. Finally, falls prevention is one of the injury priorities in the recently published Healthy People 2020 objectives, which are aimed at improving the health of North Carolina residents over the next 10 years [2].

Interested readers can visit the state coalition's Web site (available at: http://www.med.unc.edu/aging/ncfp/welcome.htm) to learn about several ways to prevent falls, including increasing awareness, increasing education and training, providing tools and resources, and fostering linkages between programs and organizations working to reduce falls. NCMJ

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As the populations of the United States and North Carolina age, the impact of fall-related injuries will increase dramatically unless steps are taken now to address the issue. The Center for Aging and Health at UNC–Chapel Hill was recently awarded a 5-year grant to develop a Falls Practice Improvement Network (FPIN). The purpose of the FPIN is to develop and support falls prevention efforts throughout the state. Multidisciplinary education content will be developed for both real-time and online courses. All real-time falls prevention courses will be open to health care and community-based professionals to begin to build bridges in the continuum of care. Representatives from local and regional falls prevention coalitions will be invited to attend as well. All online content will be free of charge during the grant period, and individuals can access content through the Web sites of the North Carolina Falls Prevention Coalition (available at: http://www.injuryfreenc.ncdhhs.gov/ForHealthProfessionals/FallsCoalition.htm) or North Carolina AHEConnect (available at: http://www.aheconnect.com/). Potential outcomes of this grant include greater numbers of clinicians and primary care professionals skilled in falls risk assessment and interventions, greater numbers of evidence-based interventions available in the community, and better links between health care and community-based professionals. NCMJ

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Preventing Child Maltreatment in North Carolina

Adam J. Zolotor

Child-maltreatment prevention has become more robust in North Carolina since the North Carolina Institute of Medicine Task Force convened in 2005. The commitment by state governmental and nongovernmental leadership and funding agencies has been instrumental to this achievement. This commentary highlights several successful approaches used to prevent child maltreatment in the state, although there is much work to be done.

North Carolina has a long history of robust prevention of child maltreatment. In 2005, the North Carolina Institute of Medicine, under the leadership of Prevent Child Abuse North Carolina and the North Carolina Department of Health and Human Services, hosted a 6-month task force to determine the direction and agenda of child abuse prevention in the state. North Carolina has been home to many exciting prevention activities in the intervening 6 years. This commentary, in no way a comprehensive view of all the important work to prevent child maltreatment, will highlight several examples of universal, selective, and indicated approaches to child maltreatment prevention. The work in child maltreatment prevention in North Carolina is due to the coalescing of goals and values from government agencies, nongovernmental organizations, academia, and private funders.

The Numbers

Child maltreatment, broadly conceived, occurs when a parent or caretaker commits an act or fails to prevent an event that results in harm or risk of harm to a child. In North Carolina, during 2008-2009 there were nearly 68,000 reports to child protective services, for a rate of 3 reports per 100 children. Of these, 7.4% were substantiated as involving abuse, neglect, or dependency. An additional 35% of reports resulted in services being provided or offered, reflecting improved flexibility in assessing and adjudicating reports and in serving families during the past 6 years [1]. In 2007, there were 25 homicides due to child abuse and 139 child deaths attributed to neglect [2].

Universal Prevention

Universal prevention programs target every member of a group of interest, such as newborns. Universal prevention programs tend to be challenged by limited resources, owing to the need to reach large numbers of families. For example, a home visitation program that seeks to serve all residents of a county may be able to visit each family only once. In contrast, a program that seeks to serve individuals at highest risk might identify 5%-10% of families with the greatest need and offer them 10-20 visits focusing on maltreatment prevention for the same cost. Furthermore, because population-based maltreatment rates are low (ie, 3 reports per 100 children), demonstration of the program's impact is difficult. It is for these reasons that there is much less evidence to support universal interventions. However, North Carolina is leading the way in developing and testing universal interventions to prevent child maltreatment.

Durham Connects. As part of the Durham Family Initiative, the Center for Child and Family Policy and the Center for Child and Family Health are working toward a universal home visitation program in Durham County, known as Durham Connects. This program will engage every family in Durham after the birth of a new child, identify family circumstances that place the child at risk for maltreatment, and connect the family to other resources. This program is designed to visit each family 1-3 times to assess their need and to link them with resources, but not to serve as a long-term service delivery model. It has been initially rolled out by targeting babies born every other day, so that babies born on alternate days can serve as a comparison group for evaluation. Previous limited-scope universal home visitation programs, although offering other benefits, have not been shown to reduce child maltreatment. However, this program is structured to include an evaluation based on the domains of risk for maltreatment; it is flexible, with 1-3 visits, depending on the need; and it is developed within an integrated system of care for children and families [3].

The Period of PURPLE Crying. The Period of PURPLE Crying: Keeping Babies Safe in North Carolina program (available at: http://www.purplecrying.info/index.php?loc=mb1r3p6) is a statewide, multimodal approach to prevent abusive head trauma. This intervention was created by a pediatrician with more than 30 years of experience in crying research, in partnership with the National Center on Shaken Baby Syndrome. The premises of the program are that all babies cry, some crying is unsoothable, crying peaks at 2-3 months of age,

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some healthy babies cry for more than 5 hours per day, and the only potential negative consequence of excess crying for the baby is abusive head trauma. This approach has been extensively tested in focus groups, among pilot subjects, and, more recently, among 4,000 families in Vancouver, Canada, and Seattle, Washington, in randomized, controlled trials. These studies showed changes in important knowledge and behaviors associated with shaking but were underpowered to detect a difference in abusive head trauma [4, 5].

In North Carolina, we have developed a 3-dose approach that targets all families of newborns. During the first dose, all new parents receive their own DVD and booklet with information about the Period of PURPLE Crying while in the birth hospital or birthing center. The key messages are reinforced by brief bedside education from a nurse, and parents are told to share their informational materials with all substitute caretakers. The second dose, given during sick- or well-child visits to the child's family physician or pediatrician, involves distribution of materials to parents that reinforce the messages of the program. The third dose consisted of a 1-year sustained media effort, including the use of paid (mostly radio), earned, and social media outlets and platforms. A rigorous evaluation of this project is underway [6].

Selective Prevention

Selective prevention strategies serve children and families who have been determined to be at risk for maltreatment. These programs are among the best-studied strategies for maltreatment prevention and often include parent education, commonly in the home, and some system of screening and referral for more-serious problems. These programs tend to be more expensive to operate and provide a higher level of service to fewer families.

Nurse-Family Partnership. The Nurse-Family Partnership is among the most extensively studied and replicated models for preventing child maltreatment; its effectiveness has been demonstrated in 3 randomized, controlled trials and during many years of follow-up of subjects [7, 8]. This model has been shown to reduce child maltreatment, decrease emergency department use for treatment of injuries and poisonings, decrease adolescent arrests, and increase pregnancy spacing. In this model, nurses make home visits to identified at-risk families, starting in the third trimester of pregnancy, with follow-up for 2 years. This strategy was widely embraced by the North Carolina Institute of Medicine Task Force on Child Abuse Prevention, the North Carolina Division of Public Health, and funders in North Carolina and has been expanded to include 10 area programs [9].

Parents as Teachers. Parents as Teachers was designed as a universal program but, in North Carolina, is often administered to families with the greatest need, as identified by a local agency running the program. There are 77 local Parents as Teachers programs in North Carolina. As such, it may be the largest program in North Carolina for preventing child maltreatment. However, although the program offers more flexibility in terms of its ability to target higher-risk groups, it was not specifically designed to prevent child maltreatment, and therefore there are fewer empirical data available to support its beneficial effect on child outcomes. The principles of the model include personal visits (every 1-4 weeks) by a parent educator, group meetings, health and development screenings and referrals, and development of a resource network [10].

Indicated Prevention

Indicated prevention programs serve children who have been determined to be victims of maltreatment. Many programs serve both selected and indicated populations on the basis of risk and program availability. Some professionals consider indicated programs appropriate for individuals at the highest risk, recognizing that highly vulnerable children may not fall neatly into a category of abused or not abused. Child protective services agencies in the United States have been the mainstay of identification, investigation, and provision of services for 4 decades. When indicated prevention strategies are being considered, the child and the caregivers may both be appropriate recipients, depending on the needs and goals relevant to their circumstances.

Trauma-focused cognitive behavioral therapy (CBT). This evidence-based therapeutic modality is for victims of traumatic events, such as child abuse, and studies have shown that at least 80% of children who receive CBT experience an improvement in their trauma-related symptoms. There are at least 170 therapists in 60 North Carolina counties with CBT training. Although CBT is not specifically designed to prevent maltreatment, it is designed to prevent the emotional consequences of maltreatment [11]. Additional information about the CBT model is available at the North Carolina Child Treatment Program Web site (available at: http://ncctp.med.unc.edu/).

Parent-child interaction therapy. This therapeutic model was originally designed and tested for children with conduct disorder. However, it has since been shown to reduce repeat maltreatment by physically abusive parents, who are taught specific skills in child-behavior management by a trained therapist [12]. The types of therapy and training in this modality are increasingly offered by child-serving agencies and mental health practitioners in North Carolina.

Conclusions

Child maltreatment prevention has become more robust in North Carolina since the North Carolina Institute of Medicine Task Force on Child Abuse Prevention convened in 2005. The commitment by state governmental and nongovernmental leadership and funding agencies has been instrumental to this success. In addition, the task force leadership wisely recommended the devotion of resources to evidence-based strategies, to promising strategies, and to new and developing programs that have a strong mechanism in place to facilitate collection and evaluation of new evidence [13].

Strategies such as the Nurse-Family Partnership and trauma-focused CBT have a strong empirical foundation. Programs such as Durham Connects and the Period of PURPLE Crying have rigorous designs in place to facilitate their evaluation. Future gains in maltreatment prevention will depend on financial and in-kind support, leadership, research, and surveillance to monitor progress and identify strengths and weaknesses of the state's system of prevention [14]. **NCMJ**

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Violence Against Women in North Carolina

Rebecca J. Macy

Research shows that partner violence and sexual assault against women are significant statewide problems in North Carolina. This commentary provides an overview of the research on evidence-based interventions designed to prevent such violence, highlights current prevention efforts in North Carolina, and offers future directions.

Partner violence and sexual assault against women are significant problems in North Carolina. Statewide data obtained from a representative sample of women by use of the Behavioral Risk Factor Surveillance System showed that 25% of North Carolina women had experienced physical and/or sexual violence since turning 18 years old [1]. Of the women who reported physical violence (eg, being pushed, hit, slapped, or kicked), 82% cited victimization by a current or former intimate partner. Of the women who reported sexual violence (ie, being forced to have sex or perform sexual acts), 69% cited victimization by a current or former partner. These North Carolina findings are similar to national findings on violence against women, which showed that nearly a quarter of women experience an act of violence during their lifetimes and that these acts are often perpetrated by male acquaintances, dates, intimates, partners, spouses, or former partners or spouses [2].

In addition, this national research showed that, relative to male survivors of partner violence, female survivors reported more-frequent, longer-term violence and greater threats of bodily harm [2]. Moreover, because of their violent victimization, women were more likely than men to report sustaining injuries, receiving medical treatment, losing work time, seeking help from the justice system, and receiving mental health counseling. Thus, partner violence and sexual assault extract a considerable toll on women's safety, health, and well-being. However, the harms of partner violence and sexual assault are not limited to individuals. According to the Centers for Disease Control and Prevention (CDC), the costs associated with partner violence in the United States exceed $5.8 billion annually [3].

Other research shows that these costs are related to a host of conditions. As examples, and relative to nonvictimized females, female violence survivors are more likely to experience physical health problems, including injuries, chronic pain, gynecological- and reproductive-health problems, gastrointestinal problems, and sleep disturbances [4, 5]. Further comparison of female violence survivors and their nonvictimized counterparts shows that female violence survivors are more likely to have mental health problems, such as depression, anxiety, posttraumatic stress disorder (PTSD), substance abuse, and suicidality [4-6].

In addition to causing health problems and disabilities, partner violence and sexual assault often leads to death. In 2007, the North Carolina Violent Death Reporting System determined that 111 homicides (18.2%) were related to partner violence, and 12 homicides (4.5%) were precipitated by rape or sexual assault [7]. Taken together, the research suggests that partner violence and sexual assault are considerable problems for North Carolina communities. Therefore, the best possible policies and the most-effective programs are needed to prevent such violence from occurring and to help females who have survived violence to establish safe, violence-free lives that allow recovery from the trauma of victimization.

Evidence-Based Preventions

Primary prevention. Even with acknowledgment of the seriousness of partner violence and sexual assault, it is regrettable that little empirical evidence is available about the effectiveness of primary prevention interventions aimed at these problems [8, 9]. However, preliminary research with positive findings offers potential avenues for violence prevention. For example, Safe Dates is a school-based program to prevent adolescent dating violence; Safe Dates was developed and researched in North Carolina [9, 10].

Preliminary research also suggests that effective programs for preventing sexual assault share certain characteristics: the curriculum addresses rape myths (eg, that rapes are committed by strangers, that victims seldom know their assailants, and that women's clothing and behaviors provoke rape); teaches communication skills (eg, by focusing on developing assertiveness skills and learning how to establish boundaries and set limits); provides information about healthy relationships; and trains women in self-defense [8]. These education and skill-building opportunities are provided most effectively in educational trainings at the high school or college level, when delivered in multiple, culturally relevant, gender-specific, brief sessions (lasting no longer than 1 hour) [8].

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Primary Prevention of Sexual Violence in North Carolina:
A Public Health Approach

Brenda Linton, Catherine Guerrero, Jen Przewoznik

Sexual violence is a serious public health problem that takes a large toll on health and well-being in North Carolina. National data indicate that as many as 1 in 6 women and 1 in 33 men experience rape or attempted rape at least once in their lifetime, whereas many more experience some other form of sexual violence, such as harassment, peeping, and threats [1]. In North Carolina, approximately 10% of women reported having experienced sexual violence after the age of 18 years [2]. Of these, 38% reported being assaulted by partners or spouses; 15%, by acquaintances; and 16%, by strangers. According to the North Carolina Council for Women and Domestic Violence Commission, the 75 rape crisis centers across North Carolina served 6,527 victims of sexual assault and received 22,671 crisis calls from April 2007 through March 2008 [3]. The number of North Carolinians who experience sexual violence is likely much higher than these figures indicate, because a number of factors (eg, fear, self-blame, and social stigma) associated with sexual violence lead to significant underreporting and because data collection systems often do not include some of the most vulnerable populations. The prevalence of sexual violence and its consequences for victims, families, friends, and society make sexual violence a serious public health problem in North Carolina.

In 2010, the North Carolina Division of Public Health's Sexual Violence Prevention Team (NCSVPT), an interdisciplinary group of stakeholders representing universities, domestic violence and rape crisis centers, community educators, the North Carolina Coalition Against Sexual Assault, and public health practitioners, released a statewide plan for preventing sexual violence in North Carolina. The state's Sexual Violence Prevention Plan includes a number of priority actions essential for preventing sexual violence in North Carolina. These activities address North Carolina's population as a whole, with particular attention to subpopulations at higher risk for sexual violence. They include increasing sustainable primary prevention programming (ie, approaches that take place *before* sexual violence has occurred) at the local, regional, and state levels; developing better data collection systems to track sexual violence and its associated risk and protective factors; increasing the capacity of public school districts, colleges and universities, and local and state agencies to address sexual violence; and reducing rates of sexual violence perpetrated against people with intellectual disabilities, through stronger state laws, policies, and procedures.

The Rape Prevention and Education (RPE) program in North Carolina is based in the North Carolina Division of Public Health. The program is responsible for distributing funds to North Carolina communities to support programming for sexual violence prevention. The RPE program works closely with the North Carolina Coalition Against Sexual Assault and other state-level partners to steward efforts to increase the capacity and sustainability of programming, through training, technical assistance, and evaluation. The most-promising programs for preventing sexual violence address the multiple levels of influence that individuals encounter daily as a result of their own choices, the lessons learned in their relationships, and the norms maintained by their communities and society.

In all 3 regions of the state, RPE-funded programs are fielding community-based task forces, assessing their communities'

In addition to supporting these individual-focused strategies, promising evidence supports an approach that targets sexual assault bystanders, which is an innovative intervention combining individual- and community-level change strategies [8]. This approach leverages the fact that, although most people will be neither victim nor perpetrator of violence, nearly all people share a desire to live in communities that are violence free. Thus, the bystander approach teaches the majority of the population how to recognize and respond to situations that involve violence and how to—safely—intervene to prevent violence. Moreover, bystander interventions engage participants as supportive allies for violence survivors and teach participants to challenge social norms that support violence, such as how to diplomatically confront a coworker who tells jokes about rape or battered women. In summary, promising evidence exists for primary prevention interventions aimed at eradicating violence against women. Despite such promise, the small number of evidence-based preventions is worrisome, given the prevalence of partner violence and sexual assault.

Secondary prevention. Secondary prevention interventions for partner violence and sexual assault aim to prevent survivors' revictimization by reducing the perpetrators' violence and by establishing the survivors' safety. As with primary violence prevention, we have limited empirical evidence supporting the effectiveness of secondary-prevention interventions [9]. There are secondary prevention interventions for partner violence with promising—albeit limited—evidence. Nonetheless, these prevention interventions offer a starting place for building the state's capacity for violence response. Secondary preventions with promising evidence include survivor advocacy (eg, legal advocacy services, such as helping survivors secure protection orders), shelter services (eg, emergency and transitional housing for survivors and children), and group-counseling interventions for violence perpetrators [9].

needs and strengths, and implementing and evaluating strategies designed to change attitudes, behaviors, and community norms supportive of sexual violence.

In the piedmont region, RPE prevention coordinators are working with student leaders and school staff to adapt and conduct prevention curricula in middle schools and high schools, basketball camps, and college campuses. Results of preliminary evaluation of the program are being used to improve the quality of the educational sessions and to create buy-in among community members for primary prevention.

RPE programs in the western part of the state are experiencing success in the area of community mobilization. Highly motivated task force members have developed primary prevention strategies customized to their communities, such as a social-marketing campaign for college students and training in sexual violence prevention for all county school employees.

In eastern North Carolina, RPE programs are taking a 2-pronged, comprehensive approach to primary prevention. Prevention coordinators train mixed-gender teams of college students to deliver educational sessions to middle school health-education classes. Selected teachers and parents receive their own training in sexual violence prevention and serve as vital partners who reinforce primary prevention messages after the educational sessions are completed.

The NCSVPT and the RPE program are continuing to strengthen the approaches to primary prevention developed during the strategic planning process, through program evaluation, continuous quality improvement, and increased engagement of key individuals, agencies, and organizations. For more information about the RPE program and available funding for efforts to prevent sexual violence in North Carolina, or to obtain a copy of the Sexual Violence Prevention Plan, contact Jen Przewoznik at jen.przewoznik@dhhs.nc.gov or 919.707.5431. NCMJ

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Further, limited evidence shows that couples counseling may be a promising intervention for those with low levels of conflict and violence [9]. However, this strategy is contentious among advocates against domestic violence, given the real concerns about counseling professionals' capacity to ensure participants' safety. In addition, National Institute of Justice researchers found that some secondary prevention interventions, such as arrest or restraining orders against the batterer, can lead to retaliatory abuse without providing survivors with increased, meaningful protection [11]. However, the investigators warned against wholesale abandonment of such secondary preventions. Instead, they recommended tailoring services to survivors' individual needs and risks.

Similar to the case with secondary preventions for partner violence, only limited research has examined safety services for survivors of sexual assault, even though such services appear helpful [12]. Among the treatment approaches examined, evidence supports a mental health treatment called prolonged exposure as being efficacious for treatment of sexual assault survivors who have PTSD [13]. Likewise, a growing body of research shows that cognitive behavioral therapy offers promising treatment approaches for reducing and preventing recidivism among sexual offenders [14].

In summary, limited, preliminary evidence supports the utility of secondary prevention interventions. However, the dearth of evidence on the efficacy of services for domestic violence and sexual assault survivors (ie, secondary preventions) created to help these individuals recover and to reduce perpetration of violence presents serious barriers for effective practice, policy, and funding advancements for these fields. Research suggests that sexual assault in particular has received especially limited funding and policy attention, and greater focus on this issue is urgently needed [15].

Current North Carolina Prevention Efforts

North Carolina is well positioned to address the critical

knowledge gap in research on interventions to prevent partner violence and sexual assault, to lead national violence prevention efforts, and to help advance the field of violence prevention. Several important efforts to prevent domestic violence and sexual assault are underway in the state. For example, the North Carolina Council for Women supports community-based efforts to prevent violence and to increase awareness of the prevalence of domestic violence and sexual assault. In addition, North Carolina is moving toward being a national leader in the primary prevention of partner violence and sexual assault, because of 2 novel, promising efforts. One of these innovative prevention efforts is the DELTA Project, which uses public health strategies to prevent partner violence. DELTA is a collaboration between the CDC and the North Carolina Coalition Against Domestic Violence and is leading efforts to implement an evidence-based, 10-year plan to prevent partner violence in North Carolina. Likewise, the North Carolina Coalition Against Sexual Assault and the Injury and Violence Prevention Branch of the North Carolina Division of Public Health are partnering in a similar CDC initiative to prevent sexual assault [16].

In addition to statewide efforts, pilot projects are underway in local areas to connect partner-violence and child-maltreatment prevention, because of the considerable overlap between these types of violence (ie, child maltreatment co-occurs in at least one-third of families in which partner violence is present) [17]. Moreover, exposure to partner violence has significant negative effects on children's well-being [18]. These pilot prevention programs include the Mothers Overcoming Violence through Education and Empowerment program, which is offered by Interact and SAFEchild in Raleigh and is primarily funded by The Duke Endowment and the North Carolina Governor's Crime Commission; and the Strong Fathers Program, which is based at Family Services in Winston-Salem and is primarily funded by the North Carolina Division of Social Services. Innovative efforts to concurrently address partner violence and child maltreatment are essential and can significantly advance the field of violence prevention. Therefore, the lessons learned from these pilot projects will inform the development of similar initiatives in North Carolina and in other states.

Future Directions

Although North Carolina is poised to lead the nation in the prevention of violence against women, the state could easily squander this unique opportunity if it fails to maximize its efforts by marshalling its resources and maintaining its commitment to these important prevention initiatives and pilot projects. Further, the state could make a significant contribution to the advancement of domestic violence and sexual assault prevention by developing 2 additional statewide initiatives.

First, North Carolina should enhance and expand its population-based surveillance systems for partner violence and sexual assault. The state-level data available regarding the extent, prevalence, and incidence of partner violence and sexual assault are woefully incomplete. Without complete data and solid evidence about partner violence and sexual assault, it will be impossible to know whether prevention efforts are making a difference. Too often, violence studies rely on retrospective, cross-sectional research methods that yield limited information on the magnitude of these problems. In addition, these research efforts have often failed to survey representative samples, have not included comparison groups, and have not attended to the diversity of North Carolina's population, including lesbian, gay, bisexual, and transgendered persons; military personnel; immigrants; persons of color; persons with disabilities; and persons in rural communities. In addition to expanding the types of data collected to include partner violence and sexual assault experiences from samples that are representative of the diverse population, North Carolina should conduct longitudinal studies to better track the outcomes of our new prevention efforts.

Second, North Carolina must develop statewide capacity to evaluate primary and secondary prevention interventions that appear promising but have limited evidence. As discussed above, the lack of evidence-based practices poses a serious challenge for domestic violence and sexual assault prevention. Without empirical evidence of what works and by what mechanisms, it will be considerably challenging to end violence against women in North Carolina. Given the significant knowledge gaps in secondary prevention, there is a specific need for evidence about interventions helpful to survivors' planning for and achieving safety, as well as programs that effectively reduce perpetration of partner violence and sexual assault.

Evaluation research is important because it provides accountability not only to funders and communities but also to survivors, who are the targets of these interventions. Rigorous prevention intervention research will enable North Carolina's communities to develop and improve services for survivors. Evaluation also improves stewardship of precious resources by illuminating interventions that are considered helpful but that actually make no difference in people's lives, or those that have unintended, negative consequences. In addition, documenting and evaluating promising, innovative preventions allows knowledge of what works to be shared among communities, avoiding reinventing the wheel repeatedly and further safeguarding limited resources.

In sum, the most notable challenge to preventing violence against North Carolina's women is the lack of evidence-based prevention interventions for partner violence and sexual assault. The individual and collective costs of partner violence and sexual assault are considerable and far-reaching. Therefore, doing nothing different from current practices is not an option. Fortunately, North Carolina's advocates, funders, policymakers, and researchers have positioned the state to be a leader in improving the quality of life of its citizens, by preventing violence against women. NCMJ

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Is Fatality-Free Travel on North Carolina's Streets and Highways Feasible? It's Time to Think the Unthinkable

Herbert G. Garrison, Jennifer L. Smith

The persistent downward trajectory in the traffic fatality rate during the past 90 years suggests that fatality-free travel on North Carolina's streets and highways may one day be a reality. Multiple interventions, including raising the driving age to 17 years and banning cell phone use, will help North Carolina achieve this vision.

Since 1921, when Harriet Morehead Berry led a contentious statewide campaign to persuade the legislature to fund a comprehensive statewide highway system [1], North Carolina has been known as the Good Roads State. In the 90 years since that auspicious beginning, North Carolina's population has surged from barely 2 million to 9 million, and we have gone from dirt roads to more than 100,000 miles of paved streets and highways [2].

But as our state has grown in population, the good roads have gotten very crowded. In the quarter century between 1980 and 2005, North Carolina's population increased by 48%, the number of drivers increased by 65%, and the annual number of miles driven on our roads increased by 145% (from 41 billion miles to 101 billion miles) [3]. While the numbers of drivers and miles driven expanded greatly, the number of roads has stayed relatively flat. In the 5-year period of 1995-2000, only 3,000 additional miles of streets and highways were added to North Carolina's transportation system [2]. In the 10-year period of 1998-2008, traffic volumes in North Carolina increased by more than 2.5 times as much as the increase in the number of travel lanes [4].

As the number of miles driven was increasing, so was the number of traffic-related fatalities. In 1981, there were 1,504 deaths due to motor-vehicle crashes in North Carolina. Since that time, the annual number of traffic fatalities in our state has increased steadily, to a high of 1,750 in 2007 [5].

While North Carolina's traffic-injury burden remains high, something unexpected has happened in the past couple of years: the number of traffic fatalities has begun to steadily decline. Compared with 2007, statewide, there were 200 fewer traffic fatalities in 2008 and 350 fewer in 2009 [6]. Of note, although the focus of this commentary is on fatalities, the long-term trend in nonfatal injuries due to motor-vehicle crashes has decreased since 1999 [7].

The decline in the traffic-injury burden is accounted for, in part, by the current recession. When the economic engine sputtered, so did the growth of highway use: the number of miles traveled by vehicles on North Carolina roads each year reached a plateau in 2007. This linkage to the economic recession is supported by the fact that declines in fatalities have tracked the increase in unemployment rates in major metropolitan areas [8].

It is unlikely, however, that the decrease in traffic fatalities and deaths is due solely to decreasing "exposure" to unsafe traffic situations. After all, the number of miles vehicles travel is staying the same, and the number of severe crashes was decreasing well before the recession. It is conceivable that other highway-safety interventions are starting to take effect and have a significant impact. Researchers from the National Highway Traffic Safety Administration have concluded that behavioral and vehicle-safety programs—including increased use of seat belts and child safety seats, reductions in drunk driving, and increased numbers of vehicles with air bags and electronic stability control [7, 8]—have contributed to the encouraging trends.

This decrease in traffic fatalities while the volume of traffic in North Carolina stays the same permits us to dream about a day when we may experience no premature deaths on our streets and highways. The persistent downward trajectory in the fatality rate associated with motor-vehicle crashes through the decades suggests that this dream may not be a fantasy (Table 1). It is a goal that is gaining traction with others. Clarence Ditlow, executive director of the Center for Auto Safety, said recently that "society should treat traffic fatalities as a disease to be eliminated" [10]. Safety advocates in Utah have created an ongoing campaign called Zero Fatalities (available at: http://www.zerofatalities.com).

The recipe for accomplishing the (maybe not) impos-

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Table 1.
Fatality Rates Due to Motor-Vehicle Crashes in the United States, 1921-2009

Year	Fatality rate[a]
1921	24.1
1930	15.1
1940	10.9
1950	7.2
1960	5.1
1970	4.7
1980	3.3
1990	2.1
2000	1.5
2009	1.1

Note. Data are from [6, 9].
[a]Defined as deaths per million vehicle-miles traveled.

sible goal of fatality-free travel on North Carolina's streets and highways is made up of the following ingredients: alert, experienced, unimpaired, and fully attentive drivers, combined with a fleet of very safe vehicles, plus divided and controlled-access highways (or equally safe streets). Getting all of the ingredients to come together is the constant challenge in traffic safety.

Through the years, North Carolina has been a national leader in responding to that challenge. There are many agencies and programs that have worked successfully to keep North Carolina one of the most progressive states in highway safety. Click It or Ticket and Booze It & Lose It are but 2 examples of interventions born in our state that are now national models. Organizations that keep North Carolinians safe on our roads include the University of North Carolina Highway Safety Research Center, the Governor's Highway Safety Program, the North Carolina chapter of MADD (Mothers Against Drunk Driving), the North Carolina State Highway Patrol and scores of local law-enforcement traffic-safety units, and multiple divisions in the North Carolina Department of Transportation, including its Executive Committee for Highway Safety.

Many of the leaders in traffic safety, such as these and other organizations (including many from the public health sector), have been studying the traffic-safety problem recently and have proposed a number of interventions (Table 2). In addition to the recommendations listed in Table 2, we believe the 5 interventions outlined below should be given special emphasis and priority, including research and resources. These ideas, while controversial and viewed by some as audacious, should be considered seriously because they, in addition to the interventions in Table 2, will propel us to fatality-free travel much sooner.

Increase the Minimum Driving Age to 17 Years

While the number of deaths associated with teen drivers is decreasing [13], there is still much concern about motor vehicle–related deaths among teens, since the motor-vehicle crash is the most common cause of death in this age group. The graduated driver's licensing system, which was pioneered in North Carolina [14], has been very effective, but teens still crash at a higher per capita rate. One state (New Jersey) and multiple other countries have adopted 17 years or older as the minimum age for new drivers. It is unclear whether maturity or experience is the key factor, but research confirms that older new drivers have fewer crashes [15].

Establish Special Driving While Intoxicated (DWI) Courts

Many in North Carolina have worked aggressively to decrease drunk driving. Lowering the legal impairment limit to a blood-alcohol concentration of 0.08 mg/dL and the nationally recognized Booze It and Lose It campaign have helped. But there are still too many motor-vehicle crashes in which drunk driving is the contributing factor. It is widely acknowledged that, when it comes to enforcement of traffic laws in North Carolina, the courts are the weakest link. The most troublesome aspect is the way in which defense attorneys ask for continuation of their cases time and again, until they can get their DWI case in front of a judge who will give them the most favorable outcome. The way to stop this practice is to establish special DWI courts that handle only drunk-driving cases. When a special court was established recently in Johnston County, the DWI conviction rate went to 89%, which was much higher than the 65% conviction rate for the state between July 1, 2009, and June 30, 2010 [16].

Table 2.
Compilation of Recommendations for Reducing Injuries Due to Motor-Vehicle Crashes

Recommendation
Alcohol interlocks required for all DWI offenders
Evidenced-based driver-education program
Financial support of traffic-checking stations to enhance enforcement of speeding and aggressive-driving laws, especially on dangerous roads and intersections
Graduated licensure and training requirements for motorcycle and moped operators
Increased fees and fines for traffic violations, especially for speeding, seat-belt violations, and DWI license restoration
Primary seat-belt-use law for rear-seat occupants

Note. Data are from [11, 12]. DWI, driving while intoxicated.

Ban Cell Phone Use

For years, drivers have been subject to distraction. Eating, watching the scenery, applying makeup, reading, and changing radio stations and CDs have been unsafe practices for a long time. But the problem of distraction has been magnified tremendously by the use of mobile devices for personal communication. Dialing and talking on cell phones, sending and receiving text messages, and searching and viewing digital material takes the drivers' attention off the road and surrounding vehicles. These distractions are problems at any speed and are in opposition to defensive driving. To reduce the risk of a crash, the safest driver pays full attention to the task of driving. North Carolina has banned texting, and, like 8 other states, it should ban drivers' use of handheld cell phones and other electronic devices. An argument against banning cell phone use is that the ban is unenforceable. However, recent high-visibility enforcement-demonstration projects in Connecticut and New York have established that enforcement is possible and effective [17].

Make Bike Lanes and Sidewalks Ubiquitous

More and more North Carolinians are riding bicycles, walking, and jogging. They are adopting these habits to save money on commuting, for recreational purposes, and to stay fit. These activities often find participants on streets and highways and in dangerous conflict with much heavier vehicles, frequently resulting in injury. The solution to this problem is for North Carolina and its municipalities to pursue a "complete-streets" approach to road construction and resurfacing, especially in urbanized and heavily congested parts of our state. According to LaPlante and McCann, "A complete street is a road that is designed to be safe for drivers, bicyclists, transit vehicles and users, and pedestrians of all ages and abilities. The complete-streets concept focuses not just on individual roads but on changing the decision-making and design process so that all users are routinely considered during the planning, designing, building, and operating of all roadways" [18p24].

Adopt Roundabouts and Rumble Strips as Standards

Two of the most dangerous settings and events for drivers are intersections and lane departures, respectively. Crashes can be reduced by installing roundabouts at intersections (especially those with heavy traffic flow) and by installing centerline rumble strips on undivided roads (similar to the rumble strips typically encountered on the shoulders of major highways). Roundabouts have been found to reduce crashes by 40% and injury-causing crashes by 80% [19]. Centerline rumble strips reduce frontal and opposing-direction sideswipe injury crashes by 25% [20].

Conclusion

If Harriet Morehead Berry were alive today, she would be amazed that her campaign for good roads in North Carolina has helped yield a comprehensive network of streets and highways on which people travel millions of miles each day. She would probably also be dismayed at the injuries and deaths associated with traveling on those good roads. There is now a foreseeable chance that someday we will all travel in North Carolina with the knowledge that we will get to our destination and back without the risk of death. That one day may be when we are all riding in robotic cars on autopilot [21]. Until then, we must keep striving to make fatality-free travel a reality. NCMJ

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Fatal and Nonfatal Firearm Injuries in North Carolina

Tamera Coyne-Beasley, Abigail C. Lees

This commentary discusses fatal and nonfatal injuries due to firearms in North Carolina and reviews epidemiologic trends in firearm-related homicide, suicide, and unintentional injuries. This commentary also provides an overview of strategies for reducing the risk of firearm-related injury and suggests future research to prevent these injuries.

Firearm-related injuries (hereafter, "firearm injuries") occur among all North Carolina demographic groups but are a leading cause of morbidity and mortality among young people aged 15-34 years and older adults aged 35-64 years. Although the most common manner of death due to firearms (hereafter, "firearm deaths") among these groups differs, with young people more likely to die of homicides and older adults of suicides, the community effects are devastating.

In 2008, there were 1,881 violent deaths in North Carolina, including 1,148 from suicide, 628 from homicide, 28 from legal intervention, and approximately 10 from unintentional firearm discharge; 67 had an undetermined intent [1]. A total of 60% of violent deaths were due to firearm use. Firearms were used in 57% of suicides and 68% of homicides [1], and the proportion of homicides and suicides that involved firearms during 2004-2008 remained relatively constant. Most firearm deaths in 2008 were, as in other years, caused by handguns, including 67% of suicides and 79% of homicides [1].

North Carolina rates of firearm death were relatively stable during 2004-2008 (range, 12.1-12.7 cases per 100,000 population), with rates of firearm-related suicide exceeding rates of firearm-related homicide each year [1]. Firearm death rates have consistently been higher among males than among females across age groups. Males aged 20-24 years had the highest rate of firearm deaths (43.13 cases per 100,000 population), followed by males aged 75-79 years and those aged 80-84 years (36.26 cases per 100,000 population in both groups) [1].

Nonfatal and Fatal Firearm Injuries

The Centers for Disease Control and Prevention [1] and the Children's Defense Fund [2] estimated that firearms yield 4-6 nonfatal injuries per fatal injury. Generally, the number of firearm injuries requiring hospitalization is less than the number requiring an emergency department (ED) visit, because many victims are treated solely through the ED or are pronounced dead there and do not require hospitalization.

A total of 6,811 ED visits for treatment of nonfatal and fatal firearm injuries were reported during 2006-2008 (mean, 25.1 visits per 100,000 population) [3]. The greatest rates of firearm injury were among individuals aged 15-44 years. Table 1 reflects the distribution of fatal and nonfatal firearm injuries among ED visitors, showing an almost equal number of assault-related injuries (which includes homicides) and unintentional injuries (which may include some cases later determined as suicides). Thus, unintentional firearm injuries are a significant cause of morbidity, although the number of deaths is relatively low.

The emotional and financial costs of these injuries can be quite high. In North Carolina, from 2004 through 2007 there were 4,014 reported hospitalizations for treatment of nonfatal or fatal firearm injuries, resulting in 28,421 days of hospital stay [4]. The median hospitalization duration was 4 days (mean, 7.1 days) and resulted in charges of $161,608,218.00 [4]. Thus, among the 4,014 hospitalizations related to firearm injuries, the median charge was $23,211.30 (mean, $40,261.14) [4]. Many patients who sustain firearm injuries do not make it to the ED or hospital or seek medical care, and hospital costs do not include societal and other costs, such as those related to disability, the psychological consequences of witnessing violence, subsequent related medical care, or lost wages.

Manner of Firearm Deaths

Homicides. North Carolina rates of firearm-related homicide during 2004-2008 ranged from 4.5 to 5.0 cases per

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Table 1.
Nonfatal and Fatal Firearm Injuries Reported in North Carolina Emergency Departments, by Intent, 2006-2008

	Intent					
Sex	Assault	Other	Self-inflicted	Undetermined	Unintentional	Total
Female	360	0	47	71	343	829
Male	2,631	58	243	477	2,570	5,979
Total	2,991	58	290	548	2,913	6,808

Note. A total of 6,811 injuries were reported, but 3 cases are excluded because the sex was unknown. Data are from [3].

100,000 population. In 2008, the highest rate of firearm-related homicide was among people aged 20-29 years (163 deaths per 100,000 population), followed by those aged 30-39 years and 40-49 years (88 and 68 deaths per 100,000 population, respectively) [1].

Although firearm-related homicides affect all races, blacks and American Indians are disproportionately affected. During 2004-2007, firearm-related homicide rates ranged from 3.7 to 4.4 cases per 100,000 population for whites, 2.7 to 5.4 per 100,000 population for Asians, 16.4 to 17.7 per 100,000 population for blacks, and 16.0 to 21.1 per 100,000 population for American Indians, who experienced the largest absolute increase in rates during this time [5]. Among youths, most victims were boys. However, these racial and sex disparities were not present among adults older than 75 years. Although rates of firearm-related homicide were low overall in this older age group, at 4 cases per 100,000 population, the firearm-related homicide rate was 3.0 per 100,000 population among whites and 1.0 per 100,000 population among blacks; approximately 50% of homicides were among women [1].

Suicides. Rates of firearm-related suicide during 2004-2008 ranged from 7.8 to 8.6 cases per 100,000 population. In 2008, the greatest rate of firearm-related suicide was detected among people aged 40-49 years (124 cases per 100,000 population), followed by people aged 50-59 years (110 per 100,000 population). Individuals older than 75 years and those aged 30-39 years had similar rates (105 and 107 cases per 100,000 population, respectively) [1]. Notably, adolescents experienced lower rates than any of these group (23 cases per 100,000 population) [1].

Whites consistently had higher suicide rates across all races and ages. Data from 2004-2007 show relatively stable suicide rates for whites (range, 15.8-17.3 cases per 100,000 population) and blacks (range, 5.0-6.2 per 100,000 population), whereas rates among Asians decreased (from 6.0 to 3.2 per 100,000 population) and those among American Indians increased (from 7.5 to 15.2 per 100,000 population) during this period [5].

Most firearm deaths are due to suicide, but homicides often receive more media attention. There are interesting patterns among suicides. For example, a study in Kentucky, North Carolina, and South Carolina revealed that, during 1990-1998, white males working in agriculture were 2 times more likely to commit suicide than were males at large in the community [2, 6].

Unintentional firearm deaths. During 2004-2008, there were 73 unintentional firearm deaths; the annual number of deaths ranged from 9 to 22. Because of low numbers, a rate could be calculated reliably only for 2005 (0.3 deaths per 100,000 population). On average, these deaths comprised approximately 1% of firearm deaths annually (North Carolina Violent Death Reporting System, unpublished data, 2010) [1]. Although numbers were small and must be interpreted with caution, across all ages, most deaths occurred among white males.

Nationally, 49% of unintentional firearm deaths were inflicted by others, most often by family members (47% of cases), particularly brothers, and by friends (43%). Fatalities occurred while playing, hunting, target shooting, and showing off a gun [7]. Studies have also demonstrated that the majority of firearms used in youth suicides and unintentional deaths were acquired from either the youth's home or the home of a friend or relative [8].

Firearm Presence in North Carolina Homes

According to the 2004 North Carolina Behavioral Risk Factor Surveillance Survey, homes of 40.9% of respondents had a firearm; this is higher than the national average of approximately 30% [9]. Firearm ownership also varied by region, with 36.7% of respondents from eastern counties, 32.3% from piedmont counties, and 52.9% from western counties reporting "yes" to the presence of firearms in their place of residence.

Preliminary North Carolina data suggest that firearm ownership may be correlated with suicide rates in the state. The average suicide rate during 2004-2008 was 12.1 cases per 100,000 population. Counties with the greatest reported prevalence of household firearms appeared to have the highest suicide rates. This pattern of higher suicide rates in states with higher prevalence of firearm ownership has also been reported in national data [10].

Firearm ownership also varies by the presence of children residing in the home: 29% of North Carolina households

contain children younger than 18 years, and 37% of these households contain at least 1 firearm (mean, 2 firearms) [11]. This is slightly higher than the national rate of approximately 33%.

Firearm Storage Practices in North Carolina Homes With Youths

Many youths are able to access household firearms because guns are often stored unsafely. In homes with firearms and children younger than 18 years, 43% of parents reported having at least 1 firearm stored unsafely—either unlocked, loaded, or both [11]. White non-Hispanic parents were almost 4 times more likely to own firearms than were parents in other racial groups and were more likely to report keeping a firearm unlocked and/or loaded. Storage practices of household firearms become less safe as children grow older, with more firearms reported to be stored unlocked and/or loaded in households with adolescents, compared with households with children. This is consistent with findings from another study [12] and particularly disturbing because adolescents are more likely than children to have access to and use firearms.

Strategies to Reduce Firearm Injuries

In recognizing the dangers posed by household firearms, many health professional organizations have recommended multiple strategies to reduce firearm injuries, including removal of firearms from homes and environments where children play and visit, as well as providing firearm-safety counseling for parents. For families that are unwilling to remove firearms from their homes, an alternative recommendation is to store the firearms unloaded and locked up, with the ammunition locked and stored separately. Several campaigns for safe storage of firearms have been developed to reinforce these messages, and some even provide tools, such as gun locks, to facilitate safer storage [13]. The long-term effectiveness of these programs has been mixed but is improved when the program is community based; engages or focuses on males, who are more likely to be gun owners; and gives the gun owners tools to lock their guns [13, 14].

CeaseFire is a Chicago-based initiative that seeks to reduce violent deaths in high-risk communities. CeaseFire has the following 5 components: community mobilization, youth outreach, public education, involvement of faith-based leaders, and participation by criminal justice agencies. Outreach staff are selected for their community experience and ability to empathize and communicate with community members. They respond to the needs of their clients, helping interested individuals find jobs, get back into school or a GED program, and disengage from gangs [15]. Individuals at increased risk for violence are also identified through CeaseFire's partnership with local EDs, where culturally sensitive hospital respondents are invited to meet with stabbing, shooting, and blunt-trauma victims to reflect on the consequences of violence and retaliation. These comprehensive efforts ultimately resulted in a 17%-24% decrease in shootings and attempted shootings and a 16%-34% decrease in the number of people shot or killed, depending on the neighborhood [14]. CeaseFire's success and sustainable effects to reduce violence have made it a model program, with new CeaseFire projects underway in New York City, Philadelphia, and Baltimore [15].

Efforts to reduce firearm injuries have also included legislation. North Carolina is a state with relatively limited firearm control laws. While several states have legislation that limits handgun purchases to 1 handgun per person per month, there is no limit on the number of handguns that can be purchased by holders of a North Carolina firearm permit. In addition, although some states, including California, Massachusetts, New York, and Maryland, require the sale of approved external locks with handgun purchases, North Carolina does not.

One type of law that is specifically designed to protect children is the child access prevention (CAP) law. CAP laws dictate the legal repercussions for adults who give children access to guns or who are negligent about safe storage. In North Carolina, the current CAP law imposes criminal charges against adults only if they allow a child under their care to use or possess a firearm, not if the child independently gains access to a firearm. Furthermore, adults are exempt from prosecution if the minor obtains the firearm in an illegal manner, if the minor has taken a gun-safety course, or if the firearm was intended to be used for sport or agricultural purposes.

Studies have demonstrated that making violation of CAP laws a felony, rather than a misdemeanor, resulted in decreased unintentional firearm deaths, particularly among children, and worked best in states with strict enforcement [16]. Violation of the CAP law in North Carolina is considered a misdemeanor. Another study found that state CAP laws did have an important effect on reducing youth firearm-related suicides among youths, whereas federal firearm laws did not [17].

A criticism of studies investigating the effect of firearm laws on firearm injuries is the presence of insufficient or mixed evidence. A nationwide task force evaluating firearm laws and injury found insufficient evidence for evaluating the effect of firearms or ammunition bans, ownership restrictions, waiting periods, registration and licensing, and permits for concealed weapons. They noted that this did not mean that these interventions were ineffective but merely that more-substantial data are needed [18].

Future Research

Future research in North Carolina is needed to understand and intervene in new trends, such as the recent increase in firearm-related suicides and homicides among American Indians, and for the development and rigorous evaluation of primary prevention strategies to prevent firearm injuries, including suicide, which remains the largest source of firearm

deaths in North Carolina and the nation. Interventions that are most likely to be successful are multilevel, affecting individuals, relationships, communities, and society, and address known risk factors for firearm injury, as well as the agent of injury—the firearm—through measures such as reducing access and ownership, combining legislation with enforcement, and changing the types and lethality of ammunition. To develop these interventions, adequate funds will be required for research that has rigorous designs and frameworks for evaluation; continued data surveillance, including integration of data held by different agencies; and innovative, multidisciplinary, and collaborative activities, including those that address employment, education, and mental health needs, that are similar to those of the CeaseFire project. NCMJ

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Occupational Injury in North Carolina

Dawn N. Castillo, Sheila Higgins

In 2008, 161 North Carolina workers died from work-related injuries, 3,324 were hospitalized, and 119,000 reported work-related injuries. Workers' compensation costs in the state exceeded $1.3 billion in 2007. Concerted efforts by the private and public sectors will be needed to reach goals to reduce the incidence of occupational injuries.

There are similarities and differences between injuries that occur in the workplace and those that occur in other settings. Similarities include injury causes, such as falls and motor-vehicle crashes, although some injury causes are more common in work settings than in other settings, such as being caught in moving parts of equipment. The strategies for controlling injuries in the workplace often are similar to those in other settings, and the workplace provides an additional avenue for prevention efforts. For example, employer practices of providing defensive-driving training to employees whose duties include driving, as well as policies mandating seat-belt use for work-related driving, complement state licensure, laws, and enforcement activities. Similar to injuries in other settings, there are socioeconomic disparities between populations with and populations without an increased risk for occupational injuries. Minority, low-wage, and immigrant workers tend to work in the riskiest workplace environments. The primary difference between injuries that occur in occupational settings and those that occur in other settings is in the control and responsibility for the health of the individuals. The work environment and processes are largely controlled by employers, and there are legal obligations for employers to provide their employees with a safe working environment.

Similar to injuries in other settings, occupational injuries result in large costs to injured individuals, their families, and society. In 2007, workers' compensation costs in North Carolina exceeded $1.3 billion [1]. These economic costs do not include the pain, suffering, and lost potential of the injured workers, their families, and employers.

Occupational injuries are an important public-health problem. Goals to reduce occupational injuries by 2020 have been set nationally and in North Carolina (Table 1) [2, 3]. Reaching these goals will require concerted and complementary efforts by the private and public sectors, including labor departments and public-health agencies, trade and labor organizations, the research community, employers, and workers.

North Carolina Labor Force

There were approximately 4.25 million people employed in North Carolina in 2008 [4]. The education, health, trade, and manufacturing industries accounted for nearly 50% of the workforce. The state's labor force is growing faster than the national average and is transitioning from traditional, labor-intensive industries to knowledge-based or service-related industries. Workers aged 55 years or older are the nation's and state's fastest-growing worker segment, accounting for 18% of the state's labor force in 2008. These transitions will affect the future frequency and types of occupational injuries in the state.

Table 1.
Proposed 2020 Goals to Reduce Occupational Injuries

Scope, goal(s)
National[a]
Reduce the rate of injuries and illnesses due to overexertion or repetitive motion that lead to days away from work
Reduce deaths from work-related homicides
Reduce deaths from work-related injuries (includes specific subobjectives for mining, construction, transportation and warehousing, and agriculture, forestry, fishing, and hunting)
Reduce nonfatal work-related injuries (includes subobjectives for injuries reported to employers, injuries treated in emergency departments, and injuries to adolescent workers 15-19 years of age)
Reduce work-related assaults
North Carolina[b]
Reduce the mortality rate from work-related injuries

[a]Goals are adapted from [2].
[b]Goal is from [3].

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Occupational Injuries in North Carolina

The Council of State and Territorial Epidemiologists (CSTE) [5] has identified occupational-health indicators that can be used by states to assess the occupational-health status of their workers and to help identify prevention priorities. A subset of indicators focused on injury is presented here, and some comparisons are made to national statistics. All data were calculated using methods specified for the CSTE indicators [5].

Nonfatal injuries and illnesses reported by employers. Analysis of employer-reported data collected by the Bureau of Labor Statistics (BLS) revealed that in 2008 there were an estimated 119,000 nonfatal work-related injuries and illnesses (hereafter referred to as "injuries") in North Carolina. National data suggest that approximately 95% of cases are injuries rather than illnesses [6]. The injury rate is decreasing in the state and the nation, and North Carolina rates have consistently remained lower than the overall national rates. Between 2003 and 2008, North Carolina rates decreased 15%, from 4,000 to 3,400 per 100,000 full-time-equivalent workers.

The industries in North Carolina with the largest burden and highest risk for injuries are shown in Table 2. The BLS summarizes data on the public sector separate from data on private-sector industries. For the past several years, the injury rate for the public sector (state and local government) was high in comparison with the rate for the state's private sector. This mirrors national trends.

The BLS collects data on events that contribute to injuries and on the demographic characteristics of injured workers, only for those cases serious enough to result in days away from work. In North Carolina during 2008, the events or exposures most responsible for injuries resulting in days away from work were contact with objects and equipment; bodily reaction and exertion, mostly overexertion, such as in lifting; and falls, most of which were on the same level as that on which the worker was standing or working (Figure 1). These events accounted for 76% of the reported injuries. These are also the most common events nationally.

In the state and the nation during 2008, 64% of injuries that led to days away from work involved injuries to men. A total of 73% of injuries in North Carolina that were associated with missed work involved people aged 25-54 years; the pattern for the United States was similar. In North Carolina, when race and ethnicity were reported, whites accounted for 50% of injuries resulting in missed workdays; blacks, 17%; Hispanics, 9%; and other groups, 1%. Race or ethnicity was unreported in 23% of injuries leading to days away from work.

The data described above are believed to be conservative. The BLS survey is based on a sample and excludes self-employed people, farms with fewer than 11 employees, and federal-government employees. Additionally, research suggests that many cases are undercounted, as a result of disincentives for reporting [10].

Work-related hospitalizations. In 2008, there were 3,324 North Carolina hospitalizations with workers' compensation identified as the expected payer. Work-related hospital-discharge rates decreased 23%, from 101 to 78 hospital discharges per 100,000 employed persons, between 2003 and 2008. US rates show a similar trend, and North Carolina was below the national rate as of 2006.

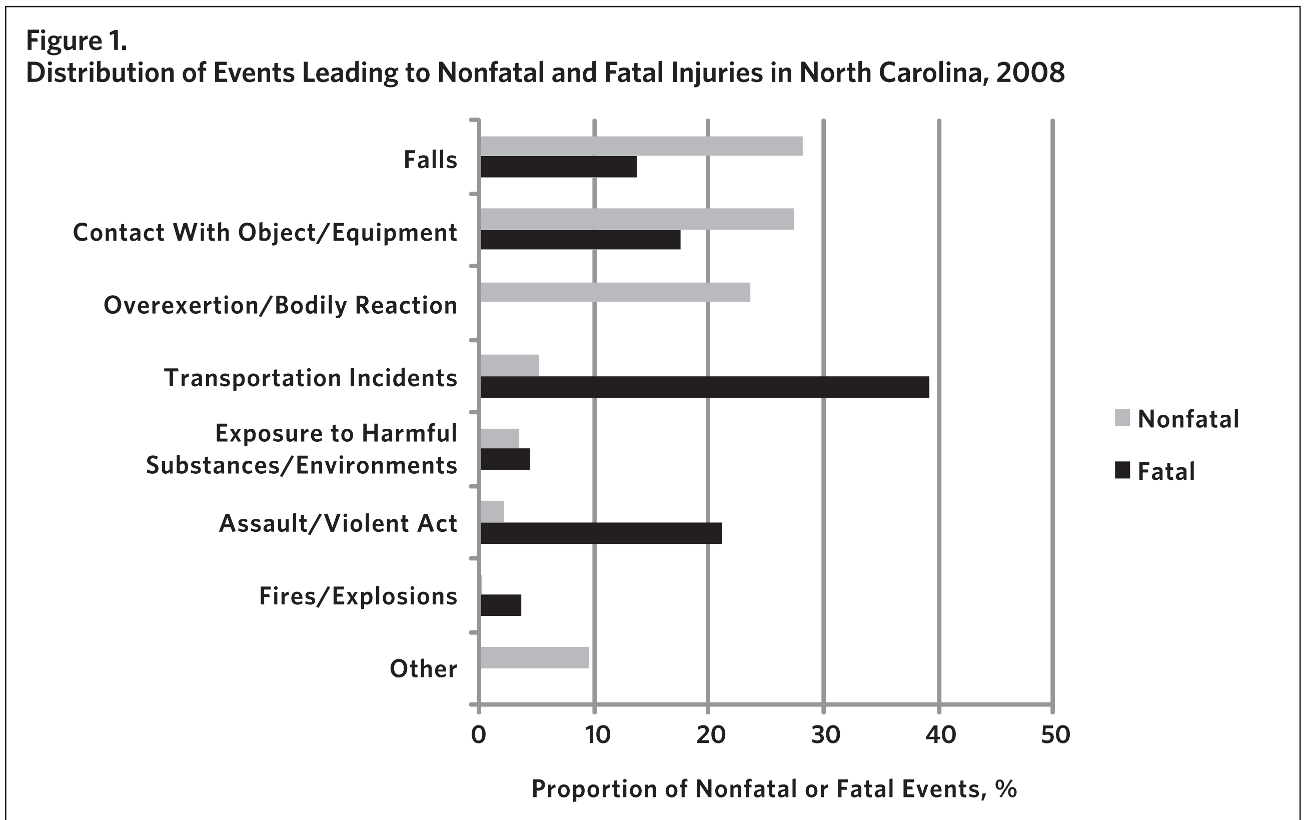
Workers 25-54 years of age accounted for 66% of work-related hospitalizations; males accounted for 73%. The 5 diagnoses with the highest percentages of work-related injuries (31% combined) were related to musculoskeletal disorders. The leading cause of work-related injuries was falls.

Hospital-discharge data do not include industry and occu-

Table 2.
North Carolina Industries With the Largest Absolute Burden of and Risk for Nonfatal and Fatal Occupational Injuries, 2008

Injury type	Value
Nonfatal	
Absolute burden, no. of events, by industry	
Manufacturing	21,900
Education and health services	18,400
Retail trade	13,700
Risk, events per 100,000 FTE employees, by industry	
Transporting and warehousing	4,900
Education and health services	4,600
Agriculture, forestry, fishing, and hunting	4,500
Fatal	
Absolute burden, no. of events, by industry	
Construction	33
Agriculture, forestry, fishing, and hunting	21
Transportation and warehousing	18
Risk, events per 100,000 employees, by industry	
Agriculture, forestry, fishing, and hunting	40.7
Transportation and warehousing	12.1
Construction	8.5

Note. Values were calculated using methods and data sources identified in [5]. Data for fatal injuries are from [7]. Data for nonfatal injuries are from [8]. Denominator data used to calculate fatality rates are from [9]. FTE, full-time equivalent.



pation codes, and race and ethnicity data were not available for 2008. Recent North Carolina legislation requires hospitals to record race and ethnicity data as of 2010.

Estimates of work-related hospitalizations, when calculated on the basis of expected payment by workers' compensation insurance, are believed to be conservative. In a recent analysis that used survey data from 10 states, workers' compensation insurance paid the hospitalization costs of a median of 61% of self-reported occupational injuries [11]. Although this study was not restricted to persons who were hospitalized because of work-related injuries, it suggests that relying on workers' compensation as the expected payer is likely to undercount work-related hospitalizations.

Fatal work-related injuries. In 2008, North Carolina had 161 work-related fatalities. The rate of work-related fatalities is decreasing in the state and the nation. From 2003 through 2008 in North Carolina, there was a 17% decrease, from 4.6 to 3.8 deaths per 100,000 employed persons. In 2008, the North Carolina fatality rate was higher than the US rate of 3.6 deaths per 100,000 employed persons.

The North Carolina industries with the largest burden and highest risk for death due to work-related injury in 2008 are shown in Table 2. A separate analysis revealed that 25 government workers (at federal, state, and local levels) in North Carolina died from work-related injury in 2008, corresponding to a rate of 14.8 deaths per 100,000 employed persons (data not shown), which is more than 3 times the average rate for all North Carolina workers.

In 2008, transportation incidents accounted for the majority (39%) of fatal work-related injuries in North Carolina (Figure 1). National patterns were similar. However, one issue has emerged recently in North Carolina that bears monitoring. A published analysis of data for the period of 1992-2006 suggested that North Carolina had the highest rate of any state for heat-related deaths among crop workers [12].

In 2008, North Carolina workers 25-54 years of age accounted for 63% of fatalities; men accounted for 90% of fatalities. Whites accounted for 60% of work-related fatalities, blacks for 25%, and Hispanics for 12%; race or ethnicity was unreported in 2% of cases. Age and sex profiles in the United States during 2008 were similar to those in North Carolina.

Improving Data for Action

The North Carolina Division of Public Health recently received funding through a 5-year cooperative agreement with the National Institute for Occupational Safety and Health (NIOSH) to build state capacity for occupational-health surveillance. North Carolina was 1 of 14 states to receive this capacity-building award. The goal of the North Carolina grant is to conduct trend analysis of secondary data sets and to link findings with prevention activities. An advisory board is being established to share information and expertise, to promote effective partnerships, and to support actions that address problems identified through surveillance. Plans include compiling all 19 CSTE occupational-health indicators and evaluating additional indicators

important to North Carolina (eg, farm injury, heat-related injury, and injury to public employees). Plans also include using additional data sources, such as workers' compensation, and conducting more in-depth analysis to describe at-risk industry and worker subgroups.

The data on occupational injuries that are currently available in North Carolina and the United States are useful for getting a sense of the size of the occupational-injury problem, for focusing research and prevention efforts, and for monitoring trends. However, important questions remain about the actual size of the problem, whether decreasing trends reported in some data systems are real, and whether specific types of worker populations or types of injuries are systematically missed in existing systems. It is important to answer these questions to understand the true burden of occupational injuries and to ensure that limited prevention resources are targeted to the most important problems [10, 13].

Additionally, there are a number of improvements that could be made to occupational-injury data [13, 14]. These include expanding public-health data systems that can be used in occupational-injury prevention by ensuring that variables on work relatedness, industry, and occupation are included in existing and developing data systems, such as electronic health records, hospitalization data, migrant-health community-clinic data, and state and national health surveys [15]. In addition, methods and guidance should be developed for combining and linking data from multiple data sets to better describe the overall occupational-injury problem [13].

Prevention

The Occupational Safety and Health Administration (OSHA) establishes and enforces regulations to keep workers safe from recognized safety and health hazards. North Carolina is 1 of 27 states and territories that have been approved by OSHA to administer their own occupational safety and health program. The North Carolina OSHA has set strategic goals to reduce fatal work-related injuries by 5% and nonfatal injuries and illnesses by 15% by fiscal year 2013. The North Carolina OSHA's strategic plan to reach these goals includes focused efforts in construction, logging, and arboriculture (a subindustry of forestry), certain manufacturing subindustries (ie, food, sawmills, and veneer, manufactured-home, and other wood products), long-term care (a subindustry of health services), and certain health hazards. In addition to regulatory enforcement, state and federal OSHA programs provide consultative services to businesses, develop strategic partnerships and alliances, develop and provide worker-safety training, and develop informational documents on preventing work-related injuries. There are also federal and state agencies and laws specific to mining and work by youths younger than 18 years of age.

NIOSH is the federal agency responsible for researching occupational safety and health. NIOSH conducts its own research, makes science-based recommendations for safety regulations, and has a wealth of informational materials on occupational safety. NIOSH also funds extramural research and provides support for training occupational-safety researchers and professionals.

North Carolina academic institutions, including the University of North Carolina, Duke University, and East Carolina University, are actively involved in occupational-safety research and prevention. These academic programs conduct research to advance knowledge about the prevention of occupational injuries in the state and the nation and to train occupational-safety and -health professionals and researchers.

Labor, trade organizations, and nonprofit organizations, including the North Carolina Occupational Safety and Health Project [16], are also involved in occupational safety. They advocate for worker safety, develop informational materials and guidance for their constituents, and partner with federal and state agencies on research and prevention efforts.

Conclusion

Although there have been declines in the numbers and rates of occupational injuries in North Carolina, there is much that remains to be done to improve the safety of the state's workers. More needs to be done to ensure that recognized injury-prevention measures are used in workplaces, that knowledge on occupational injuries and prevention is advanced, and that employers and others in the state are positioned to respond to emerging issues associated with a changing workforce. NCMJ

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Trauma Systems:
Improving Trauma Outcomes in North Carolina

Robert D. Becher, J. Wayne Meredith

Since the 1970s, there has been a tremendous improvement in the outcomes for injured patients in North Carolina; the scope, significance, and virtue of this achievement are remarkable. This commentary reviews how the state has consistently decreased the burden of injury through its integrated, systems-based approach to trauma care.

During the past 40 years, there has been an extraordinary improvement in the outcomes of injured patients in North Carolina, yet few people fully appreciate the scope, significance, and virtue of this exemplary achievement [1, 2]. Since the 1970s, when injury was becoming recognized as an enormous public health problem, North Carolina and its trauma resources have consistently taken steps to ensure optimal outcomes for injured patients. During this time, North Carolina has become a national leader in trauma-systems development and injury management, with long-standing beneficial collaborations between state-level organizations and the North Carolina medical community. These remarkable, innovative relationships, formed and still sustained by passionate, enterprising individuals, were founded with a shared mission and commitment to decreasing the public health burden of trauma and injury. Today, the North Carolina trauma system of care consists of a variety of discrete components and layers, functioning together in an organized, integrated manner to save lives [3]. The relationships and overall vision on which this system of care was founded remain vibrant to this day, continually working and collaborating to improve trauma outcomes in North Carolina.

What Is a Trauma System?

A trauma system of care is an organized, coordinated network of health care resources that provides a broad spectrum of services and definitive medical and surgical care to the acutely injured trauma patient [3]. The services and care start at the scene of the injury, with local emergency medical services, and continue across several settings, including transporting vehicle, emergency department, operating room, intensive care unit, hospital floor, rehabilitation facility, and home [4]. The goal of this highly integrated, multilayered system of injury management is to optimize the chances of survival for trauma victims by decreasing the risks, deleterious consequences, and overall burden of injury [3].

The trauma system consolidates the care of the most severely injured patients into a small number of hospitals qualified as trauma centers. Trauma centers have a high level of expertise and readiness in trauma care, as well as extremely specialized resources required for optimum care of injured patients [5]. The 3 levels of trauma center classification represent a ranking of the resources available at that center to care for injuries: level I centers offer the highest level of care, with the greatest readiness and the most resources, while level III centers have expertise and readiness below that of level 1 and level II centers but above that of a standard acute-care hospital [3]. Trauma center designation is extremely specific, and standards have been based on guidelines established by the American College of Surgeons Committee on Trauma (ACS/COT) [3].

Trauma centers serve as the lead hospitals within regional trauma systems, which are typically defined by geographic area. Geography, population density, and health care resources are inherently different in different regions of a state, as is true in North Carolina, and each regional trauma system is individualized on the basis of these factors to achieve optimal patient care [3]. For example, rural areas have large distances to cover and may depend more on helicopter transport, and coastal areas have special concerns related to recovery and transport of victims over water. Various manuals and consultation services are available to help with the complex development of trauma systems [1, 3, 4, 6].

History of the North Carolina Trauma System

The remarkable development and maturation of the statewide trauma system in North Carolina during the past 40 years parallels the recognition in the United States that injury presents a significant public health challenge. This understanding has motivated the close collaboration in North Carolina between governmental agencies and the medical community, including hospitals, emergency medical services professionals, and professional organizations, to create a unified system of management for traumatic injury [3].

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The North Carolina statewide trauma system is one of the oldest in the country and has its roots in the 1973 North Carolina Emergency Medical Service Act, which created the North Carolina Office of Emergency Medical Services (OEMS). The OEMS's mission is to improve and maintain high-quality emergency medical care, including trauma services, in North Carolina [7]. As the lead agency for trauma in North Carolina, the OEMS identifies hospitals with the interest and ability to provide comprehensive trauma care [1]. By 1980, the OEMS developed, on the basis of ACS/COT verification criteria, state designation guidelines for level I and level II trauma centers. By 1982, the following 3 hospitals had been approved as level I centers (current names are provided): Wake Forest University Medical Center (Winston-Salem), Duke University Hospital (Durham), and University of North Carolina (UNC) Hospitals (Chapel Hill) [7].

At the national level, in recognition of the important public health burden of trauma, Congress passed the Trauma Care Systems Planning and Development Act of 1986 to build a trauma system infrastructure across the United States. In 1990, Congress passed more trauma care legislation, Title XII of the Public Health Services Act, specific to the needs of the injured patient. Title XII created the Trauma–Emergency Medical Services Systems Program, which provides leadership to facilitate the development and improve the quality of statewide trauma systems [6].

In the early 1990s, concurrent with national trends, the OEMS received funding from the North Carolina Governor's Highway Safety Program to commission an assessment and critique of North Carolina's emergency medical services system by the National Highway Traffic Safety Administration (NHTSA). On the basis of the NHTSA recommendations, which were corroborated in November 1992 by the North Carolina Trauma System Task Force, the North Carolina legislature passed the Trauma System Act in 1993, which formalized a statewide trauma system. By 1996, this task force had outlined the structure and rules to define the state trauma system; these were approved in 1998 by the North Carolina legislature [7].

Today, North Carolina's trauma system is recognized as a mature, highly functional system, with a long history of designation, progressive OEMS leadership, a North Carolina Trauma Registry (NCTR), and wide cooperation between the state government, trauma centers, and local/regional emergency medical services. However, in 2005, when graded against all aspects needed to ensure a fully developed trauma system, the North Carolina system lacked a coordinated process to monitor the entire system's outcomes and lacked formal limitations, determined on the basis of community need, on the number of trauma centers (limitations are thought to be a good thing, as they allow the designation of trauma centers in regions and areas with the most need) [8].

With this feedback, the OEMS and the Emergency Medical Services Performance Improvement Center at the UNC–Chapel Hill School of Medicine now actively review the outcomes associated with the state's trauma care system. This is being done through analysis of the linked North Carolina Outcomes Data System, which merges data involving motor-vehicle crashes, emergency medical services, emergency-department visits, hospital-discharge information, the NCTR, and medical-examiner data.

Given the national stature of North Carolina's trauma system and its collaborative, innovative leadership, it is surprising that the system lacks state financial support, specifically for trauma infrastructure. Additionally, there is no state funding to offset the costs of trauma centers' participation in trauma systems or for decreasing the financial burden on trauma centers for providing uncompensated care to uninsured patients. Funding is a major issue nationally, as only 15 states have any funded programs for trauma and trauma systems [4]. Because of this, only 8 states (California, Illinois, Maryland, New Jersey, New Mexico, New York, Oregon, and Washington) have comprehensive, well-developed trauma systems in place [8]. Despite the public health threat of trauma and injury, 12 states in the United States have no elements of a trauma system at all [3]. It is largely because of the variability in financial support that the maturity of trauma systems varies considerably by state.

Current North Carolina Trauma System Structure

The trauma system in North Carolina is regionally based, with overall direction at the state level, from the OEMS. The system consists of a network of 8 geographically defined regional trauma systems, each supported by a Regional Advisory Committee. The mission of each committee is to outline, establish, and maintain a coordinated trauma system at the regional level, with broad emergency medical services, hospital, and community input [1]. Regional Advisory Committees also conduct performance improvement and educational activities [1].

Each Regional Advisory Committee is overseen by a lead facility, which must be a designated level I or level II trauma center. All hospitals that are not designated trauma centers must be affiliated with a Regional Advisory Committee (only 12 of 122 hospitals in North Carolina are designated trauma centers). Nationally, fewer than 10% of all registered hospitals are level I or level II trauma centers [4], compared with 7% in North Carolina.

The 8 Regional Advisory Committees report at the state level to the State Trauma Advisory Committee (STAC), which works with the OEMS to optimize trauma care throughout North Carolina [7]. The State Trauma Advisory Committee's mission is to provide a public forum to facilitate trauma system development at the regional and state levels and to coordinate trauma activities between the state's various trauma stakeholders [1].

By North Carolina law, the OEMS has been assigned the statutory authority to designate hospitals as trauma centers [1]. Once designated by the state, a trauma center can vol-

untarily seek additional verification by the ACS/COT, which has been establishing guidelines for the care of injured patients since 1976 [3]. In 2004, the OEMS and the ACS/COT began to work together to jointly designate and verify trauma centers. This step has allowed trauma centers to complement the state's rigorous designation process with the process of national verification by ACS/COT. Of the 12 trauma centers currently in North Carolina, 6 are level I centers, 3 are level II, and 3 are level III (Table 1 and Figure 1) [7].

The Regional Advisory Committees, the State Trauma Advisory Committee, and the OEMS actively work to enhance North Carolina's existing trauma systems of care. While trauma care is exceptional in certain areas of North Carolina, in other areas it is less developed (Figure 1). The reasons are multifactorial, although the discrepancy in development is partly attributable to the fact that 50% of North Carolina's population lives in rural areas, making access to trauma care and the development of trauma systems in those areas challenging [1]. Concomitantly, for nearly half of North Carolina's population (47%), it will take more than 45 minutes to be transported from the scene of an injury to a level I or level II trauma center (this is termed "response time," defined as the driving or flight time needed to transport a patient from the scene of the injury to the nearest level I or level II trauma center, given the local road infrastructure or flight patterns, respectively). In the continental United States, 70% of the population can be transported to one of these centers within 45 minutes [9].

Table 1.
Trauma Centers in North Carolina, by Classification

Trauma center name and location, by classification
Level I
Wake Forest University Medical Center, Winston-Salem[a,b]
Pitt County Memorial Hospital, Greenville[a]
University of North Carolina Hospitals, Chapel Hill[a,b]
Duke University Hospital, Durham[a]
Carolinas Medical Center, Charlotte[a]
WakeMed Health & Hospitals, Raleigh
Level II
Moses H. Cone Memorial Hospital, Greensboro[a]
New Hanover Regional Medical Center, Wilmington
Mission Hospitals, Asheville
Level III
High Point Regional Health System, High Point
Cleveland Regional Medical Center, Shelby
Carolinas Medical Center–NorthEast, Concord

[a]American College of Surgeons Committee on Trauma trauma center.
[b]American Burn Association and American College of Surgeons burn center.

Optimizing Trauma Outcomes

Injury is a major public health issue in North Carolina. On average, there are approximately 47,000 trauma admissions to the 122 North Carolina hospitals every year, or approximately 1 trauma admission every 11 minutes [1]. There are approximately 24,000 trauma admissions to the 12 North Carolina trauma centers every year (NCTR, unpublished data averaged for 2008 and 2009). Overall, 54% of deaths among North Carolina residents aged 1-44 years are injury related, almost double that of cancer and heart disease combined [1]. The leading cause of mortality among children, adolescents, and young adults is unintentional injury from motor-vehicle crashes [10].

These statistics on injury in North Carolina highlight its importance as a public health challenge for children and adults alike, and they make a strong argument for a continued commitment to develop and improve the statewide trauma system. The system should not only serve the current needs of the state, it should also anticipate future needs and have the capacity to expand to accommodate them [1]. In North Carolina, this has been happening consistently since the 1970s and 1980s.

Monitoring, evaluating, and improving trauma outcomes take place on a continuous basis across the entire spectrum of trauma care in North Carolina. These activities are done with weekly meetings at each trauma center; with quarterly meetings of each Regional Advisory Committee and the State Trauma Advisory Committee; with ongoing needs assessments at the local, regional, and state levels; with coordinated transportation of injured patients to trauma centers by ambulances and air medical resources; through the state's ACS-based Rural Trauma Team Development Courses; with public health and education campaigns; with supportive legislation and regulations; with vigilant attempts to secure more funding; with evaluation and updating of standards of care; with ongoing performance improvements; with establishment of guidelines and benchmarks; and with external reviews and audits [3]. All of these are functions of the integrated, inclusive North Carolina trauma system.

As part of the designation and verification process, trauma centers and programs must fulfill certain requirements and maintain standards to keep their accreditation. Among other things, the ACS requires trauma programs to demonstrate a continuous process, involving multidisciplinary performance improvement programs, for improving the care of injured patients. The goal of performance improvement programs is to reduce inappropriate variation in care and to improve patient safety [3]. Performance improvement programs in North Carolina represent the foundation of improving trauma outcomes, as they monitor patient care, assess adverse outcomes, and improve compli-

ance with benchmarks and quality-of-care indicators [11].

North Carolina has placed great emphasis on the performance improvement process. In a step that goes above and beyond national requirements, there is now a statewide performance improvement guideline, maintained by the North Carolina chapter of the ACS/COT, that all trauma centers must comply with. Furthermore, North Carolina has a combined trauma center and emergency medical services regional peer-review protection for all quality-improvement activities, meaning that North Carolina legislation protects the confidentiality of these data, records, reports, and discussions. These initiatives are unique to North Carolina and highlight the progressive, innovative approach to trauma care in the state.

All 12 of North Carolina's trauma centers, by means of their ACS and OEMS accreditation and mandate, also have an important role to play in reducing the impact of injury, by participating in injury prevention efforts. Injury prevention is crucial, as 50% of all patients who die of injury never reach a hospital or trauma center [3]. Prevention efforts are based on identification of specific injuries and risk factors, as determined by regional geography and patient populations. Examples of prevention efforts at the state level include programs such as Safe Kids, Click It or Ticket, and Booze It & Lose It [1]. North Carolina's trauma system is designed to get the right patient to the right place at the right time. To achieve this, proper triage is critical [3], and the inclusive North Carolina system mandates that a well-defined statewide triage strategy be in place. On the national level, the Centers for Disease Control and Prevention established widely accepted triage criteria, called Field Triage Guidelines, in 2006 for trauma systems and emergency medical services [12]. In an effort to standardize triage practices, North Carolina adopted these criteria (available at: http://www.ncems.org/pdf/TraumaTriage2009.pdf) in 2009.

Ensuring optimal outcomes for injured patients means that North Carolina's trauma system must be prepared for and able to adapt to multicasualty events, such as terrorist attacks and natural disasters. The September 11, 2001, terrorist strikes demonstrated that a well-functioning, well-prepared trauma system with a clear, predetermined disaster plan is an essential foundation of disaster readiness [13]. Ensuring the success of North Carolina's regional disaster plans has required large-scale coordination of multiple services, as well as intensive planning, organization, practice, repetition, and analysis [13].

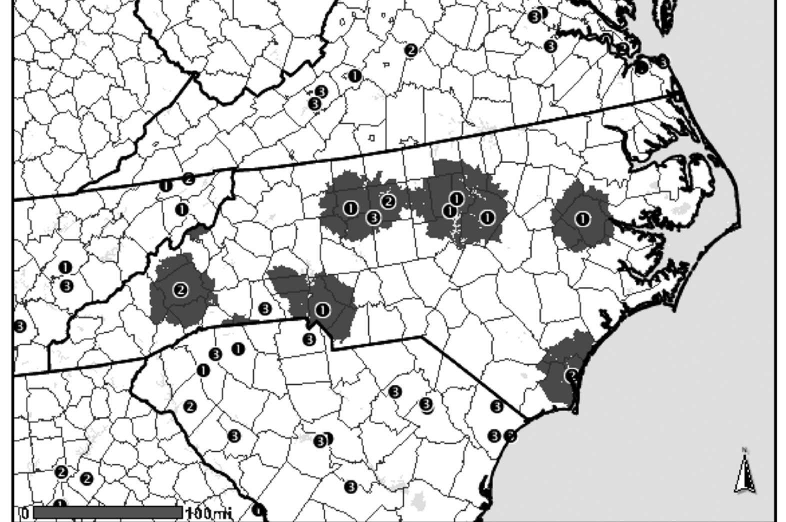
Trauma centers and trauma systems around North Carolina are ready and waiting at all times, with highly trained personnel and advanced technology immediately available to rapidly diagnose and treat any kind of injury [13]. This not only takes coordination and planning, it also requires money. And yet trauma systems are continually threatened by inadequate funding [8]. Collectively, trauma centers experience a $1 billion loss annually across the nation [5]. At the national level, funding by Congress for trauma depends on the year; in 2006, zero dollars went into the Trauma Care Systems Planning and Development Act [13]. Therefore, trauma systems and centers require outside funding for support. Without funding, trauma center closures are a reality [14], leaving entire geographic areas of the United States with no trauma coverage. This has not occurred yet in North Carolina, but the threat is ever present.

Trauma Research

Trauma research is a defining aspect of North Carolina's level I trauma centers, which are effective and productive in both research and scholarly activities, as is required by the ACS accreditation process [3]. These centers maintain highly successful trauma research programs and have produced a large number of trauma-related articles published in peer-reviewed journals. Each level I trauma center sets its own agenda for its particular interests and expertise within trauma care.

While there is cooperation among North Carolina's trauma centers that are conducting research, at present, no prospective, expansive research plan exists at the statewide level [1]. This partly reflects recent changes in the collection of data for the NCTR, as the state now directly maintains this resource. This transition has slowed a historically strong track record of publications based on NCTR data produced

Figure 1.
Trauma Center Coverage in North Carolina



Note. Reproduced from [9]. Black circles denote trauma centers, numerals denote trauma center classification level, and shaded areas denote regions (which include 53% of North Carolina residents) located ≤45 minutes from a level I or level II trauma center.

by North Carolina's trauma centers. Furthermore, the NCTR fails to capture injuries treated at the 110 North Carolina hospitals not designated as trauma centers [1, 6]. Therefore, the NCTR needs complete participation by all hospitals, as part of the inclusive system, and renewed leadership to once again make it an essential research tool to define the scope of injury in North Carolina.

Conclusion

There has been an extraordinary improvement in the outcomes of injured patients in North Carolina over the past 4 decades [1, 2]. All levels of the North Carolina trauma community now work together to provide a critical public health service that saves lives [3]. Ensuring optimal outcomes for injured patients, however, is by no means complete or guaranteed. At minimum, specific, permanent state funding for trauma systems is still needed, as is funding to offset the burden of uncompensated care. Additionally, coordination of data on outcomes, from all sources of state government, should be shared at the regional level, to improve trauma systems of care, as these regional systems do not collect their own data. Furthermore, the NCTR needs all 122 of North Carolina's hospitals to participate in providing data. Finally, the research that made North Carolina a national leader in trauma-systems development must be reinvigorated.

Improving trauma outcomes is resource intensive and financially expensive, and it requires a massive, integrated, ongoing commitment from a diverse range of health care services, professionals, and organizations [3]. By maintaining this commitment, North Carolina will remain a national leader in the field of trauma and will continue to optimize the outcomes of the state's injured citizens for years to come. NCMJ

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Spotlight on the Safety Net

A Community Collaboration
Kimberly Alexander-Bratcher

Safe Kids Cleveland County

Safe Kids Cleveland County is a community coalition that uses innovative ideas to help children and families learn how to prevent childhood injuries "at home, at play, and on the way." Born out of community tragedy, Safe Kids strives to impact the entire community, one program at a time.

Injuries are the leading cause of death for children older than 1 year. More than 15 years ago, Cleveland County lost 6 teens to motor-vehicle crashes in a single year. At the time, Cleveland Regional Medical Center was planning to become a designated level III trauma center. The group was committed to providing injury-prevention education, even though this activity was not required for level III designation. Michael Barringer, the medical director for the state's first level III trauma center, led the effort to establish Safe Kids Cleveland County and served as its chair for almost 10 years. Since its inception, Safe Kids Cleveland County has flourished and has maintained its commitment to what works in the community.

Safe Kids Cleveland County coordinates several signature programs each year. Kid Tips is an injury-prevention program for kindergarten students. The program was developed by the Hemby Pediatric Trauma Institute, which is located at Carolinas Medical Center in Charlotte. Instructors are contracted to provide 30-minute classes on a weekly basis for 12 weeks. The program's topics, which vary weekly, include fire, fall, bicycle, school bus, and home safety. In Cleveland County, the program visits every kindergarten class, educating approximately 1,600 children per year. All participants are given fitted bicycle helmets, with more than 20,000 distributed to this point. Initially funded by Children's Miracle Network, this program is now supported by Cleveland HealthCare Foundation.

Risk Watch is an injury-prevention program developed by the National Fire Protection Association. Safe Kids Cleveland County received a grant 6 years ago to implement the program in elementary and intermediate schools. Teachers are trained to integrate an injury-prevention curriculum, which includes 8 different safety topics, into core subjects throughout the year. Risk Watch began in 3 schools and is now in 14 elementary and intermediate schools in Cleveland County. Approximately 5,000 students participate each year. Safe Kids Cleveland County staff provided training, curriculum manuals, student workbooks, and classroom teaching tools to teachers at the program's outset and continue to help schedule community visitors to talk about safety, to serve as a resource for the schools, and to work as key contacts for other programs.

Safety Zone is an annual event at the Cleveland County Fair, the largest county fair in North Carolina. Cleveland Regional Medical Center leases a building on the fairgrounds, and for the past 10 years, Safe Kids Cleveland County has hosted a number of injury-prevention attractions and games in the leased building. An estimated 1,500 children and 2,000 parents attended the Safety Zone during the 2010 fair.

SAFETeens ThinkFirst is a 3-hour interactive injury-prevention program that is presented to students in driver education classes in the county. SAFETeens focuses on destructive decisions (including using alcohol and other drugs) and their consequences. During the program's first hour, emergency department nurses review age-appropriate brain development, injuries, and driving distractions. During the second hour, emergency medical service professionals simulate a motor-vehicle crash and an assessment of an injured passenger and discuss the activity with students. The third hour is led by law enforcement officers, who discuss the influence of crashes and death on the family and the potential punitive effects on

continued on page 580

continued from page 579

the driver. Of note, every SAFETeens class begins by giving students the chance to view a wrecked car donated to the program by the family of a teenage victim of a crash. Barringer attends as many classes as possible, to describe to students the difficulty of talking to parents whose child has died in a crash.

In addition to these signature programs, Safe Kids Cleveland County offers car seat–safety classes for new parents, at least 4 car-seat checks each year, bicycle rodeo and safety classes, International Walk to School days, and many other programs. Safe Kids Buckle Up, a Safe Kids Worldwide program, and Buckle Up Kids, a Safe Kids North Carolina program, partner with the Cleveland County Department of Social Services, the Shelby Fire Department, and the Cleveland County Health Department to provide and fit car seats at a reduced price for families that cannot afford them. Safe Kids Cleveland County also collaborates with Shelby, Boiling Springs, and Kings Mountain police departments; the Cleveland County YMCA; the Cleveland County Sheriff's Department; the State Highway Patrol; Cleveland County Schools; Cleveland County EMS; the Cleveland County Boys and Girls Club; Gardner-Webb University; Cleveland County Partnership for Children; Chevrolet; the Kiwanis Club; and many others to serve their local communities. Partnerships with Safe Kids North Carolina, Safe Kids USA, and Safe Kids Worldwide facilitate the program's participation in broader injury-prevention efforts. Recently, a runner represented Safe Kids Cleveland County in the Marine Corps Marathon, in Washington, D.C.

Figure 1.
Safe Kids North Carolina Director Kelly Ransdell (left), North Carolina Insurance Commissioner Wayne Goodwin (left center), and Safe Kids Cleveland County's Judy Hawkins (right center) and Joan Mabry (right).

Joan Mabry and Judy Hawkins, the Safe Kids Cleveland County cocoordinators, have a great sentiment about their leadership. She said, "It was wonderful to have a trauma surgeon as the driving force. Barringer made the connections and was a voice for the program." She notes that Barringer, the former chair of the board, and Jon Brownlee, who is a pediatrician and the current chair, both have a passion for the safety of children. They believe their work has contributed to the absence of teenage fatalities in Cleveland County during the past several years. Safe Kids Cleveland County is committed to the belief that every child has the right to grow up safe, healthy, and injury free. NCMJ

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Running the Numbers

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

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

Maternal Deaths Attributable to Violence and Injury in North Carolina

Despite advances over the past several decades in high-risk obstetric care and improved management of postpartum complications, pregnancy—and the months immediately following—is a risky time for the well-being of many women. In North Carolina, the number of pregnancy-related deaths, as reported on death certificates, declined from 593 deaths in 1916 to just 12 deaths in 2008. With the decline in pregnancy-related deaths, maternal deaths due to nonobstetric causes such as violence and injury have become more prominent as a public-health issue facing pregnant women and new mothers.

Since 1988, the North Carolina State Center for Health Statistics has been collaborating with partners in the state's medical community on a project to enhance surveillance of maternal mortality. The goal of the project is to improve registration of maternal deaths, to better characterize their causes, and to identify areas where prevention efforts need to be directed. The surveillance process is as follows. Identification of maternal deaths is conducted on an annual basis, starting with identification of death certificates that report an underlying or contributing cause of death related to pregnancy (*International Classification of Diseases, Tenth Revision* codes O00-O99). In addition, death records for all female decedents aged 10-50 years are matched to the live-birth and fetal-death files for the same and previous calendar years, to identify any women who died within 1 year after a delivery. Finally, hospital-discharge records are searched to ascertain additional deaths not identified through search of vital records and to provide supplementary data on medical diagnoses and procedures. The information on each case is reviewed by a physician (Margaret Harper) who is board certified in obstetrics and gynecology and in maternal and fetal medicine. When necessary, additional information on the circumstances surrounding the death may be obtained from the medical examiner's office or the physician who signed the death certificate [1].

All deaths occurring during pregnancy or within 1 year after delivery or termination, regardless of cause, are considered maternal deaths. After clinical review, maternal deaths are further classified as related or unrelated to pregnancy, according to the guidelines of the Committee on Maternal and Child Care of the American Medical Association Council on Medical Service. Pregnancy-related deaths are those that "result from complications of the pregnancy itself, interventions elected or required because of the pregnancy, or from the chain of events initiated by the complications or interventions, or from a disease which was obviously aggravated by the physiologic effects of pregnancy" [2]. Deaths unrelated to pregnancy are those that are temporally related to (ie, within 1 year of delivery or termination) but not causally associated with the pregnancy, such as deaths due to violence and injury.

Table 1 shows the classification of maternal deaths by cause for 2004-2008. Of the

Table 1.
Maternal Deaths in North Carolina, by Underlying Cause, 2004-2008

Cause	Deaths, no. (%) (N = 332)
Related to pregnancy	102 (30.7)
Unrelated to pregnancy	
Any	230 (69.3)
Medical	88 (26.5)
Violence/injury	140 (42.2)
Undetermined	2 (0.6)

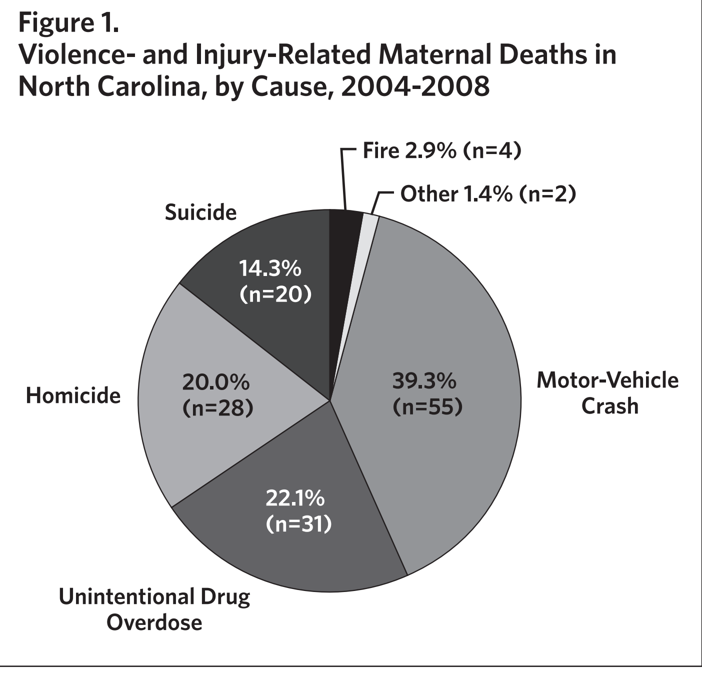
continued on page 582

continued from page 581

332 deaths during that period, 102 (30.7%) were classified as pregnancy related, while 230 (69.3%) were determined to be unrelated to pregnancy. Deaths attributed to violence and injury accounted for 42.2% of all maternal deaths.

A breakdown of the maternal deaths due to violence and injury during 2004-2008 is shown in Figure 1. Motor-vehicle crashes accounted for the largest percentage of violence- and injury-related deaths (39.3%), followed by unintentional drug overdose (22.1%), homicide (20%), and suicide (14.3%). Homicide contributed to a greater proportion of violence- and injury-related maternal deaths than it did to deaths among other North Carolina women aged 15-45 years during the same period (mortality odds ratio, 1.70 [95% confidence interval, 1.08-2.65]).

Figure 1.
Violence- and Injury-Related Maternal Deaths in North Carolina, by Cause, 2004-2008



The pattern of violence- and injury-related maternal deaths during 2004-2008 differed from the pattern during 1992-1994 in North Carolina. In the earlier period, homicide was the most common cause of such deaths (36%) [3]. Compared with 1992-1994, the proportion of violence- and injury-related deaths from drug overdose and suicide was greater during 2004-2008 [3].

Table 2 shows the increase in the number of deaths from unintentional drug overdose among recently pregnant women during 1996-2007. The number of such deaths caused by illegal drugs has remained relatively stable, while the number of deaths ascribed to prescription narcotics, including methadone, has increased dramatically.

Violence and injury are the most common causes of maternal mortality in North Carolina, accounting for more deaths than all pregnancy-related causes combined. Although the proportion of maternal deaths due to homicide has declined since the early 1990s, such deaths still account for approximately 8% of all maternal deaths. Data from the North Carolina Pregnancy Risk Assessment Monitoring System indicate that approximately 5% of women are physically abused during pregnancy—a figure that has remained relatively constant for the past 10 years [4]. Deaths due to suicide and unintentional drug overdose are also important contributors to maternal mortality. Increasing clinicians' awareness of these issues can play an important role in the strategy to prevent such deaths in this population, as the

Table 2.
Deaths From Unintentional Drug Overdose Among Women Within 1 Year After Delivery or Pregnancy Termination, North Carolina, 1996-2007

Drug type	1996-1999	2000-2003	2004-2007
Prescription narcotics	1	6	20
Methadone mentioned	1	3	14
All others	0	3	6
Illegal drugs	4	0	7

majority of women have regular contact with their obstetric- and pediatric-care clinicians throughout pregnancy and the 12 months that follow [5]. Clinician recognition of the signs of domestic violence, depression, and substance abuse in their patients, followed up with appropriate referral for intervention, may help prevent many of these untimely deaths and improve the quality of life for mothers and their families. NCMJ

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Philanthropy Profile

Preventing Shaken Baby Syndrome in North Carolina

Each year in the United States, as many as 1,400 infants receive medical treatment for inflicted traumatic brain injury, commonly known as shaken baby syndrome. Approximately 25% of these children die; most of the survivors have lifelong neurological damage from their injuries, which include subdural and retinal hemorrhages, damage to the spinal cord and neck, and fractures of the ribs. Depending on the injuries and their severity, medical costs might exceed $1 million.

According to research, the highest-risk period for abusive head trauma in infants is between 2 and 4 months of age, when infant crying might last for more than 5 hours per day—even when a child is perfectly healthy [1]. The relentless crying can be frustrating for parents, especially if they are not aware that it is part of normal behavior among babies. "No one thinks they will shake their infant," says the National Center on Shaken Baby Syndrome (NCSBS; Ogden, UT), "but research shows crying as the number one trigger leading caregivers to violently shake and injure babies" [2].

Nationally, it appears that cases of abusive head trauma in children are increasing. In a study led by Children's Hospital of Pittsburgh (Pittsburgh, PA), researchers collected data on all cases of unequivocal abusive head trauma, before the economic recession and during the recession [3]. The number of cases increased from 6 per month before December 1, 2007, to 9.3 per month after that date.

"Our results show that there has been a rise in abusive head trauma, that it coincided with the economic recession, and that it's...happening on a much more widespread level," lead researcher Rachel Berger said in a news release [3]. "This suggests we may need to dramatically increase our child-abuse-prevention efforts now and in future times of economic hardship."

Working Together

In North Carolina, a promising prevention program is now helping caregivers learn about the triggers and dangers of shaken baby syndrome. Project leaders hope the Period of PURPLE Crying: Keeping Babies Safe in North Carolina program (available at: http://www.purplecrying.info/index.php?loc=mb1r3p6) will reduce hospitalization and death from abusive head trauma by 50%. Several stakeholders—including the NCSBS, the Center for Child and Family Health (Durham, NC), and the University of North Carolina (UNC) Injury Prevention Research Center (Chapel Hill, NC)—are leading the effort.

The project is funded through September 2012, using 3 grants totaling $7 million. The Duke Endowment (Charlotte, NC), for example, is the lead funder for implementing a hospital- and community-based intervention. The Centers for Disease Control and Prevention (Atlanta, GA) is funding the evaluation of the statewide program. The Doris Duke Charitable Foundation (New York, NY) is the lead funder for developing and piloting a media campaign. All 3 groups also took cofunder roles for various parts of the project.

The Doris Duke Charitable Foundation, established in 1996, supports 4 national grant-making programs, which include child-abuse prevention. This foundation has funded efforts around shaken baby syndrome for several years. The Duke Endowment focuses its resources on children, health care, higher education, and rural churches within the Carolinas. Children at risk for abuse and neglect have been a focus of The Duke Endowment's Child Care program area since 2002.

"In our view," says Gene Cochrane, president of The Duke Endowment, "it is through this type of collaboration that such complex social problems can be prevented effectively."

Period of PURPLE Crying

Developed by the NCSBS, the Period of PURPLE Crying (available at: http://www.purplecrying.info/) uses data from 4 decades of research on normal crying behavior among infants. Experts have found that

crying bouts increase around 2 weeks of age, peak at 2-3 months of age, and then decline. These data also reveal that babies can sometimes cry for hours despite attempts to soothe them.

The program helps caregivers recognize the characteristics of normal crying behavior among infants by use of an acronym, "PURPLE," that describes the behavior (ie, *P*, peaks at 2 months of age; *U*, is unexpected; *R*, the child resists soothing; *P*, the child appears to be in pain; *L*, is long-lasting; *E*, usually occurs in the evening). It also provides coping strategies and explains the dangers of shaking an infant. For example, caregivers should respond to their baby with "comfort, carry, walk, and talk"—but it is also "OK to walk away," if and when the crying becomes too frustrating. Under any circumstance, it is "never OK to shake or hurt," to try to stop the crying.

During 2003-2007, the NCSBS tested the program through randomized, controlled trials in Seattle, Washington, and Vancouver, British Columbia. More than 4,400 parents participated. The British Columbia Ministry of Children and Family Development funded the Canadian research; the Doris Duke Charitable Foundation and the George S. and Dolores Dore Eccles Foundation (Salt Lake City, UT) funded research in the United States.

According to the NCSBS, both studies found a "statistically significant increase in the knowledge about normal infant crying." One showed a "statistically significant increase in understanding the dangers of shaking an infant," and the other showed an increase in "walk away behavior" when the mother became frustrated [4].

Spreading the Word

In 2008, Utah became the first state to implement the Period of PURPLE Crying program in all state hospitals and birthing centers, but the effort in North Carolina represents the largest statewide implementation to date. The intervention is reaching caregivers through the following 3 "doses": before the baby leaves the hospital, at a medical appointment in the first month, and through a media campaign.

For the first dose, team members from the Center for Child and Family Health have partnered with every birthing facility (85 hospitals and 1 birthing center) in the state; at each facility, at least 80% of staff members were trained in how to implement the program. While the child is still in the newborn nursery, every new parent receives a talk, a 10-minute video, and printed material on infant crying.

"We've made great efforts to emphasize the importance of showing the video to parents before [the mother and child] are discharged from the hospital," says Kelly Sullivan, a licensed psychologist who is managing the North Carolina implementation through the Center for Child and Family Health. "We've provided hospitals with portable DVD players if they needed them. We felt that, if parents see the DVD in the hospital, it's likely to be more memorable at the time when they need it."

The second dose involves county health departments, specialists in early intervention, and pediatricians and family physicians in prenatal classes and postnatal services and during sick- and well-child checks. For this part of the intervention, which began in May 2009, the Center for Child and Family Health team contacted a majority of medical practices and health departments in all 100 counties of North Carolina.

The third dose involves a media campaign, which was launched in September 2009 through a partnership with the UNC School of Journalism and Mass Communication. The campaign was designed to reinforce the prevention message by reaching family and friends of new parents, and it included a Web site, radio advertising, and cable-television advertising.

Testing for Results

While the 2 randomized, controlled trials in Washington and British Columbia tested the effectiveness of Period of PURPLE Crying materials to change the "knowledge, attitude, and behavior" of parents, the North Carolina study is looking at whether the intervention changes the *numbers of cases*. Because of unique baseline data on the frequency of shaking, experts say that North Carolina was the perfect place to test the effectiveness of a statewide program. "We know what the rates were in North Carolina before we implemented this program," Sullivan says, "and no other state knows that. We have the first published statewide baseline anywhere."

continued on page 586

continued from page 585

With funding for 5 years, the intervention includes an extensive outcome and process evaluation to look at program delivery, effectiveness, costs, and benefits. According to Sullivan, the outcome evaluation "will test whether a statewide primary prevention program...can reduce hospital admissions and deaths from abusive head trauma."

Researchers are looking for other kinds of results, as well. For example, they recently started studying the number of calls that parents are making to an after-hours nursing line. Sullivan says calls regarding crying have decreased.

If data show that the program works here, it could be replicated in statewide efforts across the country. "To have a long-term positive effect on the reduction of shaken baby cases, it's really about achieving a cultural change," Sullivan says. "If you look at any other form of maltreatment—physical abuse, sexual abuse, et cetera—the causes are much broader, and it's much harder to intervene. What makes shaken baby syndrome different is that we believe we have education that can actually reduce the frustration that occurs for people. And if we can reduce the frustration, we believe we can reduce the incidence of this form of child maltreatment." **NCMJ**

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Jeri Krentz, associate director of communications, The Duke Endowment, Charlotte, North Carolina.

Health Reform From the Perspective of a Small and Rural Hospital

Laura J. Easton

Health care reform introduces new challenges and opportunities for small and rural hospitals across North Carolina. Successful transformation will require a new vision for the health system, the establishment of solid primary care networks, the implementation of an improvement engine, and the creation of new partnerships to support evolving payment mechanisms.

Anyone who visits North Carolina is instantly charmed by its small towns and beautiful scenic spaces. Small and rural communities are the heritage and the heart of this great state. "North Carolina is, and always has been, a state of small towns," is how Rural Center President Billy Ray Hall described the state [1]. Almost 4 million people, or 52% of the state's residents, live in small towns and rural communities [2]. And they seek what all North Carolinians desire: a good education for their children, access to affordable health care, and opportunities for employment [2].

Hospitals are integral to the vitality and future of many small towns in North Carolina. The hospital is frequently one of the top employers in any rural community. Hospitals organize and oversee the availability of physicians. They are one of the cornerstones to recruitment of new industry. As described by the president of the North Carolina Chamber of Commerce, access to affordable high-quality health care is a factor in creating the globally competitive business climate desired by new industries [3]. High-quality medical care is an essential element when people seek a place to retire. As described on the Southeastern Retirement Web site, "When the time comes to retire, many people dream of retreating to the quiet life of a small town.... For people looking for just such a situation, North Carolina is a haven. The state offers a slew of choices that can fulfill any prerequisite hopeful retirees might have: quiet life, outdoor activities, good weather, top-notch medical care, cultural events, easy access to major highways...you name it" [4]. By including medical care in the list of essential elements, one can easily say that the hospital is an economic engine for North Carolina's small towns.

Passage of the Affordable Care Act (ACA) introduces new challenges and opportunities for hospitals in the provision of affordable and accessible health care. The ACA is complex and contains a diverse set of provisions. Each provision will affect the health care delivery system in unique ways. The timeline for change is aggressive and commands careful attention, deliberate interpretation, and thoughtful action. During this period of significant transformation, hospitals in small and rural communities are vulnerable to intended and unintended consequences. At the same time, hospitals in small and rural communities can play an invaluable role in achieving the objectives of health care reform to increase the access to and decrease the cost of care.

Successful transformation of the health care delivery system in small and rural towns across North Carolina will require a new vision for the hospital and health system, the establishment of solid primary care networks, the implementation of an improvement engine to drive gains in efficiency, and the creation of new partnerships to support evolving payment mechanisms.

A new vision of the hospital and health system requires an understanding of the so-called triple aim, also known as the value-based aim, that underpins the ACA and the philosophy of the administrative team implementing its provisions. The value-based aim focuses on 3 imperatives: improve the health of the population, improve the experience of care, and reduce the per capita cost of care. While the shift in thinking to these 3 imperatives is not difficult for a community-minded governing body or to medical and administrative leadership, the fundamental operating framework must shift from procedures and volume to population health. Strategic thinking will be needed to integrate health outcomes and health care cost per capita within communities. The leadership of small and rural hospitals will also need to begin the delicate balance of operating in a world of mixed reimbursement, where procedures and volume are the primary drivers of payment but incentives for the value-based aim are becoming increasingly important.

A stable, well-established network of primary care physicians is the foundation for the value-based aim of the future.

Laura J. Easton, MSN, RN president and chief executive officer, Caldwell Memorial Hospital, Lenoir, North Carolina (leaston@caldwell-mem.org).

Small and rural hospitals have unique challenges in building and sustaining this foundation. Challenges include the availability of physicians, nurse practitioners, and physician assistants; access to and availability of information technology and expertise; and the availability and willingness of physicians to take leadership in creating patient-centered medical homes.

The availability of physicians, nurse practitioners, and physician assistants to provide access to care has long been a challenge in small and rural towns in North Carolina. With the provisions that might bring 32 million uninsured Americans into the health care system in 2014 [5], demand for care is expected to outstrip the availability of health care professionals. Small and rural hospitals will need to establish competitive employment opportunities and strong relationship-building strategies in order to retain existing health care professionals and attract new ones. Deliberate and appropriate use of nurse practitioners and physician assistants will be important to mitigate gaps in the availability of physicians. Establishment of clinic-based nurse case managers or navigators will help physicians and clinics focus on high-risk, high-use patients and families. Implementation of new telemedicine technologies such as the Stroke Robot, e-ICU, and/or e-visits will complement the efforts of community physicians and provide important solutions to manpower shortages.

The drive toward an effective electronic medical record (EMR) is a key element of the transformation underway in American medicine. Data are critical in the value-based aim to define vulnerable populations and to measure the outcomes and costs associated with treating these populations. A new challenge for small and rural hospitals is obtaining and implementing the information technology required to achieve these goals. To make this transition, hospitals will need capital to purchase technology and resources to compete for personnel with expertise in health care information technology. Partnerships such as integration within large health care systems and use of information technology management services organizations will play an important role in EMR development at small and rural hospitals.

At the very heart of reform and the value-based aim is the primary care physician's office. Effective use of mid-level health care professionals, use of technologies such as the e-visit, implementation of the EMR, and stratification and proactive management of chronic disease require transformational change in the fundamental operations of the primary care office. This change can only occur through the actions of physician leaders who understand the vision and are committed and willing to making the effort to transform. Small and rural hospitals will have to seek, reward, and engage these leaders in order to be successful. Without this essential physician leadership and careful execution of office practice change, small and rural communities risk stressing the medical community and exacerbating physician shortages.

Reimbursement rates for hospitals are expected to decline; some predict reductions of up to 20% from current rates. Improving the fundamental system of care delivery in order to gain efficiency and reduce cost will require a deliberate, persistent, and methodological approach. Reducing waste, improving performance, increasing quality, enhancing customer service, eliminating errors, and managing costs is a tall order. Few small and rural hospitals have a robust improvement operating system capable of achieving these required objectives. A top-level commitment to an improvement engine such as "Lean" management can help hospitals use proven tools and techniques to eliminate waste in existing systems and to design high-performing new systems of care. True Lean management drives a tempo of change that can keep pace and even outpace the demand for improvement that reform commands.

Value-based payment systems, which include more-robust pay-for-performance models and accountable care organizations (ACOs), will evolve from implementation of the ACA. Although some small and rural hospitals do not have sufficient volumes to participate in existing value-based programs, many small and rural hospitals across North Carolina perform in the top quartile of reported quality metrics and are active participants in quality-improvement collaborative groups with the North Carolina Quality Center. Provisions exist in the ACA to establish a demonstration project for value-based payment in hospitals with lower volumes. Additionally, attention will be required to guide hospital-based physician-group practices to document and report quality metrics. Existing reporting opportunities through the National Committee for Quality Assurance and the Carolinas Center for Medical Excellence require an EMR and well-established clinic practice processes to achieve high levels of performance. Looking beyond pay for performance to the concept of ACOs, a new level of financial risk is assumed for populations receiving care. Risk is mitigated by scale, and a minimum of 5,000 Medicare beneficiaries is required for participation. Therefore, small and rural hospitals will have to partner with other organizations in order to begin participation and experimentation in the ACO model.

National health care reform establishes a new paradigm by creating a value-based payment system. The elderly population is a dominant "user" of the health care system. With the largest segment of North Carolina's elderly population living in small and rural communities, the importance of the small and rural hospital is clear [2]. A successful transition into a reformed health care era for all hospitals, small and large, is essential to the health of North Carolinians and to the vitality of the communities served. NCMJ

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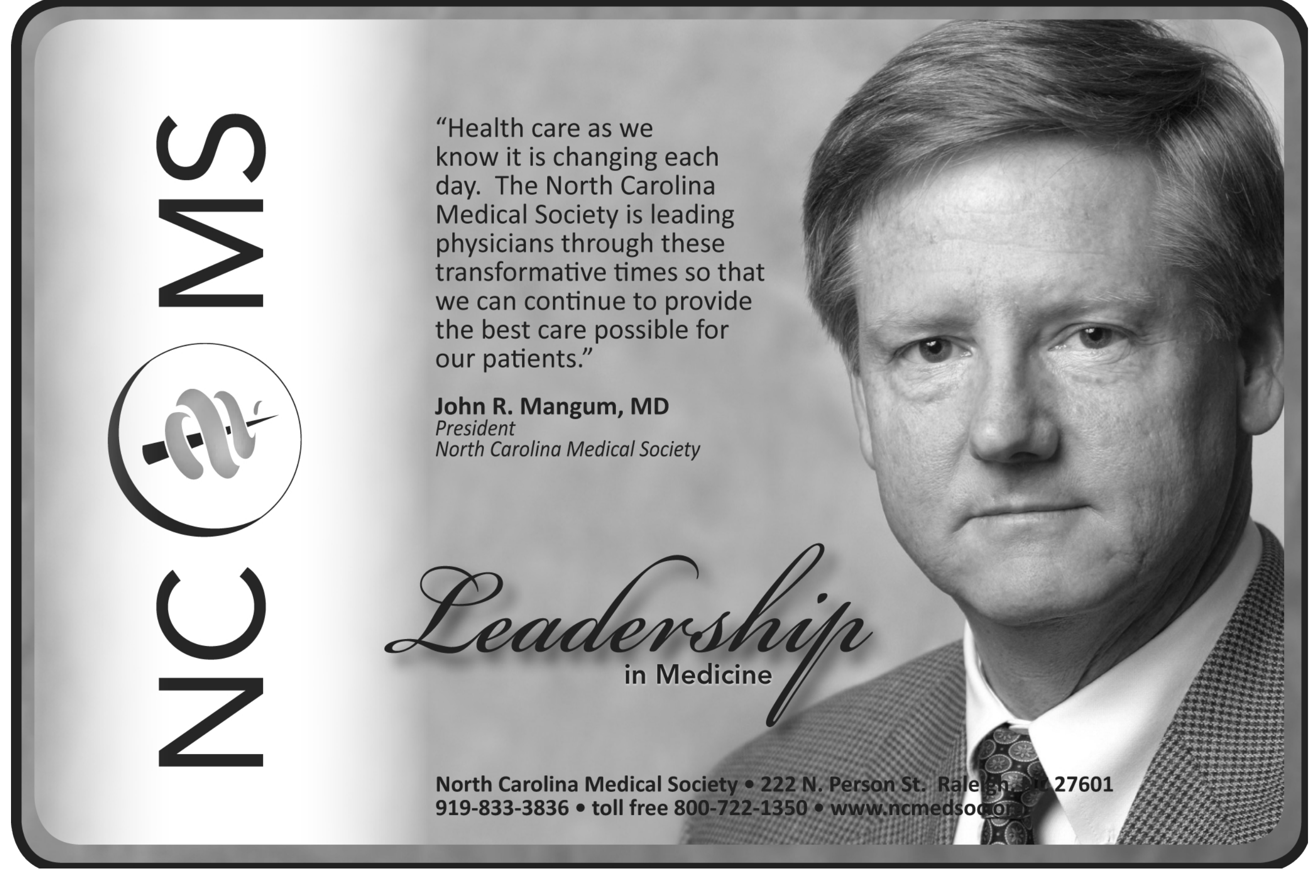

Health Care Reform:
What It Means for North Carolina's Hospitals

Michael C. Tarwater

Because hospitals are both health care providers and employers, they face significant challenges and remarkable opportunities, particularly to improve quality, increase access, and reduce cost, as implementation of the Affordable Care Act moves forward over the next several years.

For more than a year, one could not turn on the television or read a newspaper without seeing something about health care reform. Subsequently, although to a lesser degree, the same kinds of political discussions returned to the public domain in conjunction with this year's off-cycle elections. Regardless of what happens politically in the future, the March 2010 passage of the Affordable Care Act (ACA) will profoundly affect how hospitals fulfill their missions in North Carolina communities. Because hospitals are both health care providers and employers, they face significant challenges and remarkable opportunities, particularly to improve quality, increase access, and reduce cost, as implementation of the ACA moves forward over the next several years.

At Carolinas HealthCare System, we believe reform is necessary. And while many in our industry were skeptical, we supported a decision by the American Hospital Association to accept a $155 billion cut to hospital reimbursements, spread over 10 years, to reduce the cost of health care and expand coverage for the uninsured. Why? The memory of the provider cuts that were part of the Balanced Budget Act of 1997 is still vivid for us. Nonetheless, what is known about the true impact of reform, outside of this $155 billion contribution, pales in comparison to what is not known. We will continue to work toward real delivery reform and cost reduction even though this law requires so many changes to America's complex health care infrastructure that there are certain to be many unforeseen consequences.

Throughout the health care reform debate, one issue remained clear. The United States has far too many citizens without health insurance, and that greatly affects access to essential health services. Across the nation, too many people have delayed addressing critical health needs because they did not have insurance and could not afford to pay for care out-of-pocket. Providing millions of Americans access to health insurance coverage will benefit not just patients but also, in theory, every health care provider in North Carolina.

North Carolina's hospitals have a unique responsibility to provide care to all people who reach their doorsteps and need essential services, whether the individuals have coverage or not. Unlike most other businesses, hospitals provide much of that care at a reimbursement rate that is less than the cost to provide the service and, in some cases, get paid nothing. A significant portion of hospitals' reimbursement rates are not negotiated because government payers like Medicaid and Medicare provide nonnegotiable reimbursement. It is estimated that 50% of the anticipated expansion of coverage in North Carolina will be through the state's Medicaid program. Although we applaud expanded access, it is alarming to see such a dramatic increase in our dependence on a program that already reimburses less than the cost of providing care. The North Carolina Department of Health and Human Services estimates that by 2014, hundreds of thousands of people could be added to the Medicaid rolls, a number equivalent to the combined population of 67 of North Carolina's 100 counties [1]. In addition, this expansion in Medicaid would impose additional demands on a state budget already stressed by recessionary conditions. The federal government will pick up most of the expansion costs for the first few years, but the Medicaid program itself will be challenged to find enough providers to see the additional patients.

One of the most formidable challenges for hospitals—and it is not a new one—comes from what their partners in business refer to as the "cost shift." Cost shifting is the inevitable result of a system that imposes on private payers the need to compensate for the impact of less-than-cost payers (eg, Medicaid and Medicare). The reality is that hospitals, like any other business, must have a margin to continue to operate. Today, almost 75% of North Carolina's hospitals have a margin of less than 5%, with about one-third of those having a negative margin (North Carolina Hospital Administration Advocacy Needs Data Initiative, unpublished report, May 13, 2010). If programs like Medicaid do not pay the actual cost

Michael C. Tarwater, MHA chief executive officer, Carolinas HealthCare System, Charlotte, North Carolina (michael.tarwater@carolinashealthcare.org).

of providing care, someone else must pay. The businesses that provide private insurance to their employees bear the brunt of cost shifting, which is, in effect, an unlegislated tax on patients with private insurance.

Under the ACA, employers can choose to stop providing employee coverage and instead pay a $2,000 annual penalty per employee. Employees would then be eligible for either Medicaid or an exchange option, depending on their individual incomes. The exchange will likely reimburse at levels below those of most commercial carriers. Consequently, if businesses find it more economical to pay a fine than to provide coverage, hospitals will be looking at an increasing number of patients whose low reimbursement rates add strain to already stressed budgets. This of course enhances the opportunity for a vicious cycle by which government must provide additional subsidies to keep people insured, with no way to pay for those subsidies except by reducing payments to providers, raising taxes, or doing both.

The real question is whether North Carolina can successfully adapt, given the huge budget challenges that have impacted appropriations for several years running. If states are forced to fund expansion by cutting provider rates, providers will not ultimately benefit from expanded "coverage" but will in fact be harmed. This is exactly what happened in Tennessee several years ago, when an experiment in expanded Medicaid coverage virtually devastated the finances of health care providers. In fact, the current model in Massachusetts expanded coverage to everyone without funding that expansion, and the federal government now must step in to subsidize or bail out some of the state's larger hospitals.

Aside from lowering costs and expanding access, one of the principal goals of reform is to improve the overall quality of care for patients. North Carolina's hospitals support and participate in quality initiatives, such as those offered through the North Carolina Hospital Association's Center for Hospital Quality and Patient Safety. Clinicians have also undertaken numerous initiatives to improve the quality of care. Nonetheless, more must still be done to be innovative and creative in the quality arena in order to improve outcomes across the state. Additionally, there is a pressing need in our state and in the nation to focus more intently on the importance of personal choice and responsibility as variables that significantly impact individual health. New models of health care must be structured in a way that encourages much more preventive care and health improvements, while still providing the highest quality of care after someone becomes ill. Expanded health coverage will, it is hoped, allow the transition from a primary focus on people who are sick to improving access for people who want to remain well. This transition gives all providers, not simply hospitals, the opportunity to make improvements that will pay off over the long run. The changes offer a promise of healthier students, healthier workers, and a business environment where companies choose to do business.

Providers want to deliver high-quality, efficient care that benefits patients, and the government needs to be sure that models actually work before they mandate them. One important aspect of the new law is its emphasis of the medical home model. North Carolina was a national leader in developing a medical home model of care, called Community Care of North Carolina (CCNC). Under this model, service providers actively collaborate to improve patients' health. The new law includes many other demonstration projects of this nature, which is a positive development as long as it does not induce a premature rush to adopt unproven programs.

Although the bill was crafted mostly by people who have spent years developing health policy positions, it was not written by people who diagnose disease and treat patients on a daily basis. The massive amount of regulation that is following the passage of the ACA also lacks real clinical experience among its initial drafters. As new regulations are drafted and adopted, it is critical that physicians and other frontline health care professionals are consulted and allowed to comment on issues that impact quality, access, and cost. It is also very important that patients and health care professionals speak out when regulation becomes a barrier rather than an incentive to providing high-quality, cost-efficient care.

All providers will have to work with federal and state agencies with oversight jurisdiction to construct legal and efficient ways of working together, even including communicating with one another about a patient's care. The interaction between providers and patients is often the cradle for significant innovation in the delivery of health care. Not infrequently (even prior to health care reform), there are regulatory walls between where providers are now and where they need to be on the path to true clinical integration, where care is improved and cost is reduced. The legal and regulatory barriers that make it difficult for providers across the continuum to work together must be removed or relaxed.

Although hospitals are grateful for the increased coverage that will become available to millions of Americans, they do have serious concerns about their ability to remain economically viable as individuals make their way to physician practices and emergency departments. In other words, the increased coverage sounds great, but the ability to fund it at the federal or state level is uncertain.

In terms of employment, hospitals are among the few businesses still hiring both entry-level personnel and highly specialized, highly compensated professionals. However, it is difficult to see how hospitals can hire enough clinicians to accommodate the increases in utilization expected during the next 10 years. Patients' utilization of services will drive costs in 2 areas. First, the cost of providing care will increase as more people seek access to services that were previously unavailable to them. Utilization will increase. Second, North Carolina will have to train more professionals to deliver that care. At a time when community college and university bud-

gets are constrained and enrollment costs are increasing, North Carolina will struggle to train enough nurses and physicians to treat patients.

North Carolina, which is already experiencing a shortage of primary care physicians, faces even greater pressures from the impact of soon-to-retire baby boomers, along with the millions of newly insured individuals. Hospitals look forward to participating in training a new generation of physicians, nurses, and allied health professionals who have a critical role in transforming the nation's health care infrastructure. Carolinas Medical Center, like North Carolina's 4 other academic medical centers, is doing all it can to generate the workforce necessary to address the state's needs. Expansion of medical school enrollment is certainly one way to address the shortage of physicians. But without expanding access to postgraduate medical education training slots and increasing enrollment in community college–based allied-health programs and university-based health-professional training programs, North Carolina residents are going to face a serious access problem. Newly insured individuals will have an insurance card that implies they have access to essential health services, but they may not be able to find a provider who can take another patient.

Hospitals, like other providers, are faced with finding a balance as they attempt to protect their safety net status, while facing the dual challenges of increased demand and reduced compensation. The goal of hospitals, above all, is to continue providing high-quality care while protecting their role as engines of economic development and stability in their communities and across the state. North Carolina's hospitals are not waiting on a repeal of the new health reform law, and they are not counting on replacement legislation. The hospitals are working to make sure their delivery systems are flexible enough to adjust to the most significant paradigm shift to have affected the field. One of the great ironies of health care reform is that hospitals are seen as the economic driver in many communities, yet they face substantial reductions in payments at a time when utilization and service expectations are forecast to increase. My comments here are largely about cost because the ACA is really more about payment reform than about true health care delivery reform. True health care delivery reform must come from providers, not from elected officials.

Unlike other businesses, hospitals do not migrate to other countries—they do not outsource jobs. Historically, the economics of the hospital industry have been based on hospitals' ability to address community needs locally. While hospitals will change the way they do business, their successes in the past have always been tied to their ability to adapt in a dynamic field. North Carolina's hospitals are determined to find a path forward that will positively transform the industry and the care delivered to communities.

We hope, like all of you, that this grand experiment works. NCMJ

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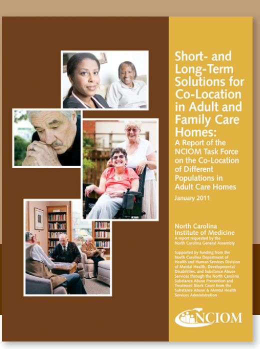

Issue Brief

Short- and Long-Term Solutions for Co-Location in Adult and Family Care Homes

January 2011

Co-Location Is the Reality in North Carolina's Adult and Family Care Homes

Although most people think of North Carolina's adult and family care homes (ACH) as residences for the frail elderly, more than 60% of residents have a mental illness, intellectual or developmental disabilities, or an Alzheimer disease/dementia diagnosis. The placement of individuals with mental illnesses, substance abuse problems, intellectual and developmental disabilities, and other disabilities[a] that may result in serious behavioral problems can pose a threat to the health and safety of other residents, as well as to the staff of ACHs. Problems reported in North Carolina ACHs over the past five years have included physical harm, sexual assault, and verbal and psychological abuse.[b,1]

Individuals with disabilities often require services and supports in their daily lives. Many individuals with disabilities live on very limited incomes and need assistance with daily activities. Due to a shortage of more appropriate community options for individuals with disabilities, as well as the financial incentives embedded in the system, many individuals with disabilities move into ACHs to gain access to needed supports.[2] Today ACHs serve more than 18,000 individuals with disabilities by providing a place to live, assistance with activities of daily living (i.e. dressing, cooking, eating), and medication management. In doing so, ACHs have become a critical part of North Carolina's mental health, developmental disability and substance abuse system. Without substantial increases in community alternatives for individuals with disabilities, this population will continue to constitute a large portion of the ACH population.

To address these issues, the North Carolina General Assembly asked the North Carolina Institute of Medicine to convene a task force to study the co-location of the frail elderly with individuals with disabilities who may have behavioral problems in ACHs. The Task Force on the Co-Location of Different Populations in Adult Care Homes was chaired by Maria Spaulding, Deputy Secretary for Long-Term Care and Family Services, North Carolina Department of Health and Human Services; Representative Jean Farmer-Butterfield, North Carolina General Assembly; and Senator John Snow, North Carolina General Assembly. There were 41 additional Task Force and Steering Committee members. The Task Force was supported by funding from the North Carolina Department of Health and Human Services Division of Mental Health, Developmental Disabilities, and Substance Abuse Services through the North Carolina Substance Abuse Prevention and Treatment Block Grant from the Substance Abuse & Mental Health Services Administration. The Task Force developed nine recommendations, including recommendations for improving and strengthening the current system, as well as recommendations for expanding affordable housing options and increasing options for how and where people with disabilities can access services and supports. Two recommendations were designated as priority recommendations.

Improving the Current System While Maintaining a Long-Term Vision of Prevention

The problems of co-location could be minimized if individuals with behavioral problems and the frail elderly were not housed together in ACHs. While ACHs may be suitable residences for the frail elderly, they may be insufficient to meet the needs of individuals with disabilities who also have behavioral problems. Unfortunately, individuals with disabilities often have few other viable options if they need housing and support services.

a. Individuals with mental illness, substance abuse problems, intellectual and developmental disabilities, and other disabilities are referred to collectively as individuals with disabilities throughout this report.
b. Ryan B. Chief, Adult Care Licensure Section, Division of Health Service Regulation, North Carolina Department of Health and Human Services. Written (email) communication. April 20,2010.

North Carolina Institute of Medicine
Report requested by the North Carolina General Assembly

Developing appropriate housing assistance programs and community-based services and supports is a challenge that will take time. Therefore, the Task Force's recommendations had two goals: both to improve the ability of ACHs to handle the co-located populations in the short-term and, in the long-term, to provide more viable options for people with disabilities whose needs are not met by ACHs to live in their home communities, thus preventing co-location from occurring. Although the recommendations are discussed individually, to understand the Task Force's vision, it is important to consider them as a whole. While each recommendation is an important piece to fixing the problem of co-location of different populations in ACHs, taken as a whole they represent meaningful changes that could improve residents' experiences in ACHs today and prevent the problems associated with co-location in the future. Additionally, given the challenges facing North Carolina's mental health system and the state budget, the Task Force recognized that changes requiring major new investments are not likely in the immediate future. Therefore, the Task Force focused not only on what needs to be done, but also on how modest investments and reallocations of existing funds could be used to achieve these goals.

Providing More Choices

Ideally the Task Force would like to see individuals with disabilities, particularly those ages 18-64, provided with a range of options for living independently in their communities with care and support services aimed at recovery and self-sufficiency.[3] Unfortunately, North Carolina does not currently have the right mix of affordable supports in place to ensure that individuals with disabilities have the opportunity to live in housing that is integrated into the community and promotes their maximum independence.

Making funding for housing more flexible, developing more subsidized housing for individuals with disabilities, and greatly increasing community-based services and supports are all critical to ensuring that individuals with disabilities have choices about where they live and the kinds of services and supports they receive. Developing such options on the scale needed to meet the need will take considerable time and sustained investment in the mental health, developmental disabilities and substance abuse system, particularly community-based services and supports. As a first step in this process, the *Task Force recommends North Carolina develop and test a pilot project to evaluate the costs, quality, consumer satisfaction, and patient outcomes of a program that supports individuals who would otherwise be in an ACH who want to move back into independent supported housing in the community.* To ensure individuals with disabilities have access to affordable housing options in the future, the *Task Force recommends the North Carolina General Assembly increase funds allocated to the North Carolina Housing Trust Fund for housing for individuals with disabilities and the North Carolina Department of Health and Human Services work with the North Carolina Housing Finance Agency to explore transitional housing options.* To meet both short- and long-term goals, the *Task Force recommends the development of an inventory of community housing options for individuals with disabilities that is easily accessed by individuals, families, and others involved in helping individuals with disabilities explore their options.*

Improving the Current System

In addition to increasing options for individuals with disabilities, North Carolina must also work to ensure that ACHs are better prepared to meet the needs of individuals with disabilities who currently reside in ACHs. With more than 18,000 individuals with disabilities currently living in ACHs and with few community alternatives available, individuals with disabilities will continue to enter ACHs.[4] The current ACH system does not have adequate screening, assessment, care planning procedures, and staff training requirements in place to ensure that ACHs can meet the needs of those entering their facilities. To better serve individuals with disabilities as well as ensure the safety of staff and other residents, North Carolina needs to update the rules and regulations governing ACHs.

Thorough screening, assessment, and care planning tools are critical to ensuring that individuals can be appropriately cared for in any type of assisted living arrangement. The lack of information on the screening, assessment, and care planning tools currently used in North Carolina's ACHs does a disservice to both facilities and residents. Increasing the type and quality of information gathered would help prevent inappropriate placement, assure that facilities are knowledgeable about the care needs of prospective residents and better prepared to provide necessary care to residents, and ensure that other appropriate agencies or organizations are included in the care planning process. All of this is critical to ensuring successful placements and the safety of residents and staff. Therefore the *Task Force recommends the North Carolina Department of Health and Human Services require standardized and validated preadmission screenings,*

level of services determinations, assessments and care planning instruments, with automated data collection, that include more information on the mental and behavioral health of residents. Furthermore, the *Task Force recommends that the North Carolina Department of Health and Human Services use the data gathered through the new automated system to develop case-mix adjusted payments for ACHs and 122C facilities* to ensure that payments to facilities accurately reflect the needs of residents.

In addition to system changes, improving the current system of care in ACHs for individuals with disabilities will require better coordination between the ACHs that house and care for individuals with disabilities and local management entities (LMEs), the local agencies charged with managing, coordinating, and facilitating the provision of mental health, developmental disabilities, and substance abuse services for residents in their area.[5] The current lack of understanding between ACHs and LMEs often prevents them from working together. Strengthening the partnership between ACHs and LMEs would create a more seamless system for those in ACHs to receive necessary assessment and care coordination, by taking advantage of the existing expertise of the LMEs. To help improve the relationship between ACHs and LMEs, the *Task Force recommends the Division of Mental Health, Developmental Disabilities and Substance Abuse Services require LMEs to hold an informational forum at least twice a year and that the Division of Health Service Regulation encourage ACH staff to attend.*

Increasing Staff Training on How to Interact With Individuals with Disabilities

Due to the history of ACHs and the perception that they provide care to the frail elderly, the training requirements for staff of ACHs include little, if any, training on working with individuals with disabilities. As the majority of residents in ACHs have a mental health, intellectual or developmental disorder, or an Alzheimer disease/dementia diagnosis, there is a need for specific training on working with individuals with disabilities. While not all individuals with these diagnoses manifest behavioral problems, many of them do exhibit aggressive or combative behaviors that pose a threat to the safety of other residents and staff.[3] Such behavioral problems can often be safely managed by well-trained staff. Unfortunately, workers in ACHs are not required to receive specific training in managing individuals with behavioral problems, such as de-escalation skills during a crisis. This lack of formal training for staff contributes to the safety risks associated with co-locating older individuals with personal care needs alongside individuals who manifest aggressive or combative behaviors.

To improve the training of ACH staff, the *Task Force recommends the North Carolina General Assembly require all ACHs to receive geriatric/adult mental health specialty team training at least three times per year.* Furthermore, the *Task Force recommends the North Carolina General Assembly require all ACH direct care workers, personal care aides, medication aides, and supervisors to be trained and to have passed the competency exam for the prevention module of state-approved crisis intervention training, such as North Carolina Interventions Prevention training, by June 2013.*

In September 2010, North Carolina was awarded a three year federal Personal and Home Care Aide State Training Program (PHCAST) grant to develop, pilot test, implement, and evaluate the impact of a comprehensive training and competency program for direct care workers. As part of this work, the *Task Force recommends the North Carolina Division of Health Service Regulation, in conjunction with the Division of Mental Health, Developmental Disabilities, and Substance Abuse Services and the Division of Medical Assistance, develop a standardized curriculum and competency test for new direct care workers as part of the federal Personal and Home Care Aide State Training Program grant.*

The current practice of co-locating the frail elderly with large numbers of individuals with disabilities, who may have behavioral problems, poses a threat to the safety of residents and staff of ACHs. North Carolina can address this problem by making appropriate changes to the current ACHs and the mental health, developmental disabilities, and substance abuse system so that individuals with disabilities have a range of options—from facility-based care, for those who want to live with other individuals in congregate living arrangements, to independent living arrangements in the community with care and support services. These changes are critical to improve the care and well-being of some of our most vulnerable citizens and the workers who provide services and supports to them. The recommendations in this report provide a roadmap to both addressing the challenges associated with co-location in ACHs and to increasing the options available to individuals with disabilities, which would reduce co-location in ACHs in the long-run. Implementing these recommendations would considerably improve the safety and well-being of residents and staff of ACHs, as well as individuals with disabilities, in North Carolina.

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A copy of the full report, including the complete recommendations, is available on the North Carolina Institute of Medicine website, http://www.nciom.org.

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Any opinion, finding, conclusion or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view and policies of the North Carolina Department of Health and Human Services Division of Mental Health, Developmental Disabilities, and Substance Abuse Services.

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Correspondence

Improving Youths' Health Through School-Based Health Centers

To the Editor:

The article by North and Parker [1] in a recent issue of the *NCMJ* highlighted school health centers as essential in helping children receive the health care services they need. North Carolina has a long history of supporting these school-based facilities, which fill an important need, including reaching children in medically underserved populations.

Maintaining and strengthening this support is a continual challenge in light of limited state resources and the lack of comprehensive data on the effectiveness of school health facilities and programs. This is why the health and education communities in the state need to rally around school-based and school-linked health centers. As part of this focus on improving school health, Blue Cross and Blue Shield of North Carolina (BCBSNC) has begun reimbursing school-based health centers that ask to be in its provider network and meet its standards for in-network services. As the state's largest private (and not-for-profit) health insurance company, BCBSNC felt it was important to demonstrate leadership on this issue by providing coverage for care delivered in this setting.

BCBSNC is reimbursing 2 school-based centers in Montgomery County and a school-based program in Wayne County for office visits, screenings, and vaccinations for students aged 5-17 years. Reimbursement applies to children who are covered by a BCBSNC plan. Additional school-based health centers are being evaluated for inclusion in our provider network.

Extending insurance coverage to care provided in school facilities is an important step toward improving access to health care for children and adolescents.

Genie Komives, MD
Vice President and Senior Medical Director
Blue Cross and Blue Shield of North Carolina
Chapel Hill, North Carolina

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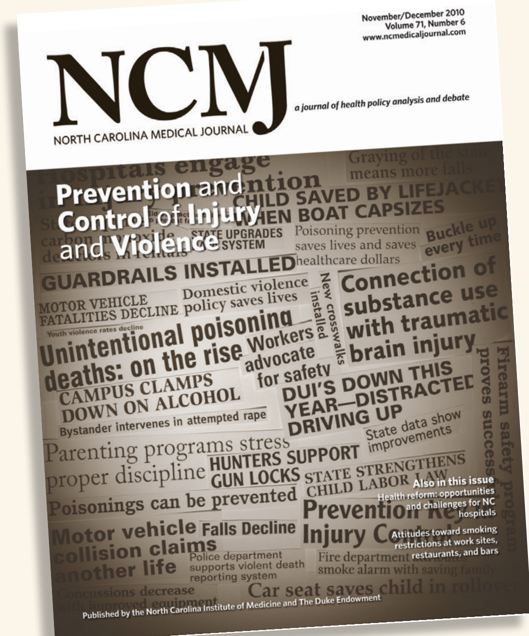

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Advertiser Index

Auto Alliance, DecidetoDrive.org 600

Act Against Violence 552

AT&T 536

North Carolina Medical Society 589

Project CHILDSAFE, US Department of Justice 564

US Department of Health and
Human Services, letsmove.gov 598

US Department of Labor 573

US Department of Transportation .... 505, 506, BC

United Way .... IBC

Walker Allen Grice Ammons & Foy LLP .... IFC

LIVE UNITED
INSTEAD OF JUST HANGING OUT ON SATURDAYS
I HELP KIDS HANG IN THERE
AT SCHOOL
BECAUSE I DON'T JUST WEAR THE SHIRT, I LIVE IT.
GIVE. ADVOCATE. VOLUNTEER. LIVE UNITED®
Ad Council
Michael Cleveland is part of United Way's ongoing work to improve the education, income, and health of our communities. To find out how you can help create opportunities for a better life for all, visit LIVEUNITED.ORG.
United Way

The "It's Not Like I'm Drunk" Cocktail

2 oz. tequila
1 oz. triple sec
1/2 ounce lime juice
Salt
1 too many
1 automobile
1 missed red light
1 false sense of security
1 lowered reaction time

Combine ingredients. Shake.
Have another. And another.

Never underestimate 'just a few.'
Buzzed driving is drunk driving.

U.S. Department of Transportation