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NORTH CAROLINA MEDICAL JOURNAL

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Implementing Bright Futures Guidelines for Well-Child Care

Also in this issue

NC ED visits attributable to
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Community engagement
assessment to decrease obesity in
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NCIOM issue brief, Growing Up Well:
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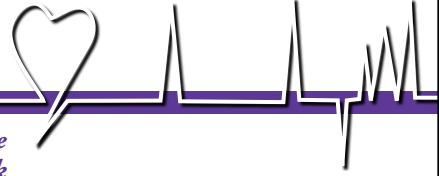


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Call for Submissions on Respiratory Diseases or Genetics

Readers are invited to submit original articles to be considered for publication in future issues of the NCMJ. In particular, the journal seeks original clinical or public health research related to respiratory diseases or genetics, as these topics will be the focus of upcoming policy forums.

- NCMJ 74(5), to be published in September/October 2013, will focus on a myriad of infectious, chronic, and vaccine-preventable respiratory diseases and their treatments.
- NCMJ 74(6), to be published in November/December 2013, will explore advances in genetics, associated diagnostic and treatment opportunities, and ethical challenges.

The NCMJ is distributed to 30,000 health professionals, researchers, educators, policymakers, and interested laypersons in North Carolina and beyond. Articles are also published on the NCMJ Web site (available at: www.ncmedicaljournal.com) and are referenced in PubMed.

The submission deadline for research on respiratory diseases is **April 5, 2013**, and the deadline for manuscripts on genetics is **May 6, 2013**. Prior to submitting a manuscript, authors should review the journal's submissions guidelines (available at: www.ncmedicaljournal.com/submissions/original-articles).

Please direct any submissions or related questions to NCMJ Managing Editor Kay Downer at kdowner@nciom.org.



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Articles

- 9** Emergency Department Visits Attributable to Asthma in North Carolina, 2008
Kristen Hassmiller Lich, Debbie Travers, Wayne Psek, Morris Weinberger, Karin Yeatts, Winston Liao, Steven J. Lippmann, Levi Njord, Anna Waller
- 18** Achieving Health for a Lifetime: A Community Engagement Assessment Focusing on School-Age Children to Decrease Obesity in Durham, North Carolina
Leonor Corsino, Jennifer R. McDuffie, Jonathan Kotch, Remy Coeytaux, Bernard F. Fuemmeler, Gwen Murphy, Marie Lynn Miranda, Brenda Poirier, Janet Morton, David Reese, Sharon Baker, Heidi Carter, Rebecca Freeman, Colleen Blue, William S. Yancy, Jr.

Policy Forum

Implementing Bright Futures Guidelines for Well-Child Care

INTRODUCTION

- 27** Bright Futures for Well-Child Care
Peter J. Morris

ISSUE BRIEF

- 28** Implementing Bright Futures Guidelines for Well-Child Care in North Carolina
Jane Meschan Foy

INVITED COMMENTARIES AND SIDEBARS

- 34** The Importance of Screening for Healthy Weight and Recommending Healthy Lifestyles in Pediatric Patients
Eliana M. Perrin, Asheley Cockrell Skinner
- 35** School-Based Obesity Treatment: The MATCH Program [sidebar]
Suzanne Lazorick, Yancey Crawford, George T. Hardison
- 39** Implications of the New Lead Screening Recommendations in North Carolina
Jennifer E. Crotty, David L. Eldridge
- 44** Maternal Care Practices and Breastfeeding in North Carolina: Becoming Baby-Friendly
Susan R. Mims, Joni H. Lisenbee
- 48** Sexually Transmitted Infections in Adolescents
Preeti Patel Matkins
- 53** Providing Anticipatory Guidance to Children and Adolescents
Stephen W. North
- 54** Safe Kids North Carolina [sidebar]
Wayne Goodwin
- 57** Behavioral Kernels and Brief Interventions: Teaching Parents Effective Behavior Management Strategies
Cheri J. Shapiro

- 60** The Importance of Routine Screening for Strengths and Risks in Primary Care of Children and Adolescents
Marian F. Earls
- 61** North Carolina's Health Check Program [sidebar]
Frank Skwara
- 63** Surveillance for Behavioral Health Problems and Developmental Disabilities in Pediatric Primary Care [sidebar]
Emma J. Miller
- 66** Immunizations for Preteens
Emmanuel B. Walter, Richard J. Chung
- 68** Coping With a Pertussis Outbreak in Alamance County, North Carolina [sidebar]
Kathleen Shapley-Quinn

DEPARTMENTS

- 7** Tar Heel Footprints in Health Care
*Carolyn Sexton
Anne M. Williams*
- 72** Running the Numbers
Sexual Behaviors and Substance Use Behaviors Among North Carolina's High School Students: Implications for Health Care Providers Wanting to Reach Teens at Risk
Jennifer Toller Erasquin, Ellen Essick, Paula Hudson Hildebrand
- 77** Spotlight on the Safety Net
Wayne Initiative for School Health
Anne M. Williams

From the NCIOM

- 79** Issue Brief
Growing Up Well
NCIOM Task Force on the Mental Health, Social, and Emotional Needs of Young Children and Their Families
- 83** 2012 North Carolina Child Health Report Card
NCIOM and Action for Children North Carolina

Correspondence

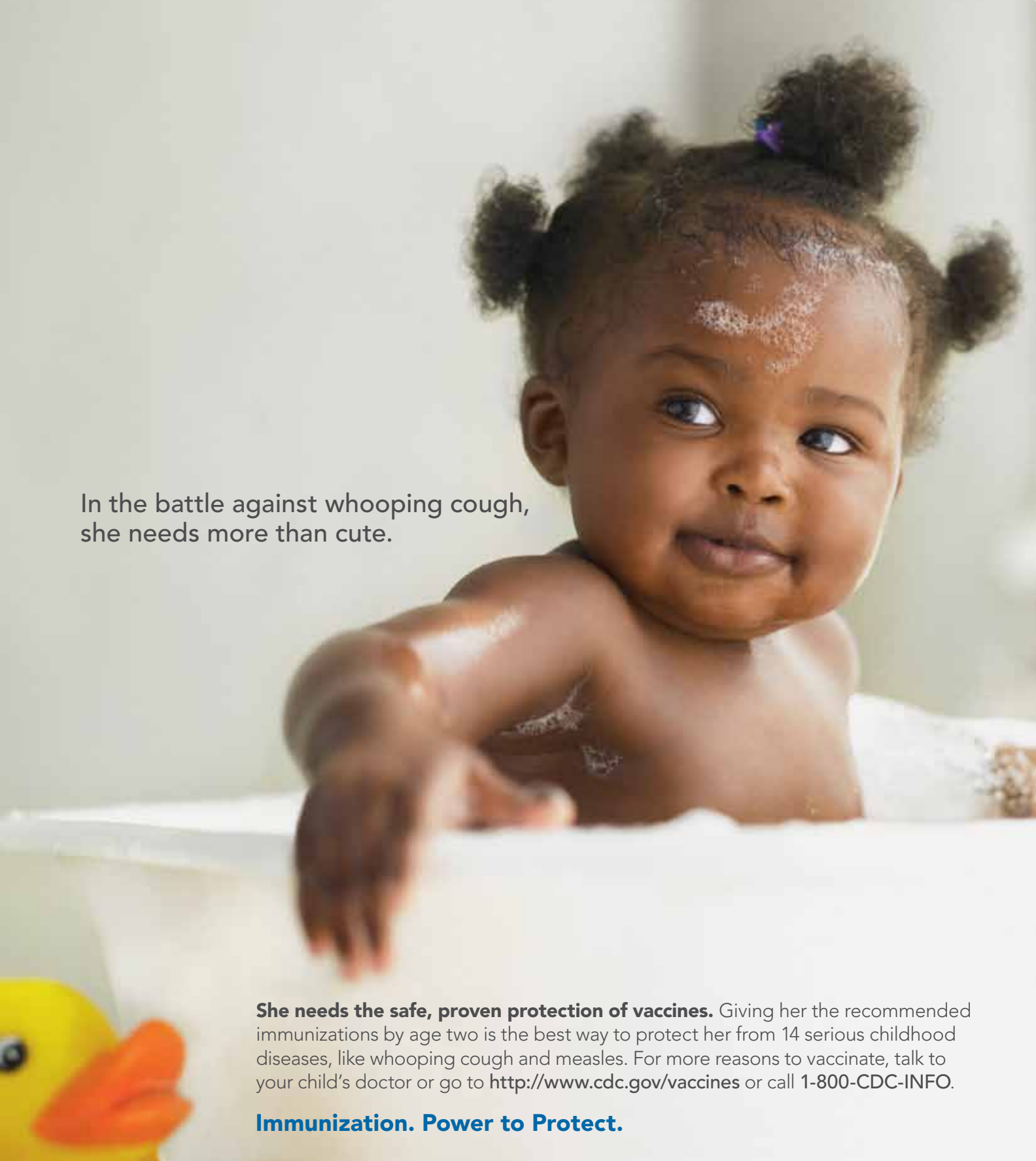
- 89** Healthy North Carolina 2020 and Social Determinants of Health
Laura Emerson Edwards

Special Article

- 90** Invisible Children
Meggan Goodpasture, V. Denise Everett, Martha Gagliano, Aditee P. Narayan, Sara Sinal

Reader Services

- 95** Classified Advertisements
- 96** Advertiser Index



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Tar Heel Footprints in Health Care

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

Carolyn Sexton, RN, MPH



Throughout her career in public health, Carolyn Sexton has contributed considerably to maternal and child health in North Carolina. After receiving her BSN at Duke University's School of Nursing, Sexton received her MPH in Health Policy and Administration from the University of North

Carolina at Chapel Hill's Gillings School of Global Public Health, while working at the North Carolina Division of Medical Assistance (DMA). As the prevention services unit program manager, Sexton served as the first state coordinator for the Baby Love program, a care management model that successfully addressed high infant mortality rates by improving access to early prenatal care and the community resources required to have a healthy baby. This work was done in close collaboration with the North Carolina Division of Public Health (DPH), and the North Carolina Office of Rural Health and Community Care.

Dennis Williams, the senior policy and program advisor at DPH, who worked with Sexton at DMA praised her continued work, "Carolyn provides a great example of what public service is all about. Through her selfless dedication, tireless advocacy, perseverance, and work ethic, she has consistently and effectively contributed to improving the health and well-being of fellow North Carolinians."

Sexton subsequently continued to work in a collaborative capacity as a public health nursing consultant at DPH, where she led statewide outreach for North Carolina's Child Health Insurance Programs, contributed to the annual review/development of DMA's Health Check Policy and provided technical assistance to school-based/linked health centers statewide. With the support of a large group of stakeholders in the primary care community, Sexton developed an Adolescent Health Check Screening that outlined a package of preventive clinical services appropriate for youth ages 11-20 receiving routine preventive care.

Among the proposed services were an annual comprehensive physical exam and health history, visual and hearing risk assessments, dental screenings, nutrition assessments, immunizations, and developmental, psychosocial/behavioral and alcohol/drug use assessments. Family planning and other additional services were also identified for female adolescents. The adolescent services guidelines were based on the 2008 Bright Futures, 3rd Edition and other national evidence-based practice resources.

Following a recommendation from the North Carolina Institute of Medicine Adolescent Health Task Force that DMA should cover and improve annual high-quality well-visits for adolescents, Sexton worked in partnership with DMA to draft a new adolescent well-visit policy. Though the entire package as originally envisioned was not adopted due to fiscal restraints, with DMA's support, aspects of the package were implemented incrementally, strengthening the foundation for improved adolescent well-child care in North Carolina. In 2009, Sexton received the North Carolina Pediatric Society's Good for Kids Award in recognition of her admirable work to improve the quality of life of adolescents across the state.

Sexton described her work on the adolescent health package as a "very exciting project because of the consensus of opinion at the national level (Bright Futures) and the passion of North Carolina adolescent health advocates. I truly loved being a part of this work and the opportunity to lead this project." She is now working as a project manager for Care Coordination for Children (CC4C), a program administered as a partnership between Community Care of North Carolina, DPH, and DMA, which provides at-risk population management for children birth to 5 years of age. **NCMJ**

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

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Emergency Department Visits Attributable to Asthma in North Carolina, 2008

Kristen Hassmiller Lich, Debbie Travers, Wayne Psek, Morris Weinberger, Karin Yeatts, Winston Liao, Steven J. Lippmann, Levi Njord, Anna Waller

BACKGROUND Asthma is a prevalent, morbid, and costly chronic condition that may result in preventable exacerbations requiring emergency department (ED) care. In North Carolina we have limited information about the frequency and characteristics of asthma-related ED visits.

METHODS We estimated statewide population-based asthma-related ED visit rates in North Carolina, both overall and by age, sex, geography, insurance, and season.

RESULTS There were 86,700 asthma-related ED visits in North Carolina in 2008, representing 2.1% of all ED visits in the state. Substantial geographic variation existed, with rates ranging from 1.3 visits per 1,000 population in Ashe County to 21.0 visits per 1,000 population in Pasquotank County. Rates by age, sex, and month were consistent with the findings of other studies. Of asthma ED visits, 4.8% were preceded by another asthma visit to the same ED within 14 days. The proportion of patients who made at least 1 additional asthma visit to the same ED within 365 days was 23.5%; 11.6% of asthma ED patients met at least 1 criterion for being at high risk of hospitalization or death.

LIMITATIONS We lacked data on ED visits for asthma outside North Carolina, information about the accuracy of asthma diagnosis in the ED, patient identifiers that would allow linking across EDs, data on race or ethnicity, and data on urgent care utilization.

CONCLUSIONS We have characterized the burden of asthma in EDs across North Carolina, by county and among key subpopulations. These data can be used to target and evaluate local and statewide asthma-control policy efforts.

Asthma is a prevalent chronic disease that is associated with substantial morbidity, health care utilization, and cost [1-3]. Both the US Department of Health and Human Services and the Centers for Disease Control and Prevention recognize that surveillance of population-level trends in prevalence, health care utilization, and morbidity can support efforts to plan for and reduce the consequences of asthma [3-5]. Currently, national estimates of asthma prevalence and health care utilization allow comparisons across states and regions [6-8] but cannot be used by states to support more targeted efforts to reduce the burden of asthma.

The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) collects statewide population data on all emergency department (ED) visits [9, 10]. ED visits are critical to asthma surveillance, because they may identify preventable asthma exacerbations and because they may be the occasion for implementation of evidence-based public health interventions that can support state and local efforts to improve asthma control [11-13]. Using 2008 NC DETECT data, we examine statewide patterns of ED use in North Carolina for asthma, both overall and by age, sex, geography, insurance status, and month (seasonality). We also identify patterns of frequent use of the ED for asthma treatment.

Methods

Data Sources

We used NC DETECT [10] to identify all visits to civilian, acute care, hospital-affiliated EDs in North Carolina

made by residents of the state during 2008. While analysis focuses on ED visits made by NC residents during 2008, additional NC DETECT data was used to identify additional ED visits made by the patients between December 1, 2007 and December 31, 2009. NC DETECT received data for an estimated 99.5% of all ED visits in the state that year. We used county-level population estimates for 2008 from the North Carolina Office of State Budget and Management [14]. Our estimate of the percentage of North Carolina residents who were uninsured in 2008 comes from Current Population Survey data [15].

Measures

Asthma ED visits. We defined asthma ED visits as visits with an ICD-9-CM code of asthma (493.xx) as the first or second diagnosis, a strategy supported by our analysis of NC DETECT visit data (abstract under review). With the NC DETECT data, we were able to link visits made by an individual to the same facility, but not visits made by an individual to different facilities, because there is no common patient identifier used by all facilities. We began by prospectively counting the number of asthma ED visits made by each patient to the same facility during the 365 days following his

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or her index visit, defined as the patient's first visit to that facility in 2008.

We identified patients as being at high risk for hospitalization or death based on the elements from the National Asthma Education and Prevention Program care guidelines definition that could be measured in our data [13]. Specifically, a patient was considered "high risk" if he or she met at least one of the following criteria: The patient made 2 or more asthma ED visits to the facility within a 30-day period; the patient made 3 or more asthma ED visits to the facility within 365 days of the index visit; or the patient made 2 or more asthma ED visits within 365 days of the index visit and at least 2 of those visits resulted in a hospital admission.

Return visits. Return visits were defined as those preceded by a previous asthma ED visit by the same patient to the same facility within the preceding 3, 14, or 30 days.

Stratification variables. Stratification variables included age, sex, county, urbanicity [16], geographic region (Eastern, Western, or Piedmont area) [17], payment method (eg, private insurance, Medicaid, self-pay), ED disposition (eg, discharged home, admitted), and chief complaint (a free text field in which the triage nurse documents the primary reason for the ED visit). The chief complaints were standardized using a validated text processor that addresses acronyms (eg, *SOB* and *SHOB* for *shortness of breath*), truncations (eg, *diff br* for *difficulty breathing*) and misspellings (eg, *dypnia* for *dyspnea*) [18]. Standardized chief complaints were grouped into 5 clinically homogenous categories—asthma, dyspnea,

TABLE 1.
Chief Complaints by Category Used in Chief Complaint Analysis

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

cold, cough, or injury—by one of the authors (DT). Table 1 (online version only) shows the free text search terms used to find complaints in those categories and provides examples of chief complaints included in each category.

Analysis

Data were analyzed using SAS 9.2 (SAS, Cary, NC), Microsoft Excel 2007 (Microsoft Corporation, Redmond, WA) and ArcGIS 9.2 (ESRI, Redlands, CA). Because NC DETECT represents population data, we do not include P values when reporting comparisons. This project was approved as exempted research by the Institutional Review Board of the University of North Carolina at Chapel Hill.

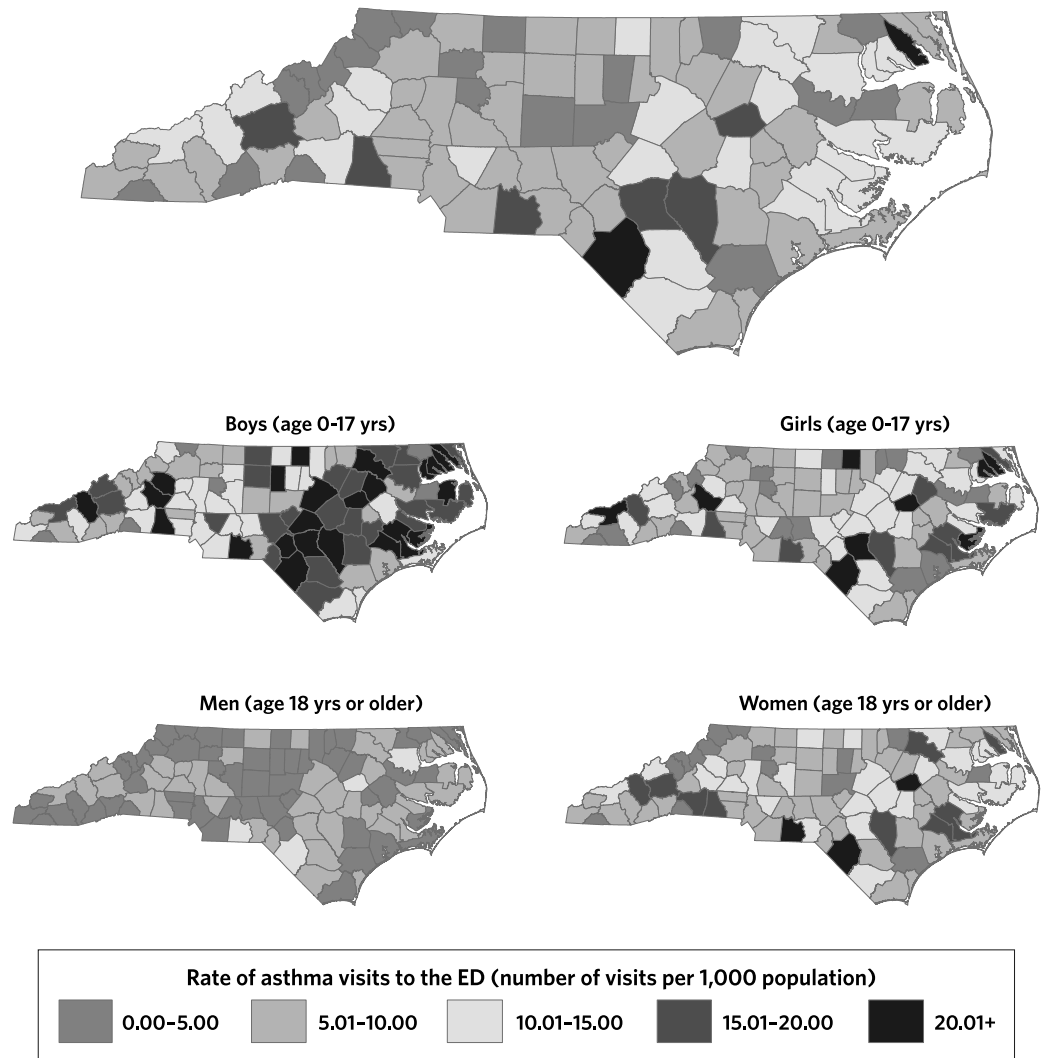
We present counts of ED visits for asthma in North Carolina in 2008 (by age, sex, geographic region, payment method, and ED disposition, and overall), comparing them with counts of ED visits for any reason, in Table 2; addi-

TABLE 2.
Number of Emergency Department (ED) Visits for Asthma in North Carolina in 2008 Compared With Total Number of ED Visits for Any Reason

Population characteristic	Asthma ED visits ^a	All ED visits
	N (%)	N (%)
Age (years)		
0-1	4,303 (5.0)	195,518 (4.8)
2-4	7,482 (8.6)	154,075 (3.8)
5-9	9,666 (11.2)	158,717 (3.9)
10-14	6,672 (7.7)	143,137 (3.5)
15-17	3,805 (4.4)	134,068 (3.3)
18-24	10,098 (11.7)	514,715 (12.7)
25-44	23,814 (27.5)	1,240,374 (30.7)
45-64	15,029 (17.3)	875,070 (21.6)
65 +	5,798 (6.7)	627,012 (15.5)
Unknown/missing	33 (<0.1)	167 (<0.1)
Sex		
Female	49,592 (57.2)	2,266,928 (56.1)
Male	37,084 (42.8)	1,775,537 (43.9)
Unknown/missing	24 (<0.1)	388 (<0.1)
Region		
Eastern North Carolina	29,563 (34.1)	1,238,304 (30.6)
Piedmont North Carolina	46,210 (53.3)	2,257,539 (55.8)
Western North Carolina	10,729 (12.4)	535,934 (13.3)
Unknown/missing	198 (0.2)	11,076 (0.3)
Payment method		
Uninsured		
Self-pay (no insurance)	19,480 (22.5)	974,563 (24.1)
Insured		
Private insurance	21,386 (24.7)	903,145 (22.3)
Medicare	10,020 (11.6)	1,055,484 (26.1)
Medicaid	29,026 (33.5)	756,005 (18.7)
Other government payments or workers' compensation	2,767 (3.2)	92,914 (2.3)
Other/unknown/missing	4,021 (4.6)	260,742 (6.4)
Disposition		
Discharged to home or self-care	70,132 (80.9)	3,036,673 (75.1)
Admitted to a hospital department	10,252 (11.8)	527,931 (13.1)
Left without treatment or against medical advice	1,225 (1.4)	133,210 (3.3)
Transferred to another location	543 (0.6)	70,621 (1.7)
Placed in observation (not admitted)	355 (0.4)	15,552 (0.4)
Died	28 (<0.1)	7,918 (0.2)
Other	64 (<0.1)	21,366 (0.5)
Unknown/missing	4,101 (4.7)	229,582 (5.7)
Total	86,700	4,042,853

^aAsthma ED visits are those that had an ICD-9-CM code of 493.00-493.99 as the first or second diagnosis.

FIGURE 1.
Asthma Emergency Department (ED) Visit Rates in North Carolina in 2008 by County



Note: Asthma ED visits are those that had an ICD-9-CM code 493.00-493.99 as the first or second diagnosis.

tional data (medians, means, and standard deviations, and the frequency of chief complaints across all asthma ED visits) are available at http://www.ncdetect.org/NCMJ_AsthmaEDVisitsInNC2008.pdf. In Figure 1, we present maps of annual asthma ED visit rates (the number of visits per 1,000 population) by county, both overall and by age and sex. Information about ED visit rates by county is presented in Table 3 (online version only) and Table 4 (online version only). Finally, to examine seasonality, we present asthma ED visit rates (the number of visits per 1,000 population) for every calendar month of 2008 by age (Figure 2), sex (Figure 3, online version only), region (Figure 4, online version only), and insurance status (Figure 5, online version only). The denominators for rates related to age, sex, and region are based on midyear state population estimates [14], whereas rates related to insurance status are based on estimates of the proportion of people living in North Carolina during

2008 with and without insurance [15].

To examine frequent use, we first report the number and characteristics of individuals making repeat asthma ED visits in 2008 (Table 5). We then describe patients meeting at least 1 criterion for high risk of hospitalization or death, comparing them by age, sex, region, and payment method to those not considered to be at high risk (Table 6). We conducted similar analyses comparing visits identified as return visits to visits that were not preceded by another asthma visit in the previous 3, 14, or 30 days (Table 5).

Results

There were 86,700 ED visits with a first or second diagnosis of asthma in 2008, representing 2.1% of all ED visits in North Carolina. The rate of asthma ED visits in the state in 2008 was 9.4 per 1,000 population. Asthma visits were more likely to be made by people who were younger and

TABLE 3.
Emergency Department (ED) Visit Rates in North Carolina Counties in 2008, for Asthma Visits and for All Visits Regardless of Diagnosis

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

Note: ED visit rates are the number of ED visits per 1,000 population. Asthma ED visit rates include visits that had an ICD-9-CM code of 493.00-493.99 as the first or second diagnosis. Overall ED visit rates include all visits regardless of diagnosis.

TABLE 4.
Ranking of Counties by Asthma Emergency Department (ED) Visit Rate, Overall ED Visit Rate, and Ratio of Asthma ED Visit Rate to Overall ED Visit Rate

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

Note: ED visit rates are the number of ED visits per 1,000 population; the actual rates can be found in Table 2. Here, in each column, a rank of 1 indicates the highest ED visit rate in the state and a rank of 100 the lowest ED visit rate. Asthma ED visit rates include visits had an ICD-9-CM code of 493.00-493.99 as the first or second diagnosis. Overall ED visit rates include all visits regardless of diagnosis.

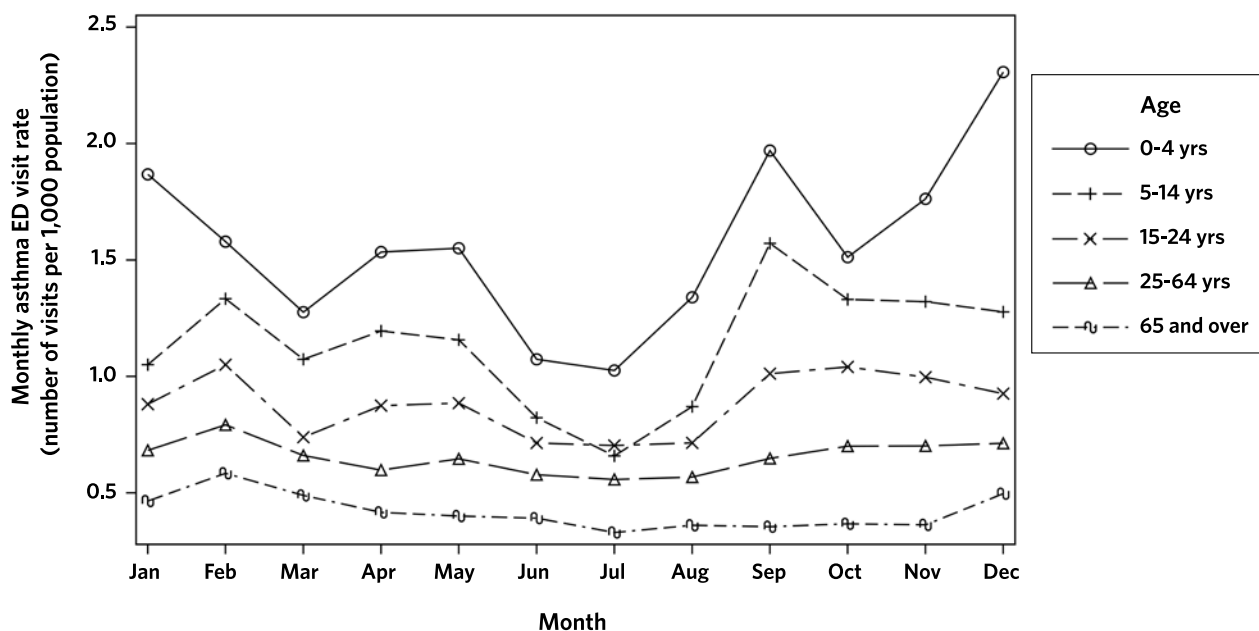
who used Medicaid as their payment method (Table 2). The 6 most common chief complaint categories accounted for 64% of the asthma ED visits: Asthma accounted for 21%; shortness of breath, 12%; dyspnea, 11%; cough, 10%; chest pain, 5%; and wheezing, 5%.

Substantial variation exists in asthma ED visit rates geographically; overall rates for individual counties in 2008 range from 1.9 visits per 1,000 population to 21.0 visits per 1,000 population (Figure 1). The 6 counties with the highest asthma ED visit rates that year were Pasquotank, Robeson, Wilson, Anson, Cleveland, and Cumberland (Table 4, online version only). There appears to be no consistent relationship between the asthma ED visit rate for a county and the rate of ED visits for all diagnoses in that county. The asthma ED visit rates in the Western, Piedmont, and Eastern regions were 9.4, 8.5, and 11.1 visits per 1,000 population, respectively. The asthma ED visit rates in urban versus rural counties were 9.4 and 9.1 visits per 1,000 population, respectively.

Across North Carolina in 2008, asthma ED visit rates among children ages 0-17 years and adults age 18 and older were 14.5 and 7.8 visits per 1,000 population, respectively. The median age of individuals making asthma ED visits was 25.5 (mean=29.0, SD=28.5); the median age for those making ED visits for any reason was 36 years (mean=38.0, SD=24.3). The asthma ED visit rate for males was 8.2 visits per 1,000 population, and for females it was 10.5 visits per 1,000 population. Taking age and sex together, asthma ED visit rates among boys ages 0-17 years, girls ages 0-17 years, men age 18 years or older, and women age years 18 or older were 16.7, 11.1, 5.1, and 10.2 visits per 1,000 population, respectively. The asthma ED visit rate for those who were insured was 8.1 visits per 1,000 population, compared with 13.7 visits per 1,000 population among those with no insurance.

Asthma visit rates were highest among children 4 years

FIGURE 2.
Monthly Asthma Emergency Department (ED) Visit Rates in North Carolina in 2008, by Age



Note: Asthma ED visits are those that had an ICD-9-CM code 493.00-493.99 as the first or second diagnosis.

FIGURE 3.
Monthly Asthma Emergency Department (ED) Visit Rates in North Carolina in 2008, by Sex

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

Note: Asthma ED visits are those that had an ICD-9-CM code 493.00-493.99 as the first or second diagnosis.

FIGURE 4.
Monthly Asthma Emergency Department (ED) Visit Rates in North Carolina in 2008, by Region

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

Note: Asthma ED visits are those that had an ICD-9-CM code 493.00-493.99 as the first or second diagnosis.

FIGURE 5.
Monthly Asthma Emergency Department (ED) Visit Rates in North Carolina in 2008, by Insurance Status

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

Note: Asthma ED visits are those that had an ICD-9-CM code 493.00-493.99 as the first or second diagnosis.

old or younger and varied considerably by month (Figure 2). There were 2 substantial peaks for children 4 years of age or younger—in September, and in December through February, and there were also peaks in September and February for children aged 5-14 years. A less pronounced third peak was observed in April-May for children age 4 or younger. As shown in Figures 3, 4, and 5 (online version only), fairly minor variations in seasonal patterns are seen by sex, by region, and by insurance status, although the overall frequency of visits by these variables is different, as reported above.

Of the 67,906 patients who made an asthma ED visit in calendar year 2008, 75.6% had only the 1 asthma ED visit to that facility, while 15.1%, 4.7%, 1.8%, and 2.0% of asthma ED patients made 2, 3, 4, and 5 or more asthma ED visits to the same facility within 365 days following the first (index) visit, respectively.

A total of 7,886 patients (11.6%) making asthma ED visits met at least 1 criterion for high risk of hospitalization or death (see Table 6). These high-risk individuals were more likely than other asthma patients to be in the age group 18-64 years, to live in the Eastern region of the state, and to have had Medicaid coverage for at least 1 of their visits (39.8% of those at high risk had at least 1 Medicaid payment across multiple visits, whereas only 31.9% of those not at high risk had a Medicaid payment). A little more than 60% of the individuals who met any 1 criterion for high risk also met at least 1 other criterion; 11.6% of all patients making

asthma ED visits in 2008 met at least 1 of the 3 criteria, 5.3% met at least 2 criteria, and 0.7% (455 patients) met all 3.

The proportions of patients making return asthma-related ED visits within 3, 14, and 30 days of a preceding visit were 1.8%, 4.8%, and 8.2%, respectively. Patients making return visits within any of the intervals were more likely to be 18-44 years of age, were more likely to reside in the Eastern region of the state, and were less likely to reside in the Piedmont. Individuals who returned within 14 days were more likely to have no insurance while those not returning to the ED were more likely to have private insurance.

Discussion

To our knowledge, this is the first statewide, population-based surveillance study of asthma ED visits in the United States. In 2008, the 86,700 asthma-related ED visits made in North Carolina accounted for approximately 2% of all ED visits. Although the asthma ED visit rate in North Carolina is higher than the national average (9.4 vs. 6.7 visits per 1,000 population), in North Carolina asthma ED visits make up only a slightly greater proportion of all ED visits than is the case nationally (2.1% versus 1.8%) [19]. Notably, the annual asthma ED visit rates in North Carolina are substantially higher than the goals set for Healthy People 2020 for children younger than 5 years (18.8 versus 9.6 visits per 1,000 population), for those 5-64 years of age (9.3 versus 4.9 visits per 1,000 population), and for those age 65 or older (5.0 versus 1.3 visits per 1,000 population) [20].

Interestingly, more than 4,000 ED visits with an asthma diagnosis were made by children younger than 2 years. This figure is surprisingly high and may be related to the inconsistency in assigning asthma diagnoses (versus other diagnoses such as reactive airway disease) to this age group [21]. The clinical literature does not support the diagnosis of asthma in the majority of children under the age of 2 years who may wheeze with a viral illness, because many do not go on to develop asthma [22]. However, we found that ED clinicians do frequently assign asthma diagnoses to children in this age group.

More broadly, the patterns we found in ED visit rates among children and adults by sex are consistent with the differences between children and adults and the differences between males and females described in other studies. Specifically, although asthma ED visit rates are higher among females than males overall, they are higher in males than in females before puberty, with a reversal in adulthood [6, 23-25].

Although most chief complaints documented were respiratory, only 21% were listed as “asthma” specifically. This may be because there is no national standard for chief complaint documentation in ED records [26]. Some ED information systems allow free text entry of chief complaints while others use drop-down lists (only some of which include asthma, while others may only have terms such as *wheezing* or *shortness of breath*). Thus, the observed variability in chief

TABLE 5.
Counts of Return Emergency Department (ED) Visits for Asthma^a Within 3 or 14 Days
Compared With Counts of ED Visits for Asthma That Were Not Preceded by an Asthma
Visit Within 3 or 14 Days

Population characteristic	Return visits within 3 days	Visits not constituting a return within 3 days	Return visits within 14 days	Visits not constituting a return within 14 days
	N (%)	N (%)	N (%)	N (%)
Age (years)				
0-1	69 (4.4)	4,234 (5.0)	116 (2.8)	4,187 (5.1)
2-4	134 (8.5)	7,348 (8.6)	228 (5.5)	7,254 (8.8)
5-9	156 (9.9)	9,510 (11.2)	277 (6.7)	9,389 (11.4)
10-14	116 (7.3)	6,556 (7.7)	217 (5.3)	6,455 (7.8)
15-17	62 (3.9)	3,743 (4.4)	134 (3.3)	3,671 (4.5)
18-24	202 (12.8)	9,896 (11.6)	517 (12.5)	9,581 (11.6)
25-44	526 (33.3)	23,288 (27.4)	1,585 (38.4)	22,229 (26.9)
45-64	249 (15.7)	14,780 (17.4)	834 (20.2)	14,195 (17.2)
65 +	67 (4.2)	5,731 (6.7)	217 (5.3)	5,581 (6.8)
Unknown/Missing	1 (<0.1)	32 (<0.1)	1 (<0.1)	32 (<0.1)
Sex				
Female	890 (56.3)	48,702 (57.2)	2,299 (55.7)	47,293 (57.3)
Male	692 (43.7)	36,392 (42.8)	1,827 (44.3)	35,257 (42.7)
Unknown	0 (0)	24 (<0.1)	0 (0)	24 (<0.1)
Region				
Eastern North Carolina	610 (38.6)	28,953 (34.0)	1,648 (39.9)	27,915 (33.8)
Piedmont North Carolina	780 (49.3)	45,430 (53.4)	2,012 (48.8)	44,198 (53.5)
Western North Carolina	186 (11.8)	10,543 (12.4)	454 (11.0)	10,275 (12.4)
Unknown/missing	6 (0.4)	192 (0.2)	12 (0.3)	186 (0.2)
Payment method				
Non-insured				
Self-pay (no insurance)	356 (22.5)	19,124 (22.5)	1,081 (26.2)	3,825 (4.6)
Insured				
Private insurance	325 (20.5)	21,061 (24.7)	749 (18.2)	20,637 (25.0)
Medicare	164 (10.4)	9,856 (11.6)	562 (13.6)	9,458 (11.5)
Medicaid	624 (39.4)	28,402 (33.4)	1,448 (35.1)	27,578 (33.4)
Other government payments/ Workers compensation	42 (2.7)	2,725 (3.2)	90 (2.2)	2,677 (3.2)
Other/unknown/missing	71 (4.5)	3,950 (4.6)	196 (4.8)	3,825 (4.6)
Total	1,582^b	85,118	4,126^c	82,574

Note: Data are for asthma ED visits by North Carolina residents in 2008. Percentages have been rounded and therefore do not always add up to 100%.

^aAsthma ED visits are those that had an ICD-9-CM code of 493.00-493.99 as the first or second diagnosis. Return visits are ED visits in which the person had a previous asthma-related ED visit within the previous 3 days or the previous 14 days.

^bReturn visits within 3 days represented 1.8% of all asthma visits to the ED during 2008.

^cReturn visits within 14 days represented 4.8% of all asthma visits to the ED during 2008.

complaints found in this study is not surprising.

Given the high population density of the piedmont region, it is not surprising that more than 50% of asthma ED visits in 2008 occurred there. However, the annual asthma ED visit rates in the Western and Eastern regions were higher. This may, in part, reflect the fact that those regions are more rural and residents therefore have less access to primary care. Although there is substantial geographic

variation in asthma-related ED visit rates, counties with high overall asthma ED visit rates have high rates across all age groups and both sexes. This may suggest the presence of systemic factors affecting the entire population, such as environmental (eg, external or ambient) factors that trigger exacerbations, allergens, variability in incidence rates of influenza, and/or disparate access to high-quality preventive care, asthma management, and acute health care.

TABLE 6.
A Comparison of Asthma Emergency Department (ED)
Patients at High Risk of Asthma-Related Hospitalization or
Death With Those Not at High Risk

Population characteristic	Patients at high risk ^a	Patients not at high risk
	N (%)	N (%)
Criterion for high risk that was met ^b		
≥ 2 asthma ED visits within 30 days	5,116 (64.9%)	
≥ 3 asthma ED visits within 365 days	5,742 (72.8%)	
> 2 asthma ED visits within 365 days, at least 2 of which resulted in hospital admission	1,111 (14.1%)	
Age (years)		
0-1	414 (5.3)	3,196 (5.3)
2-4	659 (8.4)	5,365 (8.9)
5-9	781 (9.9)	7,109 (11.8)
10-14	469 (6.0)	5,082 (8.5)
15-17	293 (3.7)	2,867 (4.8)
18-24	988 (12.5)	6,812 (11.4)
25-44	2,444 (31.0)	14,982 (25.0)
45-64	1,396 (17.7)	10,078 (16.8)
65 +	441 (5.6)	4,499 (7.5)
Unknown/Missing	1 (<0.1)	30 (<0.1)
Sex		
Female	4,608 (58.4)	34,227 (57.0)
Male	3,278 (41.6)	25,769 (42.9)
Unknown/Missing	0 (0.0)	24 (<0.1)
Region		
Eastern North Carolina	2,797 (35.5)	19,645 (32.7)
Piedmont North Carolina	4,117 (52.2)	32,474 (54.1)
Western North Carolina	956 (12.1)	7,775 (13.0)
Unknown/missing	16 (0.2)	126 (0.2)
Payment method		
Non-insured		
Self-pay (no insurance)	1,354 (17.2)	12,276 (20.5)
Insured		
Private insurance	1,175 (14.9)	16,103 (26.8)
Medicare	847 (10.7)	6,697 (11.2)
Medicaid	2,358 (29.9)	18,653 (31.1)
Other government payments/ Workers compensation	154 (2.0)	2,005 (3.3)
Multiple payment methods ^c	1,741 (22.1)	1,550 (2.6)
Other/unknown/missing	257 (3.3)	2,736 (4.6)
Total	7,886^d	60,020

Note: Data are for North Carolina residents who made an asthma-related visit to an ED in the state in 2008. Asthma-related ED visits are those that had an ICD-9-CM code of 493.00-493.99 as the first or second diagnosis.
^aHigh risk patients were those who met one or more of the following criteria: 3 or more asthma ED visits to the same ED within a 365-day period; 2 or more visits to the same ED within a 30-day period; or 2 or more visits to the same ED within a 365-day period, at least 2 of which resulted in a hospital admission.
^bSome patients met more than one criterion.
^cPatients counted as having multiple payment methods were those having at least 2 different payment methods for at least 2 consecutive visits to the ED during 2008.
^dHigh-risk patients constituted 11.6% of all asthma ED patients with index visits during 2008.

Notably, 7 counties that had high asthma ED visit rates overall in 2008 border Tennessee and may experience the hypothesized “down wind” effect of the coal-power plants there [27].

Counties with higher asthma ED visit rates were largely those with higher asthma hospitalization rates [28] and higher health risks [29], particularly for boys 0-17 years old. This may be due to individual and community factors in these counties, such as racial or ethnic disparities (eg, higher prevalence of asthma among Native Americans), lack of access to appropriate health care for asthma (eg, an inadequate number of physicians specializing in chronic lower respiratory diseases), and higher poverty rates. These issues have important implications for addressing current and future public health policies regarding asthma management and control.

Our findings regarding seasonality of asthma-related ED visits are generally consistent with those in the published literature [30-37], with some notable differences. For example, we observed the well-documented “September epidemic” in which children 14 years of age or younger have peaks in asthma-related ED use during that month. However, the September peak appears to be more dramatic in 0-4 year olds in North Carolina than in children that age in Canada [32, 36]. Moreover, a December peak observed in Canadian adults is much less dramatic in North Carolina. These differences between North Carolina and Canada may reflect childcare practices, environmental triggers, or allergies. The December/January peak we observed in children younger than 4 years of age has also been reported in New York City [37]. Although seasonal patterns of asthma ED visits are quite consistent among individuals 5 years old or older, there may be more variation than has been recognized among children 4 years old or younger.

We examined 3 aspects of frequent use: number of asthma ED visits within 365 days, high-risk patients, and return visits. Approximately 24% of individuals with at least 1 asthma ED visit in 2008 had 2 or more asthma ED visits to the same facility within 365 days. To the best of our knowledge, this is the first population-based estimate of repeated ED use for asthma. Prior studies have reported a somewhat higher rate of repeat ED visits within a year. This is probably because many of those other studies report rates of repeat ED visits for any reason rather than just repeat visits for asthma, or reflect visit rates among inner-city and other high-risk subpopulations, or rely on self-reported ED use [38-40].

We identified more than 8% of asthma ED visits as return visits for asthma within 30 days. Our findings are similar to those in the published literature, with the exception that fewer of the return visits in North Carolina occur as soon as within 3 days [41, 42]. Geographically, return visits are slightly more likely to be made by patients living in the Eastern region of North Carolina and less likely to be made by individuals in the Piedmont region.

Limitations

First, we lacked data on ED visits made by North Carolinians to EDs outside North Carolina and therefore may have underestimated asthma ED visit rates. Second, we lacked clinical data to confirm the accuracy of asthma-related diagnoses in the ED. Because there is no consistent definition of an asthma ED visit using administrative data, we included all ED visits with an asthma ICD-9-CM diagnosis code (493.xx) in the first or second position. This strategy was supported by our clinical experience and by our internal analyses of NC DETECT data, including information on chief complaint, procedure codes, and additional diagnoses; our preliminary analyses support this strategy (abstract under review). Third, we lacked patient identifiers that would allow us to link visits across facilities. This may have resulted in our underestimating the number of return and repeat visits made by individuals and overestimating the number of individuals making asthma ED visits. Any bias may have been minimized by the fact that there are no incentives for patients to use multiple facilities. Fourth, NC DETECT does not contain data on race and ethnicity, which are key factors in disparities in asthma outcomes [19]. Finally, we lacked data on utilization of urgent care centers. Given that these centers are used for acute exacerbations, our estimates underestimate the burden of asthma in North Carolina.

Conclusions

Given the importance of conducting regular and rapid surveillance for asthma, NC DETECT is a valuable tool. We have quantitatively characterized the burden of asthma in North Carolina overall, by county, and by key subpopulations. Our findings have important implications for data-driven, public health surveillance and programmatic efforts at the local and state levels. For example, these data can be used to investigate asthma management issues, including access to asthma medication for disease management and prevention of asthma exacerbations and episodes. In addition, the analysis of county-level ED visit rates may help counties with high rates develop community-based efforts to decrease costly ED visits for asthma. Furthermore, this analysis can be replicated over time to support evaluation and improvement of local and statewide asthma control policy efforts. Finally, by estimating the prevalence of measurable criteria that identify patients with asthma who are at high risk of hospitalization or death [43-45], we can open discussion within North Carolina and inspire future work to develop strategies that target these at-risk patients. NCMJ

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Achieving Health for a Lifetime: A Community Engagement Assessment Focusing on School-Age Children to Decrease Obesity in Durham, North Carolina

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BACKGROUND: Obesity is a prominent problem in the United States and in North Carolina. One way of combating it is with community-engaged interventions that foster collaboration between health-oriented organizations and community residents.

PURPOSE: Our purpose was to assemble a multifaceted group in Durham, North Carolina, to identify factors affecting obesity-related lifestyle behaviors; assess policies, resources, and the population's perception of the problem of obesity; and develop plans to improve health outcomes related to obesity.

METHODS: A team consisting of more than 2 dozen partners was assembled to form Achieving Health for a Lifetime (AHL) in order to study and address obesity in the community, initially focusing on elementary school-age children. The team developed a resource guide by collecting information by telephone interviews of provider organizations; geospatial resource maps were created using high-resolution geographic information systems, Duke's Data Support Repository, and county and city records; and focus groups were conducted using the nominal group technique.

RESULTS: The AHL team, in collaboration with 2 other teams focused on diabetes and cardiovascular disease, identified 32 resources for diabetes, 20 for obesity, and 13 for cardiovascular disease. Using Geographic Information Systems (GIS), the team identified an area of Durham that had only 1 supermarket, but 34 fast-food restaurants and 84 convenience stores.

LIMITATIONS: The focus on particular neighborhoods means that the information obtained might not pertain to all neighborhoods.

CONCLUSION: The AHL team was able to assemble a large community partnership in Durham that will allow the members of the community to continue to work toward making residents healthier. Communities facing similar challenges can learn from this experience.

Obesity in both sexes and all age groups has become a prominent problem in the United States. The city of Durham in North Carolina, like many cities in this country, has many individuals who are obese. The Durham County 2011 Community Health Assessment notes that 65% of adults in the county are overweight or obese [1]. Obesity is more prevalent among blacks and Hispanics than among whites throughout the United States [2], and in the city of Durham, 41% of the population is black and 14.2% is Hispanic [3]. Obesity is becoming more prevalent in children as well as adults. Nationally, 16.9% of children are obese [4], and in Durham County, 20% of children are [1].

The scope of the problem in Durham has stimulated a team of researchers, clinicians, and community members to develop a proposal for reducing obesity, starting with elementary school children. The project, called Achieving Health for a Lifetime (AHL), will then expand to include older and younger children in schools and eventually parents and older adults in the communities surrounding the schools.

Recommendations regarding diet, physical activity, and other behaviors have been widely disseminated for decades. Some experts in the United States now believe that in order to better manage the problem of overweight and obesity, national policy changes are needed that might have an

effect on citizens' dietary and physical activity habits [5]. Multidimensional approaches that include policy change and combine the resources of public, private, and philanthropic organizations to ensure a coordinated and sustainable long-term effort can also be effective when initiated locally, as evidenced by recent research [6-13]. However, such an approach is likely to be successful only after a proper community assessment is carried out in partnership with the community in which one hopes to initiate change. Following the examples of the city of Somerville, Massachusetts, the city of Chicago, the state of Delaware, and others [6-10], AHL used community meetings, interviews, focus groups, and advisory councils to assess existing local services and gaps in those services, and to solicit input, support, and assistance from a range of sources.

Community engagement is defined as the process of working collaboratively with groups of people who are affiliated by geographic proximity, special interests, or simi-

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larities in their situations with respect to issues affecting their well-being [14]. The process helps communities take responsibility for their own health promotion and disease prevention by involving health professionals, community residents, and other stakeholders in all steps, from needs and asset assessments through program planning and implementation and then evaluation. True equality of leadership and respect for all opinions is fostered by open communication, efforts to achieve a common understanding, coordination, collaboration, and finally, forming a partnership to work toward a common goal [15-17]. Furthermore, community engagement presents a significant number of opportunities and challenges that should be carefully considered prior to embarking on a large-scale partnership. In order to achieve success, researchers using the process of community engagement need to have a solid understanding of its theory and practice.

AHL is a unique community engagement project conducted in Durham, North Carolina, and sponsored by Durham Health Innovations (DHI), which is a partnership between Duke University and the Durham community that seeks to improve the health of residents of Durham County. DHI is funded by Duke University, through a Clinical and Translational Science Award that Duke received from the National Institutes of Health, and by contributions from community organizations. AHL was formed to assemble a large community group to identify predisposing, enabling, and reinforcing factors for obesity-related lifestyle behaviors; to assess policies, resources, and circumstances in Durham that facilitate or hinder efforts to improve these behaviors; to assess the target population's perception of the problem of obesity; and, based on the results of those assessments, to develop plans to improve measurable health outcomes related to obesity in Durham and tailor those plans for specific communities or populations [18].

The AHL project follows a social ecological framework to promote behavioral changes in dietary habits and physical activity [19]. The social ecological framework incorporates all aspects of the individual interacting with his or her environment, including the following: individual-level beliefs, attitudes, behaviors, and medical considerations (if any); family relationships; community practices; social, organizational, and cultural norms; and public policy. In the case of AHL, the individual is the school-age child and the interactions are mediated by the school. This focus was chosen based on feedback provided by stakeholders involved in the early stages of planning. The belief was that intense intervention on behalf of elementary school children could help slow the rising incidence of childhood obesity and prevent its complications. In addition, schools can serve as focal points that can eventually be used to reach a wide age-range of people in the community. Policy, infrastructure, and commercial changes were identified as additional impactful elements of such a community intervention; however, they were also perceived to require greater resources and a lon-

ger duration to realize their impact. Focus on those elements was therefore deferred until the intervention becomes more established in the community.

Another important attribute of the social ecological framework is that it recognizes the societal and cultural perspectives of people of different ages, genders, races, ethnicities, and socioeconomic backgrounds. It examines how all of these different perspectives converge to influence individual behavior and provides the opportunity to develop a consumer-guided intervention that meets the community's existing needs and fills projected gaps in service [20]. This approach also facilitates partnerships among health care organizations, other health-related programs, and the community, stimulating these parties to contribute to decision-making. This process tailors the approach to the specific community or population, coordinates and expands local opportunities, and fosters ownership regarding the plan of care. Application of this model to the issue of childhood obesity has resulted in identification of the following spheres of influence as contributing to a child's propensity for weight gain: genetic environment, family environment (ie, behaviors modeled by parents and other household members, shared foods and activities) and community/social influences (eg, government and school policies, built social and geographic environments, sociodemographics) [21].

The purpose of this article is to offer information regarding the AHL experience and the results to date of the initial steps described above in order to demonstrate the processes and intricacies of community engagement in a metropolitan area in the South. Our goal is to further inform the development of similar programs by communities around the country interested in resolving health problems affecting their populations, particularly obesity.

Methods

Research teams and community engagement. DHI initiated a call for proposals in the fall of 2008. Parties interested in improving any aspect of health in the Durham community were invited to form teams and submit proposals. The main charge to these teams was to propose an economical and sustainable strategy aimed at improving a widespread health issue in Durham using community and university resources and representation. Multiple teams competed for support, with only 10 teams receiving grants.

The AHL team focused on obesity and was made up of groups focused on adult, childhood, and minority obesity as well as the effect of health on school readiness. The AHL team included members from community organizations and from Duke University Medical Center, and those members were organized by a project manager with roots in both settings. Community engagement was accomplished by having all team members brainstorm names of community organizations that might be interested in participating, especially in the community assessment. Community organizations representing many segments of the Durham

community were invited to an initial meeting, which took place after the AHL team received funding. A total of 50 community organizations attended. From this effort, the AHL team convened more than 2 dozen community partners (Table 1), who attended a series of planning meetings over a 2-year period. Attendees included representatives from local government, religious institutions, civic clubs, private businesses, and grassroots nonprofit organizations. The complete AHL team, including all of the community collaborators, met quarterly. From these partners, a steering committee was formed consisting of the representatives from the organizations most central to the model being developed. The steering committee met every other week and designated additional committees to accomplish such things as developing a resource guide, constructing resource maps, and conducting focus groups. The work of these committees is detailed below.

The resource guide. The resource guide was developed via collaboration among 3 of the 10 DHI-sponsored teams—those for diabetes, cardiovascular disease, and obesity. DHI encouraged collaboration, and the teams themselves decided to collaborate. The teams identified and categorized local events, facilities, and organizations in the area of health care for these related health areas. This resource guide was developed through a 3-step process. First, representatives from all 3 teams brainstormed what types of organizations should be included in the resource guide and what types of information should be collected about each organization. Next, a questionnaire to standardize the collection of the desired information was developed by a resource guide subcommittee formed from members of the 3 teams. And finally, 5 nursing student volunteers, supervised by the resource guide subcommittee chairman, telephoned each identified organization, administered the questionnaire, and solicited the names of any other programs that should be contacted.

The geospatial resource maps. The DHI teams, in conjunction with the Nicholas School of the Environment at Duke University, used high-resolution geographic information systems (GIS) and geospatial mapping techniques to visualize community-level resources in relation to health data points, environmental variables, census data, zip codes, and environmental factors in order to examine and understand the interrelationships between mapped data and other related community-level factors such as health outcomes, health disparities, and access to care for particular populations. Duke’s Data Support Repository provided de-identified, aggregate clinical and business data regarding receipt of care from the Duke University Health System. Community data came from published government reports as well as from surveys and focus groups conducted by academic institutions and community nongovernmental organizations. The following are examples of the types of locational information that were requested for the AHL-specific maps because their frequency and proximity may impact indi-

vidual behavior: health care facilities and the types of care they offer; walking trails and other exercise options in various neighborhoods; and grocery stores, convenience stores, and restaurants.

This spatial analysis makes it possible to reveal hidden trends, novel approaches to the examination of access to care and other resources, and novel intervention strategies for improving health. By matching previously unlinked data sets such as health data records to their corresponding location (ie, their specific latitude and longitude, as for individual tax parcel units), spatial patterns can emerge that were not evident when the data were viewed in tabular or statistical formats [22]. These patterns, determined through model-based inference and displayed graphically, can be powerful outreach tools that show the community where problems exist and where vulnerable populations reside, thereby identifying areas that are ripe for intervention and policy change.

TABLE 1.
Community Partners During the Achieving Health for a Lifetime Project

Duke University School of Medicine
Department of Community and Family Medicine
Department of Medicine
Department of Pediatrics
Department of Psychiatry
Graduate Medical Education
Durham City and County Government
Durham County Health Department
Durham Public Schools
School Health Advisory Committee
Child Nutrition Service and School Board
Durham Parks and Recreation
Neighborhood Improvement Services
Partnership for a Healthy Durham
Community Organizations
Community Health Coalition
Durham Congregations, Associations, and Neighborhoods
Durham Congregations in Action
Durham Council of Parent-Teacher Associations
Durham Partnership for Children
Eat Smart, Move More North Carolina
East Durham Children’s Initiative
El Centro Hispano
Health Care for All North Carolina
Inter-Faith Food Shuttle
Northeast Central Durham Leadership Council
Operation Breakthrough
Partnership for the Advancement of Children’s Health
Salvation Army Boys and Girls Club
Structure House
Take Off Pounds Sensibly
Union Baptist Church—Parrish Nurses Association
YMCA of the Triangle

Note: Not all partners are still participating.

This process ensures that targets and strategies are based on solid research findings.

Focus groups. Our team conducted 6 very pointed focus groups to assess the target population's perception of the problem of obesity. These focus groups used the nominal group technique for achieving consensus developed by Delbecq and VandeVen [23]. Because Durham is a city in which many focus groups and surveys have been conducted, sensitivity to research burnout was needed. Therefore, our team focused on gathering the information from a diverse group of people in the community, who provided a very broad range of perceptions of how obesity affects the community. We conducted focus groups with parents of overweight children (in English and in Spanish), overweight adolescents, overweight or obese individuals with chronic diseases (in English and in Spanish), and adults who had successfully maintained weight loss.

Results

Resources identified to address the problems. A resource guide to Durham's health landscape summarizing available resources was created. It included the following information for each entry: name of organization, institution, or business; contact information (address, phone number, Web site, contact person); mission statement; target population; detailed description of service(s) provided; and availability of translation services for those who do not speak English. In total, the teams identified 32 resources for diabetes, 20 for obesity, and 13 for cardiovascular disease. These are all listed in a spreadsheet titled Durham Primary Care Landscape, which can be found at <https://docs.google.com/spreadsheets/d/1OAmqmbZqm7HxKcmdmYXN5c2pPRDgtOFRCUnFZVEwyS2c&hl=en#gid=0>. The obesity resources are provided by Duke University Medical Center (Telepharmacy Project, Project Access, Project LATCH), Durham County Health Department (Care-a-Van, Community Outreach/Health Educators/Nutrition Education/DINE for LIFE, child care nutrition consultation project, Wellness for Life), Durham Parks and Recreation (parks and recreation), Durham Community Health Network (community-based managed care program for Durham Carolina Access), US Department of Health and Human Services (El Centro Hispano, Inc), and 8 community nonprofit organizations (Marian Clinic; Samaritan Health Center; Healing with CAARE, Inc; Lyon Park Clinic; Walltown Neighborhood Clinic; Diabetes Sisters; Structure House, LLC; Union Baptist Church Health and Wellness Ministry). To keep this list of resources up to date, the community organization Partnership for a Healthy Durham has been recruited to maintain the landscape spreadsheet.

These resources are some of the entities that were mapped via GIS coordinates. In addition, GIS was used to create preliminary maps that identified the locations of nutrition resources such as convenience stores, fast food establishments, restaurants, and grocery stores, and physical activity resources such as parks, youth services, and

gyms. These maps show that resources are not evenly distributed throughout Durham. For example, in northeast central Durham, the community represented in Figure 1, there is only 1 supermarket; however, there are 34 fast-food chain restaurants and 84 convenience stores. Also, the geospatial map shows that northeast central Durham has few parks and no trails (Figure 2). On a map showing the location of resources, shading was used to indicate whether a high or low percentage of the population in a given area has a body mass index (BMI) of 30 or greater, indicating that they are obese (Figure 3). The geospatial maps demonstrate that areas in which many residents have a high BMI, or belong to a minority group, or have low socioeconomic status may overlap (as is the case in northeast central Durham, for example), and that these areas have more convenience stores than grocery stores, more fast-food restaurants than other types of restaurants, and fewer parks and youth facilities, including gyms.

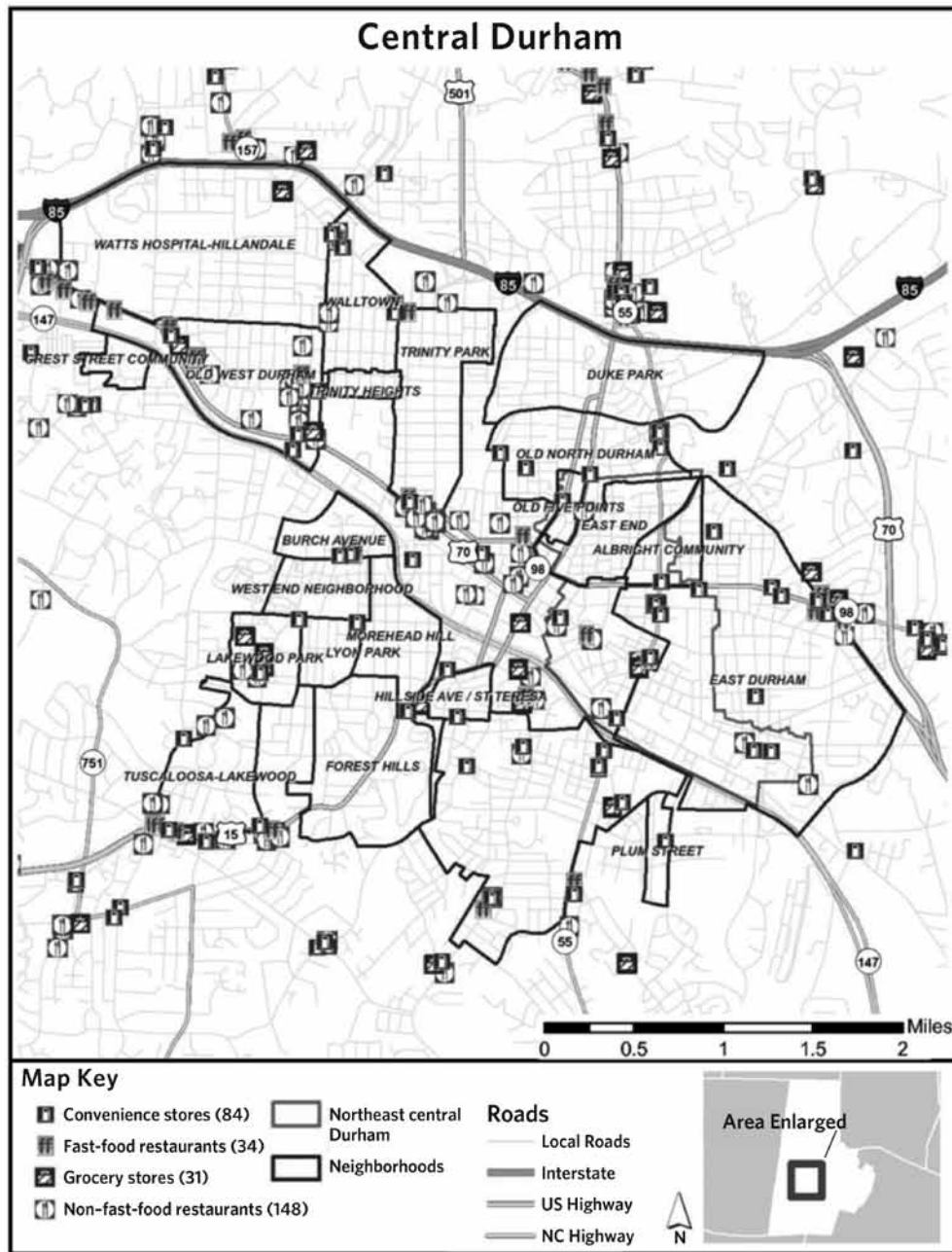
This information influenced 2 decisions made by the AHL team in formulating its final report and implementation plan to DHI. The first was our decision to concentrate efforts in those areas in which there are gaps in services as evidenced by the resource guide and GIS maps. And the second was to use our social ecological model approach to address obesity in areas where many partner organizations already exist and to focus on a group for which it is easy to rally support—young children. The planned strategy was to establish an intervention at 1 elementary school in a community and then expand to other schools and eventually the rest of the community. Schools can be an accessible and unthreatening location for meetings that include students, their immediate family members, relatives in their extended family, and even unaffiliated members of the community. Furthermore, if healthy changes are first made at schools by the students and staff, those changes could then spread to the families and extended families of the students and eventually to the entire community.

Focus groups. The focus groups reported that community members ranked obesity highly among problems deserving more community education, services, and policy change; that finances, bad habits, stress, inactivity, temptation, and lack of motivation are barriers to weight management; and that social support and improvements in appearance, energy, and self-esteem provide motivation to manage one's weight.

Discussion

Using a community-engagement approach, the AHL team successfully assembled a large partnership bringing community and academic institutions together to address a particular persistent and prevalent health problem in the local population. This type of approach has the potential to benefit community members, health care professionals, and researchers alike [24]. Both innovative and inclusive, it emphasizes the importance of building trust with community

FIGURE 1.
Places Where Food Is Sold in Central Durham

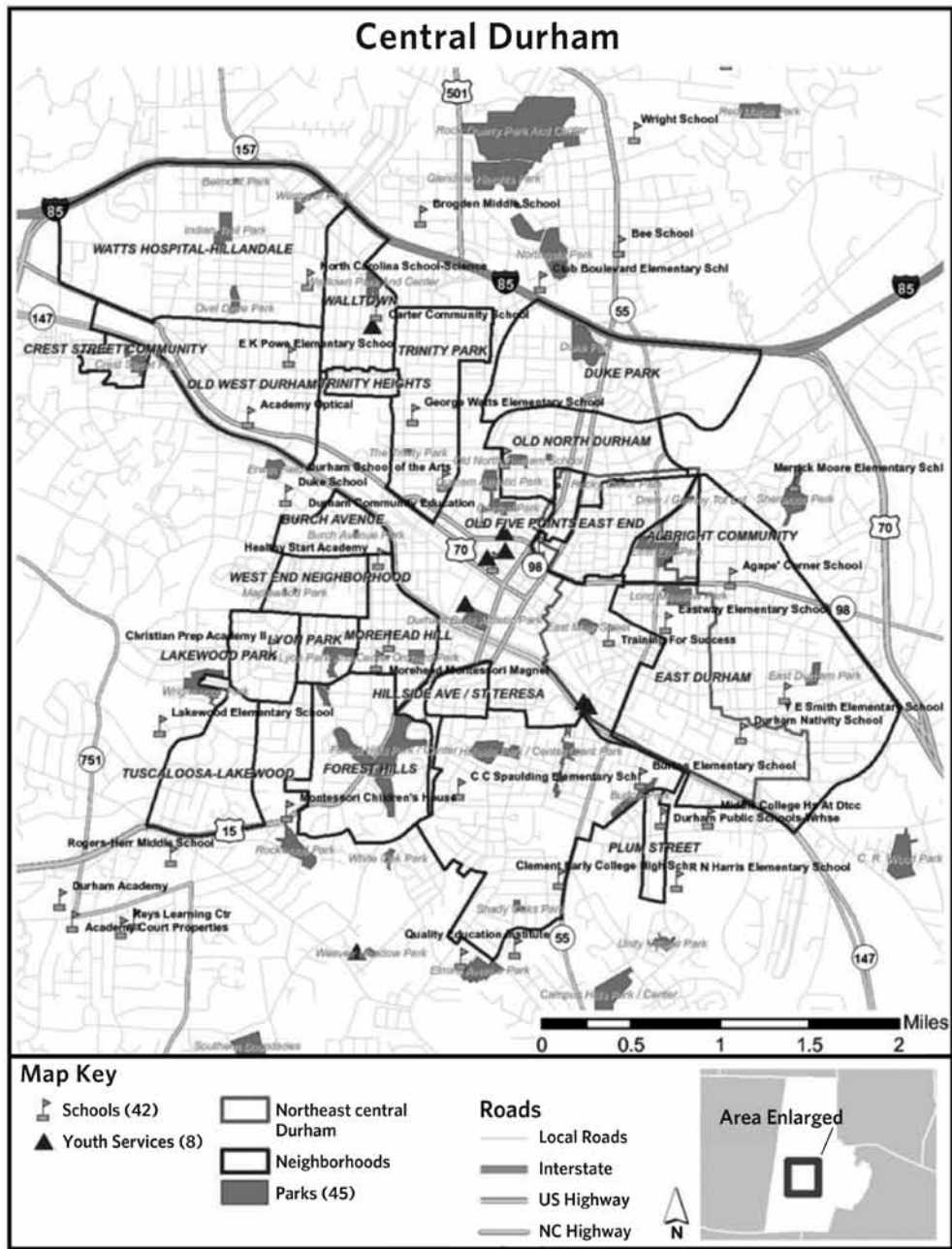


members, finding shared interests, and building on existing strengths while addressing gaps and barriers [25]. Building trust within the community is a key component of success in conducting community participatory research, especially in a community such as Durham, which may be overexposed to research because of its proximity to large academic institutions. The AHL team focused on building trust in a number of ways such as by conducting formal and informal meetings with community members and holding these meetings in locations within the target community; by ensuring that

community leaders had prominent roles on the team; and by ensuring that community leaders' contributions to the team were visible to the community. Further, during the process, we emphasized that we were not simply collecting data—our main focus was improving the community.

The partnership was assembled based on a common interest: decreasing obesity in Durham. The team built on existing strengths by involving existing structures and organizations, and resources already available in the area. By taking a community-based participatory approach, the AHL

FIGURE 2.
Physical Activity Resources in Central Durham



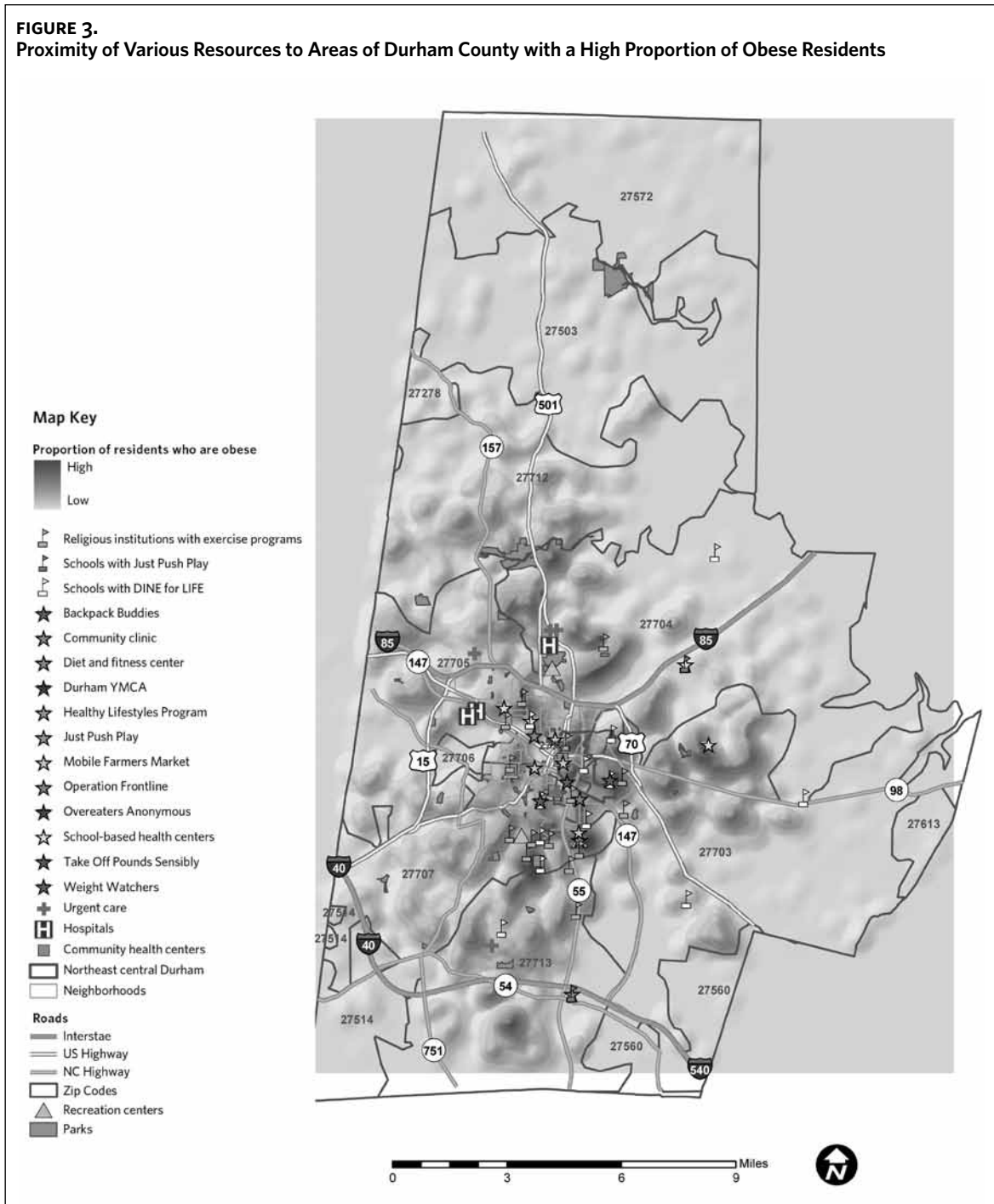
Note: Youth services include gymnasiums and other services.

team was able to obtain valuable information regarding the community's perception of the obesity problem. Without such input, professionals and researchers can lose sight of how difficult it is for underprivileged individuals to follow basic weight-management recommendations, such as eating more fresh fruits and vegetables. They face such barriers as a lack of grocery stores in proximity to residential areas, a lack of transportation that would allow shopping at grocery stores outside the neighborhood, and the high cost of

healthy food. These barriers must be overcome. It will not suffice just to disseminate messages.

The GIS findings of the study support this lack of grocery stores. Using GIS, the team was able to identify areas of Durham in which a greater percentage of the population had a high BMI and lower socioeconomic status. Furthermore, they found that these areas had more convenience stores, fewer grocery stores, more fast-food restaurants, fewer restaurants of other types, and fewer parks and gyms than

FIGURE 3.
Proximity of Various Resources to Areas of Durham County with a High Proportion of Obese Residents



did other areas. A wealth of research has shown that it is an unfortunately common phenomenon for poorer and ethnically diverse neighborhoods to have fewer grocery stores with healthy food choices, more convenience stores, and a greater density of fast-food restaurants [26].

Despite our success in building a robust community partnership, we faced several challenges throughout the process. During the initial creation of the AHL team, which arose from the merger of 3 separate groups that focused on different aspects of the problem of obesity, we encountered

issues such as difficulty maintaining the interest of some of our community and academic members. We lost partners for several reasons, including lack of time, inadequate funding, and disagreement among team members over the project's mission and leadership. This shows that for this type of partnership to succeed, a great deal of time, clarity, and commitment is needed from the team members. Furthermore, it is important for those working in community engagement programs to recognize that health care professionals may be perceived as having more power than community

members, and that this power differential can impede community-based research [27]. Working toward ameliorating this differential is critical in the development of a successful partnership. One way to build trust and collaboration among diverse partnership members is to develop a memorandum of understanding in which the goals, expectations, and responsibilities of each team member are described and acknowledged.

Future directions

The team has pilot-tested an intervention at an elementary school in a low-income neighborhood in Durham. Individual initiatives have targeted increasing the consumption of fruits and vegetables, delivering nutrition education to both students and their families, providing cooking classes and exercise programs (especially walking groups), and referring those who are overweight to affordable professional intervention programs. AHL also aims to eventually promote and encourage policy changes to help achieve a healthier community.

In summary, AHL was able to assemble a large community partnership in Durham that may allow the members of the community to work towards a healthier city. Our experience can inform the development of partnerships in similar communities facing similar challenges. **NCMJ**

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Bright Futures for Well-Child Care

Introduction

Advice on how to raise children started with Spock. (That's the iconic Dr. Benjamin Spock, not the iconic Vulcan.) Dr. Spock wrote *Baby and Child Care* over 60 years ago, and it became the bible—and, apocryphally, it is said to have been outsold only by the Bible—for mothers and fathers of the Greatest Generation, as they raised their Boomers. Dr. Spock told parents that they were so smart that they already knew how to raise their children; he then wrote over 1,000 pages telling parents what they did not already know. T. Berry Brazelton and his work, *Touchpoints*, were compared to and arguably supplanted Spock and his work, as the guidance for Baby Boomers parenting Generation X'ers. Brazelton told parents that they were keen observers of their children's growth and development, and then wrote nearly 500 pages telling them what they were seeing and what it meant.

The American Academy of Pediatrics' (AAP) Bright Futures guidelines, over 20 years in the making, blends the anticipatory guidance provided by Spock and Brazelton with evidence-based guidelines for examination, testing, screening, and immunization of babies, infants, children, and teens. Bright Futures is more than a reference; it is also a toolkit, providing tangible materials to help providers, children, parents, and families. Bright Futures is the new icon, shaped by evidence more than opinion and reified as the standard of care under provisions of the Affordable Care Act. Bright Futures is a triumph of public policy made practical.

The AAP nurtured the slow growth of Bright Futures from concept to blueprint. North Carolina providers contributed national leadership for the project, including input from 2 of the authors in this issue of the NCMJ, Jane Foy and Marian Earls. Foy chaired the AAP Task Force on Mental Health, and Earls was a key member of the AAP Committee on Psychosocial Aspects of Child and Family Health. In addition to this leadership, the North Carolina Pediatric Society and Community Care of North Carolina piloted demonstration projects that provided training, guidance, and materials to make evidence-based practice the norm in well-child care, not the exception, across the state.

The genius of Bright Futures lies in the near-invisible connection between evidence-based guidelines and population health. An individual provider, seeing a unique child and parent, applies clinical interventions that can ultimately lead to changes in population health outcomes. Bright Futures simply says: more immunization, less vaccine-preventable disease; earlier recognition of developmental disabilities, earlier intervention for school readiness and success; timely screening for age- and development stage-related issues, more timely referral, intervention, and treatment. Care well for the individual and family, and the community benefits.

Many, perhaps too many, of our emerging indicators of quality care measure how to slow the progression of chronic disease and illness. Instead, Bright Futures aims to detect and prevent disease, and its indicators promote and measure health. Bright Futures engages providers, children, and parents alike, encouraging engagement rather than prescription, and aiming us all in the direction of health.

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

Implementing Bright Futures Guidelines for Well-Child Care in North Carolina

Jane Meschan Foy

The Bright Futures guidelines published by the American Academy of Pediatrics offer a comprehensive agenda for improving the health of people from birth to age 21 years. The guidelines are the culmination of a century of multidisciplinary, multiorganizational efforts in the United States to prevent illness and promote health in children and adolescents, and, in turn, the adults they become. Regulations interpreting the Patient Protection and Affordable Care Act (ACA) specifically state that group health plans must, at a minimum, provide coverage for the preventive services recommended in the Bright Futures guidelines. Thus the ACA will be an impetus for implementation of the guidelines. This issue brief describes the genesis, history, and development of the guidelines. In addition, it briefly touches on each of the commentaries and other articles contained in this issue of the NCMJ dedicated to the implementation of Bright Futures guidelines.

As part of its Bright Futures national health promotion initiative, the American Academy of Pediatrics (AAP) publishes guidelines for the health supervision of infants, children, and adolescents. The most recent edition of the Bright Futures guidelines [1], published in 2008, includes recommendations that are based on rigorous scientific study, as well as recommendations informed by the opinions of experts, including young people affected by chronic illness and their families. The guidelines cover the periodicity and content of routine physical examinations, screening activities, immunizations, and anticipatory guidance in the primary care medical home. The guidelines also address the environment of services and organizational partnerships necessary to support the pediatric medical home and those people the pediatric medical home serves: typical children, children and youth with special health care needs, and their families.

North Carolina has been a state leader in the implementation of Bright Futures guidelines; however, there is much work to be done. The commentaries in this issue of NCMJ highlight a number of the successes North Carolina has experienced in providing preventive services to children and adolescents. They also discuss the challenges that lie ahead.

Bright Futures and the Affordable Care Act

In March 2010, President Obama signed into law the Patient Protection and Affordable Care Act (ACA). Within this law is an extraordinary provision—section 2713—that requires all nongrandfathered health plans to cover—with no cost-sharing by families—all immunizations recommended by the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention (CDC) and “the evidence-informed screenings provided for in the comprehensive guidelines supported by the Health Resources and Services Administration” [2]. This brief provision was subsequently translated into approximately 75 pages of regulations, issued in July of 2010, including language affirming that this provision of the ACA refers to the 3rd edition of Bright Futures: Guidelines for Health Supervision of Infants, Children and Adolescents [1, 3]. The periodicity schedule in the Bright Futures guidelines was actually reprinted in the regulations. Thus the full array of preventive and health promotion services recommended in the guidelines—including periodic physical exams; medical, developmental, and behavioral screenings; and anticipatory guidance—will be a required preventive benefit in new insurance plans beginning January 1, 2014.

Over time, as health plans predating the ACA make changes that eliminate their grandfathered status, more and more plans will be required to provide the Bright Futures benefits. Thus the ACA will effectively remove a major financial barrier to implementation of a comprehensive health promotion and disease prevention strategy for US citizens from birth to age 21 years. A review of the history of pediatric preventive health care places this historic accomplishment in context.

Historical Background

The professions of public health and pediatrics have a long history of supporting the healthy growth and development of children. In the late 19th and early 20th centuries,

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pediatric providers such as Abraham Jacobi and Job Lewis Smith created milk stations and child health dispensaries to meet the basic health and nutritional needs of infants and young children [4]. In an effort to promote healthy child-rearing practices, Jacobi wrote pamphlets about hygiene and breastfeeding [4]. The Children's Bureau within the US Department of Health and Human Services was created by President Taft in 1912 to improve the lives of children and families [5]. During the early 1930s, a publication of the bureau titled *Infant Care* sold more than 8 million copies, reflecting the interest of young families in replacing old wives' tales and suspect child-rearing practices with an authoritative source of guidance on caring for children [6].

The AAP was formed in 1930 [7], and began to compile expertise in well-child care from the clinical experience of its member pediatricians, and as the years went by, from scientific inquiry. The science of epidemiology advanced understanding of the circumstances leading to disease and health, such as poverty, housing, and access to care. As the public health community began identifying populations at risk for certain health threats, pediatricians began screening children at risk for anemia, lead toxicity, and tuberculosis [4].

In 1967 the AAP published *Standards of Child Health Care*, a 132-page document covering the range of pediatric care, with 15 pages devoted to preventive pediatrics [8]. These standards have been updated periodically since 1972, along with a recommended schedule for well-child visits, commonly known as the periodicity schedule [9]. Beginning in 1985, the AAP developed more focused and extensive guidelines specifically for preventive care and health supervision, which are referred to as guidelines for health supervision or guidelines for health maintenance. These were updated periodically through 2002 [9].

The 1980s saw an increase in single parenthood, drug use, domestic and community violence, homelessness, and HIV/AIDS. In the early 1990s, fueled by a sense that it was urgently necessary to mitigate the effects of these factors on young families and children, the leadership of the Bureau of Maternal and Child Health implemented the *Healthy People 2000* public health interventions, setting targets for improvement of health measures over the following decade [4]. Medicaid, in an effort to extend the benefits of well-child supervision to underserved populations, initiated the Early Periodic Screening, Diagnosis, and Treatment (EPSDT) program, which defined the elements of well-child supervision for its beneficiaries [4]. Working together, Medicaid and the Bureau of Maternal and Child Health funded a large-scale review, referred to as "*Bright Futures*." Their aims were to gather information about the interventions and tools available to pediatric health professionals; to expand the role of families and communities in assuring the health of children; and to expand the concept of health maintenance to include health promotion [4].

The initial *Bright Futures* project, headed by physician Morris Green, was housed at the National Center for

Education in Maternal and Child Health at Georgetown University. Its advisory board established 4 multidisciplinary panels and charged them with developing health supervision guidance reflecting the epidemiologically based health risks and family needs of 4 age groups: infancy, preschool, middle childhood, and adolescence. The panels' recommendations were based on the evidence available and on the opinions of an impressive group of experts. Their recommendations were reviewed by more than 1,000 people including representatives from community-based organizations, parent groups, and organizations of physicians, nurses, nutritionists, and dentists. The first edition of the *Bright Futures* guidelines was published in 1994, along with the *Bright Futures Children's Health Charter* [10]. These documents are a call to action, placing responsibility for the health and well-being of children with everyone: children and families, community agencies, health professionals, local and state governments, and the business sector [4].

An implementation phase followed the development of the recommendations. The Bureau of Maternal and Child Health established the *Building Bright Futures* team, chaired by physician Judith Palfrey and enriched by the participation of leaders of family organizations such as *Family Voices* and the *National Parent Network for Children and Youth with Special Health Care Needs*. The team developed and piloted practical tools and prepared and disseminated a series of monographs to assist practitioners with implementation. Curricular materials were developed for pediatric training. The *Building Bright Futures* team and staff participated nationally in many multidisciplinary forums to disseminate *Bright Futures'* ideas and implementation methods [4].

In 2000, responding to the emerging obesity epidemic and a revision of the immunization schedule of the CDC, the *Bright Futures* team carried out a modest revision of the central *Bright Futures* document. In 2002, the Bureau of Maternal and Child Health entered into a cooperative agreement with the AAP to undertake an extensive revision of the *Bright Futures* guidelines. That revision was published in 2008 as the 3rd edition of the guidelines. An ambitious and comprehensive work, it integrates the initiatives of the Bureau of Maternal and Child Health (eg, *Healthy People 2010*), the EPSDT program, the health supervision guidelines and medical home initiatives of the AAP, and the 1994 American Medical Association Guidelines for Adolescent Preventive Services [4, 11].

Processes Used to Develop the Latest *Bright Futures* Guidelines

The depth and breadth of the collaborative processes that undergirded the 3rd edition of the *Bright Futures* guidelines set the stage for its extraordinary influence on public policy. To develop the guidance, the Project Advisory Committee appointed a multidisciplinary panel of 38 experts from the fields of pediatrics, mental health, public health, nutrition, oral health, family medicine, nursing, and education. Along

with family representatives, these experts developed recommendations for the content of 33 preventive visits during childhood and adolescence. The panelists relied on the evidence available, and when evidence was not available or was inconclusive, they relied on the expertise and clinical experience of panel members. Throughout the process, the committee consulted with individuals and organizations that have expertise and experience in a wide range of topic areas [1].

The committee appointed an evidence panel comprised of experts in finding and evaluating evidence from clinical studies. This panel conducted literature searches on key questions, drawing from such sources as the Cochrane Collaboration and the US Preventive Services Task Force [1].

More than 1,000 health care and public health professionals, educators, parents, and child health advocates reviewed the document and provided comments. The Project Advisory Committee incorporated the feedback and ultimately published the following recommendations for clinical practice [1]. The full set of recommendations (ie, guidelines) is available through the American Academy of Pediatrics' Bright Futures Web site [12].

Clinical Recommendations From Bright Futures, 3rd edition

Physical examination. There was insufficient evidence to support many of the components of physical examination as effective screening procedures, but US Preventive Services Task Force recommendations were presented when available. The Project Advisory Committee's decision to recommend a physical examination at every visit reflected the importance to parents of receiving reassurance about their child's physical health. The guidelines also recommend that clinicians monitor growth parameters (length or height, weight, head circumference, weight-for-length in infants, and body mass index [BMI] beginning at age 24 months).

Screenings. The guidelines recommend universal screening for newborn metabolic disorders, hemoglobinopathy, delays in development, autism, psychosocial strengths and difficulties, eye abnormalities (amblyopia, strabismus, defects in visual acuity), hearing deficits, anemia, oral health problems, blood pressure measurement at age 3 years and up, and lead exposure at certain ages. Under specific circumstances, screening is recommended for tuberculosis, dyslipidemia, chlamydia, gonorrhea, HIV, syphilis, cervical dysplasia, alcohol or drug use, and elevated blood pressure in children younger than 3 years of age.

Immunizations. The Bright Futures guidelines recommend that health care professionals follow the recommendations published each January by the CDC's Advisory Committee on Immunization Practices.

Anticipatory guidance. The evidence experts found that many anticipatory guidance topics have not been studied in a randomized controlled trial. They used morbidity and mortality data for each age group and scientific studies related

to risk factors and prevention when available. From a broad set of topics in healthy development, nutrition, physical activity, safety, oral health, mental health, family support, and injury and disease prevention, they selected 5 anticipatory guidance topics of particular importance to each of the 33 visits. For example, the 5 priority topics for the first visit in infancy are family readiness, infant behaviors, feeding, safety, and routine baby care. The 5 priority topics for an adolescent visit are physical growth and development, social and academic competence, emotional well-being, risk reduction, and violence and injury prevention. The guidance emphasizes that parental (and youth) concerns should predominate in prioritizing anticipatory guidance for a particular visit.

Bright Futures Guidelines and Community Child Health

In recognition of the fact that good health requires more than clinical encounters, the Bright Futures guidelines provide tools and resources to enhance the community-based system of care that surrounds the child and family. As stated in the Bright Futures 3rd edition, community-based care "recognizes the critical role of the environment in influencing child health and in promoting family well-being" [1]. The comprehensive care needed by each child consists of primary care provided in a medical home and an array of additional services including substance abuse treatment, language assistance, respite care, recreation opportunities, services for children and youth with special health care needs, and services relating to housing, employment, education, and mental health. The guidelines mention state Title V (Maternal and Child Health) agencies, early care and education providers, schools, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and parent support programs such as Family Voices as key partners in improving the child health system of care. It is critical for primary care providers to link parents and children to these and other community organizations in order to successfully implement the guidelines.

Implementation of the Bright Futures Guidelines

To establish feasibility and to support implementation of the guidelines, the Bright Futures team has developed a toolkit for practitioners and parents [12], which includes previsit questionnaires, documentation templates, and anticipatory guidance handouts. The team has also identified and tested national practice-based quality improvement (QI) strategies. Results have not yet been published, but early reports indicate that these strategies appear to be promising ways of improving care [13].

The articles in this issue of the NCMJ cover the implementation of select Bright Futures guidelines. Some commentaries relay North Carolina-specific information, while others delve more deeply into a particular aspect of the guidelines.

The North Carolina Community Care Network has been an invaluable asset: This network of Medicaid providers assures a medical home for each Medicaid beneficiary and offers a framework for practice improvements such as adherence to the Bright Futures guidelines. That said, we know that some infants, many children, and even more adolescents do not receive all of the recommended care, all of the time, in effective ways.

North Carolina Medicaid's Health Check program covers the preventive services outlined in the guidelines and has been a national leader in implementing bundled rates for financing the menu of services. In his sidebar, Skwara [14] reports on the participation rates of North Carolina's eligible children and the strategic partnerships formed to increase participation in underserved and at-risk populations.

Several commentaries in this issue of the NCMJ highlight opportunities for improving developmental and behavioral outcomes for North Carolina's children. Earls [15] underscores the emphasis of the Bright Futures guidelines in identifying child and family strengths, as well as the child's or adolescent's developmental delays, learning and behavior problems, and social-emotional needs. Also in her commentary, she points to the "primary care advantage" in providing timely anticipatory guidance, identifying and addressing emerging psychosocial problems, facilitating referrals for further assessment and intervention, and managing the child's care with other specialists. In addition, Earls describes several of North Carolina's effective quality-improvement initiatives to facilitate implementation of screening for developmental and behavioral problems. Shapiro [16] summarizes recent advances in brief parenting interventions that can be feasibly delivered in primary health care settings in response to parental concerns or observed problems. Miller [17] comments on the benefits of integrating a social worker into the pediatric medical home to promote mental health across the pediatric age span and to provide, coordinate, and monitor mental health services.

Overweight and obesity remain a problem for youth in North Carolina and the nation. It is imperative that providers incorporate screening and appropriate interventions for youth who face these issues. Perrin and Skinner [18] voice concern about the high rates of overweight and obesity among North Carolina children and the low rates of healthy behaviors such as physical activity and sound dietary choices. The authors make a strong case that primary care providers can improve outcomes for their patients by measuring BMI (as recommended in the guidelines), communicating the results to parents, implementing interventions to prevent obesity, and using effective methods to change behaviors of children with abnormal BMIs.

Immunization is an important preventive strategy to improve population health by reducing communicable disease, and vaccinations have been proven to save lives. Despite this, however, not everyone who should get vaccinated does. In their commentary, Walter and Chung [19]

highlight the rationale for immunizing preteens with recently developed vaccines and strategies for improving North Carolina's preteen vaccination rates. Shapley-Quinn [20] describes in her sidebar the management of a pertussis outbreak in an Alamance County elementary school.

Children face other concerns such as lead exposure. While this public health problem is less of an issue—in terms of prevalence—than it has been historically, it is entirely preventable. Crotty and Eldridge [21] highlight recommendations for lead screening and discuss new thresholds for counseling, abatement services, and chelation therapy.

Just as with adults, certain behaviors such as substance use and sexual behavior also impinge on the health of youth in North Carolina. These behaviors can lead to serious short and long-term consequences. Erausquin, Essick, and Hildebrand [22] report on the prevalence of some sexual and substance use behaviors as measured by the 2011 North Carolina Youth Risk Behavior Survey. They note that results of the survey confirm the need to screen sexually active adolescents for sexually transmitted infections (STIs) and the need to screen North Carolina's school-aged populations for substance use. In her commentary, Matkins [23] focuses on sexually transmitted infections (STIs), reviewing their epidemiology in North Carolina adolescents and summarizing current recommendations for STI screening, testing, and treatment.

Several articles discuss community-level interventions to complement the clinical activities recommended in the Bright Futures guidelines. Mims and Lisenbee [24] highlight North Carolina's low breastfeeding rates and discuss strategies for improving them through a hospital-based initiative. Lazorick, Crawford, and Hardison [25] describe an effective interdisciplinary, school-based obesity treatment program that combines a nutrition, physical activity, and technology curriculum with a Web-based resource system; early results indicate that the program brings about substantial and sustained improvements in healthy weight and improvements in fitness. Goodwin [26] describes the efforts of Safe Kids North Carolina to enlist the Governor's Highway Safety Program, fire stations, the US Drug Enforcement Administration, the State Bureau of Investigation, North Carolina Riverkeepers, and media outlets in preventing injuries to North Carolina's children.

Finally, North [27] offers practical guidance on delivering recommended preventive services in a child- and family-centered way that recognizes both the opportunities and limitations of the clinical encounter.

A Cautionary Note

A number of issues deserve the attention of child advocates as section 2713 of the ACA is implemented, in North Carolina and elsewhere. First, children's access to preventive services will be harmed if health care providers are required to absorb the elimination of cost-sharing for families. Advocates will need to work assertively to prevent

insurers from passing the cost of copayments on to health care providers. Second, the impact of pediatric preventive services coverage on insurance premiums should be minimal, and such concerns should not be used to delay or deny these benefits for children. Third, clarification will be needed about which governmental entities will be responsible for enforcing the various parts of section 2713. And finally, assistance and coordination will be necessary to incorporate Bright Futures guidelines into electronic medical records.

In North Carolina there is an additional concern. The North Carolina General Assembly has recently discontinued the state's 16-year-old universal vaccine program. This state-federal-private partnership, built on the federally supported Vaccine for Children program for publicly insured children, made possible the administration of childhood vaccines in the medical home to children of any insurance status, and it significantly improved children's vaccination rates in North Carolina [28]. The universal vaccine program also strengthened pediatric medical homes as one-stop locations for preventive services. Discontinuation of the universal vaccine program means that pediatric providers must absorb the expense of purchasing and managing a separate supply of vaccines for privately insured patients, while also meeting all of the storage, monitoring, and documentation requirements of the Vaccine for Children program. This burden is causing some pediatric practices to discontinue part or all of their immunization services. Between 2009 and 2011, as funding for the universal vaccine program decreased, North Carolina's immunization ranking among states dropped from 4th to 24th, according to the National Immunization Survey [29]. Furthermore, without immunizations to incentivize families' participation in other preventive services of the medical home, there is a real risk that the full array of benefits called for by the Bright Futures guidelines will be underused.

On January 1, 2014, the ACA will begin requiring new insurance plans to cover the immunizations recommended by the CDC's Advisory Committee on Immunization Practices, without copayments. It will be important to advocate for coverage of vaccines by all insurance plans so that immunizations (as well as other recommended preventive services) will be available in pediatric medical homes.

Final Thoughts

The agenda for the current Bright Futures guidelines is bold and comprehensive. Critics have argued that the guidelines are overly ambitious and that recommendations should have been limited strictly to those for which there is the highest level of evidence. To its credit, the Bright Futures team has put into place a lively research agenda to advance the evidence base. To the credit of those authoring the regulations that interpreted section 2713 of the ACA, the stakes were considered too high to wait for definitive findings of this research.

The height of these stakes was affirmed in papers recently published in the journal *Pediatrics* [30, 31]. Drawing

from the diverse fields of neuroscience, molecular biology, genomics, developmental psychology, epidemiology, sociology, and economics, Shonkoff and colleagues [30] describe how early childhood experiences and environmental influences affect brain architecture. They report that toxic stress—caused by chronic adverse influences such as recurrent physical and emotional abuse, poverty, absence of both biological parents, or alcoholism, drug abuse, and mental illness in household family members—is likely to cause impairments in learning, behavior, and both physical and mental health across the life span. The authors state that “many adult diseases should be viewed as developmental disorders that begin early in life,” and they note that “persistent health disparities associated with poverty, discrimination, or maltreatment could be reduced by the alleviation of toxic stress in childhood” [30]. These transformational findings of brain science affirm the importance of offering support and guidance to families of young children about the most effective ways to nurture and care for their children; identifying, as early as possible, problems that emerge in the children themselves and in their physical and emotional environment; and intervening with appropriate health and human services when problems are identified.

For all of these reasons, implementation of section 2713 of the ACA offers North Carolina an extraordinary opportunity to improve the health of its young people and the adults they will become. We should position ourselves to take full advantage of this opportunity. **NCMJ**

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The Importance of Screening for Healthy Weight and Recommending Healthy Lifestyles in Pediatric Patients

Eliana M. Perrin, Asheley Cockrell Skinner

Regular pediatric care should focus on early obesity prevention and healthy lifestyles and should include obesity screening with sensitive and culturally appropriate communication, beginning at age 2 years. North Carolina is a leader with its Eat Smart, Move More campaign and tools that can help pediatric care providers achieve greater self-efficacy.

The National Health and Nutrition Examination Survey (NHANES) for 2009-2010 found that 15% of children and adolescents in the United States aged 2-19 years were overweight, and an additional 17% were obese. Rates were significantly higher among nonwhite children: 39% of black and Hispanic children were overweight or obese, compared with 28% of white children [1].

North Carolina lacks a surveillance system that collects data on measured overweight and obesity among a sample of people representative of the state's population as a whole, so it is difficult to compare our state with the rest of the nation. However, we do know that among low-income children in North Carolina, the rates of overweight (16.4%) and obesity (17.5%) are higher than among children in the nation as a whole, and that in some counties in North Carolina the proportion of low-income children who are either overweight or obese approaches or even exceeds 50% [2]. Results of the North Carolina Child Health Assessment and Monitoring Program (CHAMP) survey show that a disparity between white children and minority children also exists in the state: In 2011, 25% of white children aged 10-17 years were overweight or obese, compared with 39% of nonwhite children [3].

Why It Is Important to Address Childhood Overweight

Childhood obesity is stigmatized, and it increases the risk of having many health problems including type 2 diabetes, depression, metabolic syndrome, hyperlipidemia, hepatic steatosis (fatty liver), hypertension, sleep apnea, orthopedic problems, and adult obesity [4]. Fortunately, childhood also represents a window of opportunity during which overcoming obesity eliminates those increased risks. Although those who were obese in childhood and remain obese in adulthood have a 5.4 times greater risk of type 2 diabetes than do those

who have never been obese, those who reverse their obesity by adulthood have a risk level similar to that of those who have never been obese [5].

Excess body mass index (BMI)-years, which measures the extent and duration of excess weight, are comparable to pack-years in smoking. The higher the level of excess BMI-years, the greater the self-reported incidence of diabetes [6]. It is important for clinicians to know that younger children are more likely than older children to change their behavior if advised to do so by a clinician [7]. A recent study of intense obesity interventions in young children [8] showed that such interventions improved weight. All of these studies suggest the importance of addressing obesity early.

Weight Screening

Pediatricians are on the front lines of obesity prevention. An expert committee composed of representatives from 15 professional organizations has called for pediatricians to assess obesity risk and to conduct BMI screening annually, providing obesity prevention messages for children who are not overweight and suggesting healthy lifestyle interventions for those who are [9]. These recommendations have been echoed by First Lady Michelle Obama's "Let's Move!" campaign. Even the usually conservative US Preventive Services Task Force recommended in 2010 (reinforcing their 2005 recommendation) that all children aged 6-18 years be screened for obesity [10].

Recommendations follow the standard definitions of what constitutes overweight and obesity in children [9]—definitions that are based on age- and sex-specific percentiles for BMI. A child whose BMI is below the 5th percentile for children of the same age and sex is considered to be underweight; one whose BMI is at or above the 5th percentile and below the 85th percentile is considered to be a healthy weight; one whose BMI is at or above the 85th

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School-Based Obesity Treatment: The MATCH Program

Suzanne Lazorick, Yancey Crawford, George T. Hardison

Motivating Adolescents with Technology to Choose Health (MATCH) is a curriculum for middle school students developed by one of the authors (G.T.H.) when he was a science teacher in Martin County, North Carolina, where obesity rates are extremely high. The program is based on insights gained from studies of school-based interventions [1, 2]. It adopts a behavioral approach widely applied in health promotion, one that is based upon the social cognitive theory of self-regulation [3]. MATCH combines what is known about how children learn best in a classroom setting with strategies for promoting behavior change. The curriculum has 4 essential elements: It provides students with information about the unhealthy effects of overweight, teaches them specific self-regulation health skills, gives them individualized tasks that require them to apply those skills, and reinforces the skills with age-appropriate external motivational strategies.

MATCH takes an interdisciplinary approach to student wellness: The curriculum includes lessons on nutrition, physical activity, and technology, and the program provides teachers with a Web-based resource system that allows them to meet educational and wellness objectives simultaneously. The lessons, which are delivered over a 16-week intervention period, are aligned with National Common Core Curriculum Standards. They are designed to parallel the North Carolina Standard Course of Study for seventh grade and are taught embedded within existing curriculum rather than requiring additional instructional time.

When MATCH is implemented in a school, all seventh-grade teachers are trained to deliver MATCH lessons within their subject area, and one teacher serves as the coordinator. All materials are available for download from a secure Web site, and students complete lessons in a student-friendly workbook. Students learn about the body system by system (eg, cardiovascular system, endocrine system) as a structure for the sequenced series of inter-

disciplinary lessons and receive intermittent rewards for completion of MATCH-related activities. All students receive the same intervention regardless of weight category; the only time weight status is noted is during the student's self-categorization, which is completed privately.

Because the program lasts 16 weeks and is integrated across subjects, students are able to acquire the knowledge and skills they need to begin internalizing positive health behaviors. Lessons are taught in health, science, math, language arts, and technology classes, and cover such topics as energy balance, peer accountability contracts, body mass index (BMI) calculation, and persuasive writing. At the beginning and end of the program, height, weight, fitness level, and health behaviors are measured. All results are entered into the Web-based system by teachers, and key data are shared with the students, who use this information to establish health-related goals and to develop action plans for weight management.

The program's objectives are aligned with those of the Coordinated School Health program of the Centers for Disease Control and Prevention, and it follows recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity outlined in the report of an expert committee consisting of representatives from 15 professional organizations [4]. First offered in 2006, the MATCH program is now being implemented in 15 public schools in eastern North Carolina during the 2012-2013 school year. More information is available at www.MATCHwellness.org.

MATCH is now a community-academic partnership led by 2 of the authors—G.T.H. and S.L.; the latter is an obesity-focused preventive medicine pediatrician at East Carolina University (ECU). In 2008, the North Carolina State Board of Education selected MATCH for pilot expansion as a promising school-based obesity intervention. Through funding from the Blue Cross and Blue Shield of North Carolina Foundation and the Kate B. Reynolds

percentile and below the 95th percentile is considered to be overweight; and one whose BMI is at or above the 95th percentile is considered to be obese. Because BMI is based on height and weight, which are regularly measured during primary care visits, obesity screening can occur at the same intervals as standard well-child care beginning at age 2 years. For children younger than 2 years, the ratio of weight to length can be used rather than the ratio of weight to height, and those whose ratio puts them at or above the 95th percentile for children of the same age and sex are considered to be overweight.

Pediatric primary care providers who screen for and document overweight and obesity are more likely to counsel patients and their parents about diet and exercise [11]

and to screen and refer for comorbidities of overweight [12]. Use of toolkits encouraging screening and communication is associated with change in parental perception of overweight and positive dietary and physical activity changes [13]. Parents with accurate perception of weight status are more likely to be ready to make weight-related behavioral changes [14]. Lack of communication with families about weight status of overweight children is the strongest predictor of parental misclassification of a child, and pediatricians need to remember that their opinions are highly valued by patients [15].

The majority of parents with overweight children do not recognize that their overweight child weighs too much [16], and even fewer have ever been told by a clinician that their

Charitable Trust, G.T.H. now directs MATCH as an ECU employee. The program has maintained its long-standing relationships with several school districts that were part of the original expansion, including those in Martin, Washington, and Pitt counties. Districts in Pamlico, Hyde, Halifax, Edgecombe, and Chowan counties are also now participating. Since 2006, approximately 2,500 students have completed MATCH.

Using data from 2006 and 2007, we conducted a single-site study (using pre-post design) during the first 2 years of MATCH in 2 cohorts. Both cohorts received the same intervention and represented 2 sequential school years of 7th graders. One year after completion of MATCH, the proportion of students in cohort 1 (n = 92) with a BMI indicating a healthy weight increased from 45% to 53%, and the proportion of students in cohort 2 (n = 106) with a BMI indicating a healthy weight increased from 53% to 59% [5]. In no other study of a school-based intervention of this sort have such substantial and sustained improvements been found. In 2011-2012, with different teachers delivering the intervention in the same school and in 6 additional schools, the number of lessons taught varied widely, from 14 to 50. Decreases in BMI Z-scores similar to those seen in the original pilot program were achieved in 2 of the 7 schools. In addition, in nearly all schools there was improvement in fitness as measured by the validated Progressive Aerobic Capacity Endurance Run (PACER) test, which is a component of Fitnessgram, a standardized fitness test [6]. Variations in the number of lessons taught and in outcome measures are notable. The focus in further expansion will be to improve program fidelity and attain more consistent results at all participating schools, using a more rigorous study design. Evaluation is ongoing in the 15 schools currently participating.

Although nutrition and physical activity policy and environmental changes are needed to prevent obesity, an entire generation lives in an obesogenic environment now, characterized by cultural trends that decrease opportunities for physical activity and increase access to energy dense foods. MATCH offers an intense, theory-based, individual-focused, school-based model to counteract this environment while simultaneously meeting educational objectives. Because MATCH has been intentionally de-

veloped for widespread expansion, it offers a promising opportunity for merging public health missions with educational ones. **NCMJ**

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child is overweight [17]. Many pediatricians are not screening adequately for early weight trends of concern. Or if they do screen, they are not conveying that information to parents and making appropriate follow-up recommendations. Parents want to know their child's weight status, and they find the term "unhealthy weight" quite motivating [18]. Although only 54% of parents believe that it is very important to seek medical attention for overweight children, 94% say that they would seek care for conditions that limit life expectancy [19]. This suggests the need to frame obesity as a health problem. Obesity screening is being attempted in many places including schools and communities, but primary care physicians have been recognized as important communicators of weight-related messages.

Communicating the Results of BMI Screening to Parents

Despite clear definitions for overweight and obesity across all ages, ensuring that parents understand the results of BMI screening remains a challenge. One reason for this is that children, particularly those aged 3-8 years, have a naturally low percentage of body fat, so a child at the 95th percentile for BMI will often appear to parents to be at a healthy weight or even "skinny." Indeed, these children do not appear overweight by adult standards, so one cannot trust visual impressions. These children are at higher risk for their growth trajectories to continue to be overweight throughout childhood and into adulthood [20].

One approach to BMI communication that has been studied is the use of color-coded BMI charts [21]. These charts use a stoplight motif of increasing risk zones, with green representing healthy weight, yellow representing overweight, and red representing obesity. Using these charts in place of standard black-and-white charts significantly improves understanding of BMI screening results, particularly for parents with a low level of literacy or numeracy.

Primary Care Efforts to Prevent and Treat Obesity

Perhaps the biggest challenge in primary care BMI screening is deciding what action to take when a child is found to be overweight or obese. Moderate- and high-intensity interventions are the most promising, but are costly and are often difficult for families and health systems to carry out. The most effective treatment interventions include multiple components of lifestyle change, focusing on increasing physical activity and improving diet [10]. Our own research showed that environmental considerations such as the availability of fast food and soft drinks are top concerns for North Carolina pediatricians. However, the barriers most related to low self-efficacy (belief in their own capabilities) among providers were practice-based and include lack of reimbursement for non-MD staff, lack of an on-site dietitian, and lack of materials and resources for patient education [22]. Toolkits and brief training can improve pediatrician self-efficacy and lead to healthier patient behaviors [13].

Growing evidence points to prevention as critical in addressing obesity, particularly on a large scale. Interventions to prevent obesity, compared with those aimed at treating obesity that already exist, have demonstrated better success, particularly among children aged 6-12 years [23]. The importance of preventing obesity in the first year of life is being increasingly emphasized. Pediatricians' frequent visits with parents during this important period allow them to promote breastfeeding and to encourage early playtime. They can also teach parents to respect satiety, to avoid offering children juice or cereal in a bottle, and to avoid offering children fast food.

Encouraging healthy lifestyle behaviors is the most critical component of helping children to maintain a healthy weight and of promoting overall health for children. Promotion of healthy weight and healthy lifestyles can occur in many venues, but primary care physicians have the opportunity to play a unique role in children's weight-related health. Although the factors that influence obesity in children are many, ranging from genetics to the environment, the mainstays of obesity prevention and treatment are healthy behaviors—primarily physical activity and healthy dietary behaviors.

Recommendations are that children engage in at least 60 minutes of physical activity every day. In North Carolina, only 30% of parents report that their children aged 6-17 years are active for 60 minutes 6-7 days per week [3]. The proportion of children participating in daily physical activity declines throughout childhood and into adolescence. Although the

families and children being surveyed may not be representative of the population of the state as a whole, North Carolina children appear to be somewhat less likely to meet physical activity recommendations than are children in the rest of the nation. In 2011, 50% of high school students across the United States reported engaging in 60 minutes of physical activity at least 5 times per week, and 30% reported doing so every day [24]. In contrast, more than 32% of US high school students reported watching 3 or more hours of television each day, whereas only 26% of North Carolina children reported watching more than 2 hours of television each day [3,24].

Pediatricians can also use Eat Smart, Move More North Carolina prescription forms that contain "5-3-2-1-Almost None" prevention messages: Eat 5 or more servings of fruits and vegetables daily; eat 3 structured meals daily, limiting fast food and eating more meals prepared at home; limit television and video games to less than 2 hours per day; engage in 1 hour or more of moderate to vigorous physical activity daily; and limit sugar-sweetened drinks to "almost none." These are the prevention messages that experts think are most important for the primary care setting. The prescription forms are available at <http://www.eatsmartmovemorenc.com/PediatricObesityTools/Texts/PrescripPadColor.pdf>.

Health Consequences of Obesity

The reason we are concerned about BMI starting at age 2 years is that high BMI predicts adult obesity and has immediate health effects as well. Health consequences of obesity may emerge early. For example, inflammation, a measure of cardiovascular risk, increases in very obese children as young as age 3 [25]. Additionally, other health risks associated with obesity in adults also appear in children, including high cholesterol levels, high blood pressure, and type 2 diabetes [4]. Primary care pediatricians should discuss health risks as additional motivation for families who are attempting to make behavior changes.

Conclusion

The North Carolina rates for unhealthy behaviors and overweight and obesity among children are calls to action for those of us on the front lines of this epidemic. We must be sure to have conversations with parents to teach them healthy eating and physical activity patterns for their children. We must let them know through sensitive, health-promoting communication when we see early weight trajectories that cause concern or unhealthy dietary or physical activity patterns, before patterns become entrenched or contribute to health problems. We owe it to our children, our families, and our future. **NCMJ**

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Implications of the New Lead Screening Recommendations in North Carolina

Jennifer E. Crotty, David L. Eldridge

In June of 2012, the Centers for Disease Control and Prevention updated their recommendations regarding the prevention of childhood lead poisoning. This commentary provides an overview of the new recommendations for blood lead screening and follow up.

Healthy People 2010 objectives included a call for the elimination of elevated blood lead levels (BLLs) in children, and this remains an objective of Healthy People 2020 [1]. Although fatal lead encephalopathy is nearly nonexistent today as a result of vigorous public health interventions, many children are still at risk of experiencing adverse cognitive effects caused by exposure to lead [2]. In North Carolina in 2010, 132,014 children underwent blood lead screening at well-child visits at the ages of 12 or 24 months [3]. Of those, 519 children had screening BLLs equal to or greater than 10 $\mu\text{g}/\text{dL}$, which at the time was the threshold at which repeat screening and investigation were required. Of note, 81% of the Medicaid population aged 9-35 months underwent blood lead screening in 2010, a significant increase from 2005, when 56% of that population underwent screening [4]. There is no way to know for certain whether the prevalence of elevated BLLs decreased between 2005 and 2010, because in 2005 nearly half of the Medicaid population was not screened. In all, 162,060 children between the ages of 6 months and 6 years were screened in 2010, with 146 confirmed cases of BLL elevation in which levels were at least 10 $\mu\text{g}/\text{dL}$ but lower than 20 $\mu\text{g}/\text{dL}$, and 24 cases of elevation in which levels were equal to or greater than 20 $\mu\text{g}/\text{dL}$ [3].

Currently 804,000 children—40.6% of the state's pediatric population—are enrolled in North Carolina Medicaid [5]. That number is likely to grow with anticipated changes in health care coverage under the Affordable Care Act, as an increased number of children will have Medicaid and will meet requirements for lead screening. In addition, the Centers for Disease Control and Prevention (CDC) recently changed its recommendations with regard to repeat blood lead screening [6, 7], which is now indicated for children with BLLs equal to or greater than 5 $\mu\text{g}/\text{dL}$. So the number of children for whom repeat blood lead screening is indicated will increase. Practitioners therefore need to be well-versed in the reasoning underlying blood lead screening recom-

mendations and to be aware of the appropriate course of action called for by various test results [8].

CDC Screening Recommendations

Recommendations regarding who should receive blood lead screening have not changed. All Medicaid-enrolled children must undergo BLL screening at 12 and 24 months of age, and Medicaid-enrolled children between 36 and 72 months of age who have never been previously tested must also be tested [9]. All refugee children should be tested within 90 days of arrival in the United States, with repeat testing 3-6 months after placement in a permanent residence, regardless of the initial test results. Neonates or infants born to women with lead exposure during pregnancy or lactation should also receive blood lead screening. It is strongly recommended that all North Carolina children, regardless of their insurance coverage or risk factors, have BLL levels checked at 12 months of age and again at 24 months of age. In addition, the CDC recommends universal lead screening for communities in which 27% or more of the housing stock was built before 1950 [10]. In North Carolina, the proportion of housing that falls into that category is assessed at the county level [3].

Blood for lead screening is often obtained by capillary fingerstick, because that method is efficient and low in cost. However, all fingerstick results with a BLL equal to or greater than 5 $\mu\text{g}/\text{dL}$ require confirmation through repeat testing by venous sampling in order to avoid possible contamination from residual lead ingrained in children's fingers [6, 11]. Decisions about any action to be taken (such as chelation) should be based on venous results.

When considering which children may be at risk, consult the Web site of the Environmental Health Section of the North Carolina Division of Public Health [12]. Their list of all of the North Carolina zip codes in which universal testing is required is reproduced in Table 1, and their list of questions to ask parents can be found in Table 2 [10]. However, keep in mind that recent research [13] indicates that questionnaires

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such as the one in Table 2 do not accurately predict elevated BLLs in all populations. The most accurate route for detection is universal screening.

New Thresholds for Counseling, Abatement Services, and Chelation Therapy

The North Carolina Division of Public Health's new follow-up schedule for children under the age of 6 years

who have BLLs that are equal to or greater than 5 µg/dL is reproduced in Table 3 [7]. This schedule highlights that, regardless of level, all blood lead test results must be reported to parents and documented. It also stresses that all parents must be educated about lead sources, environmental assessment, and prevention of lead exposure. For 1-year-olds with lead levels lower than 5 µg/dL, a repeat BLL should be performed at 2 years of age, or sooner if risk of

TABLE 1.
North Carolina Zip Codes in Which All Children Should Undergo Blood Lead Screening Because the Risk for Lead Exposure There Is High

27011	27405	27810	27871	27954	28137	28365	28463	28581	28752
27013	27406	27812	27872	27956	28139	28367	28464	28585	28753
27014		27813	27873	27957	28144	28368	28466	28586	28755
27016	27504	27814	27874	27960	28150	28369	28469		28756
27024	27508	27816	27875	27962	28159	28371	28470	28604	28757
27028	27510	27818	27876	27964	28160	28372	28471	28611	28761
27030	27521	27819	27877	27965	28169	28373	28472	28615	28762
27042	27530	27820	27878	27967	28170	28376	28478	28616	28771
27046	27534	27821	27882	27970		28377	28479	28621	28772
27047	27536	27822	27883	27973	28208	28379		28622	28777
27052	27542	27823	27884	27974		28382	28501	28623	28779
27053	27544	27824	27885	27979	28301	28383	28504	28624	28781
	27546	27826	27886	27980	28303	28384	28510	28627	28782
27101	27549	27827	27888	27982	28305	28385	28511	28635	28789
27105	27551	27828	27889	27983	28306	28386	28513	28637	28792
27107	27553	27829	27890	27985	28315	28390	28515	28640	
	27555	27830	27891	27986	28318	28393	28516	28642	28801
27202	27557	27831	27892		28323	28394	28518	28644	
27212	27559	27832	27893	28001	28325	28395	28519	28657	28909
27217	27563	27839	27897	28007	28326	28396	28521	28659	
27239	27565	27840		28009	28328	28398	28523	28662	
27242	27568	27841	27909	28018	28330	28399	28525	28663	
27252	27569	27843	27910	28019	28332		28526	28666	
27260	27570	27844	27915	28020	28333	28401	28528	28669	
27262	27573	27845	27919	28032	28334	28422	28529	28670	
27263	27576	27846	27922	28034	28338	28430	28530	28675	
27288	27577	27847	27923	28040	28339	28431	28531	28679	
27291	27582	27849	27924	28043	28340	28432	28537	28681	
	27584	27850	27925	28072	28342	28434	28538	28685	
27305	27589	27851	27926	28073	28343	28435	28551		
27306		27852	27928	28076	28345	28438	28552	28702	
27311	27601	27853	27932	28077	28349	28439	28553	28705	
27314		27855	27935	28083	28350	28441	28554	28708	
27341	27701	27856	27937	28089	28351	28444	28555	28710	
27342		27857	27938		28352	28447	28556	28714	
27343	27801	27860	27941	28101	28356	28448	28557	28725	
27360	27803	27862	27942	28102	28357	28450	28560	28726	
27371	27804	27863	27944	28114	28358	28452	28570	28733	
27379	27805	27864	27946	28119	28360	28456	28572	28734	
	27806	27866	27947	28127	28362	28457	28573	28735	
27401	27807	27869	27950	28128	28363	28458	28577	28743	
27403	27809	27870	27953	28135	28364	28462	28580	28746	

Source: Reproduced with permission of the Environmental Health Section, Division of Public Health, North Carolina Department of Health and Human Resources.

TABLE 2.
Lead Risk Assessment Questions for the Parents of Children Who Do Not Live in a Zip Code in Which Risk is High

If the answer to any of these questions is "yes" or "I don't know," the child should undergo blood lead screening

Do you receive Women, Infants, and Children (WIC) Program services, or is your child enrolled in Medicaid (Health Check) or Health Choice?

Does your child live in or regularly visit a house that was built before 1950, including home child care centers or homes of relatives?

Does your child live in or regularly visit a house that was built before 1978, with recent or ongoing renovations or remodeling (within the last 6 months)?

Does your child live in or regularly visit a house that contains vinyl miniblinds?

Does your child have a brother, sister, other relative, housemate, or playmate who has or has had a high blood lead level?

Is your child a refugee or an immigrant, or was your child adopted from another country?

Note: Adapted with permission from the lead risk assessment questionnaire on the Web site of the Environmental Health Section, Division of Public Health, North Carolina Department of Health and Human Services. http://www.deh.enr.state.nc.us/Children_Health/Lead/Lead_Forms/Lead%20Risk%20Assessment%20Questionnaire%202011-05-13%20FINAL.pdf. Accessed November 14, 2012.

exposure increases. For all BLLs of 5 µg/dL or above, further investigation and retesting is required. If this elevated level is confirmed on venous sampling, laboratory assessment of a child's iron status as well as hemoglobin or hematocrit should be considered. When ingestion of lead particulate matter or a foreign body is a concern, an abdominal radiograph should be obtained and examined for the presence of radiopaque material [7].

Treatment for children with extremely elevated BLLs has not changed. Chelation directed by a toxicologist or a practitioner experienced in chelation therapy should be initiated only in children whose BLL is 45 µg/dL or higher. Chelation is not recommended for asymptomatic children with BLLs below 45 µg/dL, because multiple studies have shown that there is no cognitive benefit from treatment in this group [14]. Rather, these children should have developmental and medical follow-up, with removal of the cause of lead. It may take months to years for the BLL to drop below 5 µg/dL. A careful environmental investigation, led by the patient's local health department (see Table 3), is the key to locating the source of the lead and ending the patient's exposure [8].

Health Effects and Sources of Lead Poisoning

Deleterious effects of lead poisoning are more subtle in children than in adults. Children are at a higher risk of experiencing effects from low levels of lead exposure because the developing nervous system is so vulnerable. Children's hand-to-mouth exploratory behaviors expose them to more contamination, and their increased fractional gastrointestinal absorption of lead makes them less likely to excrete what they do ingest. In addition, absorption of lead is increased in the presence of dietary deficiencies of calcium, iron, and

vitamin C, all of which are more common in the pediatric population than in adults [15].

Now that lead in gasoline is nonexistent, the most common source of lead is dust or chipped paint from contaminated surfaces, and the highest concentration of this is in old houses or houses that are being renovated. Other well-known sources include antique furniture or toys, contaminated foodstuffs grown in lead-rich soil, cosmetics such as kohl, ceramic glazes, stained glass-making materials, folk remedies, herbal products, imported products (ceramics, pewter, toys, candy), and contaminated drinking water [16]. Cases of ingestion of foreign bodies containing lead, leading to rapidly increasing and severe lead poisoning and even death, have recently been reported in children [17, 18].

Acute lead poisoning, with BLLs generally greater than 60 µg/dL, is increasingly rare, but must be considered an emergency when it does occur. Children may complain of headaches, abdominal pain, loss of appetite, and constipation, and on examination they may display clumsiness, agitation, and decreased activity. These symptoms can rapidly deteriorate to vomiting, stupor, and convulsions [19]. Chronic symptoms seen in adults, such as peripheral neuropathy and chronic renal disease, are rare in children.

New clinical evidence obtained over the past 10 years has shown that even very low levels of lead exposure in asymptomatic children can cause irreversible developmental and behavioral effects [20]. The changes in the CDC's recommendations reflect the findings of multiple studies that have shown that there is no safe blood lead level in children; even very low levels may harm cognitive function [20]. Although it has long been known that high BLLs are poisonous to the developing nervous system, it has also been shown that in children whose lead levels were never greater than 10 µg/dL, IQ decreased 7.4 points as lifetime average BLL increased from 1 µg/dL to 10 µg/dL [21].

Practical Advice

Pediatric primary care practitioners embrace well-child interventions and are entrusted with the role of carrying out many different screening protocols. The CDC's new recommendations are aimed at minimizing the effects of lead on children, but they will also likely increase the number of blood draws and office visits, thereby increasing costs to the state's health care system. As family-centered patient advocates, we must recognize that these recommendations are the surest method of managing elevated BLLs; however, each pediatric practitioner is responsible for making a well-informed decision about how to proceed with lead screening and follow-up. It is the primary care provider's role to provide anticipatory guidance with regard to in-home exposures, unsafe renovation practices, and potential lead exposures associated with parental occupations or hobbies.

Furthermore, it is important to assess each child's nutritional status. Although there is currently no evidence that routine supplementation with iron, calcium, or vitamin C

TABLE 3.
Follow-Up Schedule for Blood Lead Levels in Children Under the Age of 6 Years: Recommendations from the North Carolina Division of Public Health

Blood Lead Level	Recommended Response
<5 µg/dL	<ul style="list-style-type: none"> Report blood lead test result to parent and document the notification. Educate family about lead sources, environmental assessment, and prevention of lead exposure. Perform another blood lead test at 2 years of age, or earlier if risk of exposure increases.
<p><i>All diagnostic (ie, confirmation) tests should be performed as soon as possible within the time periods listed below.</i></p> <p>If diagnostic test result falls into a lower category than the initial test result, follow response for that risk category.</p> <p>If diagnostic or follow-up test result falls in a higher category, conduct another diagnostic test based on the higher risk category and follow the recommended response for that risk category.</p>	
5-9 µg/dL	<ul style="list-style-type: none"> Report blood lead test result to parent and document the notification. Educate family about lead sources, environmental assessment, and prevention of lead exposure. Conduct diagnostic test for confirmation within 3 months. <p>If diagnostic test result is 5-9 µg/dL:</p> <ul style="list-style-type: none"> Conduct nutritional assessment. Take environmental history to identify lead sources and emphasize the importance of environmental assessment to identify and mitigate lead hazards. Continue follow-up testing every 3 months until 2 consecutive test results are <5 µg/dL. Test other children under the age of 6 years in same household.
10-19 µg/dL	<ul style="list-style-type: none"> Report blood lead test result to parent and document the notification. Educate family about lead sources and prevention of lead exposure. Conduct diagnostic test for confirmation within 1 month. <p>If diagnostic test result is 10-19 µg/dL:</p> <ul style="list-style-type: none"> Conduct nutritional assessment and refer to WIC Program. Take environmental history to identify sources of lead exposure. Refer to local health department for environmental investigation. Continue follow-up testing every 1-3 months until 2 consecutive test results are <5 µg/dL. Test other children under the age of 6 years in same household.
20-69 µg/dL	<ul style="list-style-type: none"> Report blood lead test result to parent and document the notification. Educate family about lead sources and prevention of lead exposure. Conduct diagnostic test for confirmation within 1 week for results of 20-44 µg/dL, within 48 hours for results of 45-59 µg/dL, or within 24 hours for results of 60-69 µg/dL. <p>If diagnostic test result is 20-69 µg/dL:</p> <ul style="list-style-type: none"> Conduct nutritional assessment and refer to WIC Program. Take environmental history to identify sources of lead exposure. Refer to local health department for required environmental investigation. Provide clinical management. Refer children to CDSA Early Intervention or CC4C as appropriate Refer to Division of Social Services as needed for housing or additional medical assistance. Continue follow-up testing every 1 month until 2 consecutive test results are <5 µg/dL. Test other children under the age of 6 years in same household.
≥70 µg/dL	<ul style="list-style-type: none"> Report blood lead test result to parent and document the notification. Educate family about lead sources and prevention of lead exposure. Conduct diagnostic test for confirmation immediately as an emergency laboratory test. <p>If diagnostic test result is ≥70 µg/dL:</p> <ul style="list-style-type: none"> Hospitalize child and begin medical treatment immediately. Conduct nutritional assessment and refer to WIC Program. Take environmental history to identify sources of lead exposure. Refer to local health department for required environmental investigation. Refer children to CDSA Early Intervention or CC4C as appropriate. Refer to Division of Social Services as needed for housing or additional medical assistance. Continue follow-up testing every 1 month until 2 consecutive test results are <5 µg/dL. Test other children under the age of 6 years in same household.

Note. WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; CDSA, Children's Developmental Service Agency; CC4C, Care Coordination for Children. Adapted with permission from the North Carolina Division of Public Health.

above the level of the recommended daily requirement provides any prevention of lead toxicity, assuring that a child's diet contains recommended amounts of these critical nutritional elements is essential.

Recognizing that the vast majority of children in North Carolina who have elevated BLLs are impoverished, we must combine screening efforts with a concentration on primary prevention of lead exposure with the goal of ensuring safe housing and good nutrition for all children. A multidisciplinary effort is required to provide the best care. When appropriate, referral to the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) should be considered. Collaboration with local health departments is the key to patient management, for they conduct environmental investigation, with the goal of ending the lead exposure as the primary intervention. Development and school performance should be carefully scrutinized. Further testing for recognized delays or concerns about learning disabilities should be performed when needed. Appropriate therapies and interventions can then be initiated depending on each child's needs. Considering recent clinical evidence regarding lead's insidious neurodevelopmental effects, careful follow-up and support is crucial to the success of these children over the long term. NCMJ

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Maternal Care Practices and Breastfeeding in North Carolina: Becoming Baby-Friendly

Susan R. Mims, Joni H. Lisenbee

Baby Friendly hospitals promote and support breastfeeding to increase the number of infants who receive the health and social benefits and optimal nutrition that breast milk provides. Hospitals that implement best practices for breastfeeding can receive the “baby friendly” designation. A transdisciplinary approach is increasing the number of North Carolina mothers who initiate breastfeeding.

The American Academy of Pediatrics unequivocally states that “human milk is the preferred feeding for all infants, with rare exceptions” and recommends exclusive breastfeeding during the first 6 months of life and continued breastfeeding for at least the first year of life [1]. Despite knowledge that breast milk is the best source of nutrition for infants, in the United States nearly one-quarter of infants never receive any breast milk [2]. Breastfeeding fell out of fashion with the advent of formula in the early 20th century. Modern scientific evidence demonstrates the health benefits of breastfeeding, and health providers, public health professionals, and members of the general public have increasingly focused on spreading that message supporting a resurgence in breastfeeding.

Breast milk offers a long list of proven benefits for infants and their mothers. Breast milk protects a newborn against many infectious diseases by bolstering the immune system and passing important immunological components from the mother to the baby [1]. In addition to decreasing an infant’s chances of having an acute disease in childhood, breast milk also enhances developmental growth and protects against chronic diseases later in life, such as obesity, diabetes, heart disease, and cancer [1]. Nursing mothers also experience benefits from breastfeeding, including a more rapid return to prepregnancy weight, osteoporosis prevention, a decreased risk of depression, and protection against breast, uterine, and ovarian cancer [1]. In addition to these health benefits, breastfeeding also has environmental and societal benefits and offers cost savings to families and employers.

A mother’s decision to breastfeed is influenced by many factors, including her knowledge base, social norms, lactation problems, family and social support, and employment. In North Carolina, obstacles to breastfeeding are more pro-

nounced among women who are poor or have less education, resulting in lower breastfeeding rates in these populations [3]. There are also substantial variations in breastfeeding rates among racial and ethnic populations, with non-Hispanic black women being least likely to breastfeed their infants [3, 4].

The Centers for Disease Control and Prevention (CDC) Healthy People 2020 goals for breastfeeding include achieving exclusive breastfeeding for the first 6 months of life for 25.5% of infants [5]. North Carolina is currently well below this target: Only 15.3% of mothers in the state breastfeed exclusively for the first 6 months [6]. The goal for continuing breastfeeding until the infant is a year old is 34.1% [5], but in North Carolina, only 20.8% of infants are still breastfeeding at 1 year [6]. Although breastfeeding rates are currently below the CDC goals, those rates are increasing (Figure 1). From 2008 to 2009, breastfeeding initiation rates in the United States increased from 74.6% to 76.9% [7], the largest annual increase in a decade. North Carolina’s breastfeeding initiation rate of 68.2% falls below the national average [6].

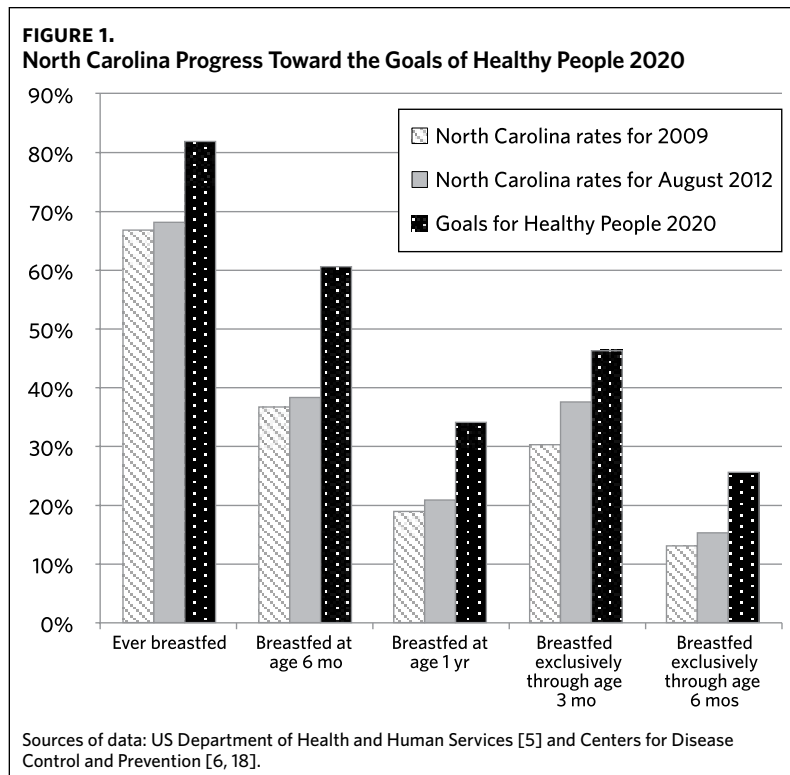
To meet Healthy People 2020 goals, the North Carolina Division of Public Health revised a document in 2011 that it had released in 2006 titled Promoting, Protecting, and Supporting Breastfeeding: A North Carolina Blueprint for Action [8]. The 2011 update offers a status report, discussing many statewide activities to promote breastfeeding. The North Carolina Breastfeeding Coalition [9], the Carolina Global Breastfeeding Institute [10], and the Perinatal Quality Collaborative of North Carolina are leaders in this effort [11].

Recognizing that hospital maternity practices can either interfere with or support the practice of breastfeeding, in 1991 the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) developed the Baby-Friendly Hospital Initiative (BFHI) to guide institu-

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tions in promoting breastfeeding. The Baby-Friendly USA Web site states that “The Baby-Friendly Hospital Initiative is a global program...to encourage and recognize hospitals and birthing centers that offer an optimal level of care for infant feeding” [12]. To facilitate the goal of optimal support for breastfeeding, the BFHI offers 10 steps to successful breastfeeding, which are outlined in Table 1 [13]. To achieve the “baby friendly” designation, a hospital or birthing center must demonstrate implementation of these steps during an onsite review.

The Healthy People 2020 goal is for 8.1% of live births to occur in baby-friendly hospitals [5]. North Carolina has achieved this goal; the rate in the state is 9.91% [14]. However, it is important that we continue to strive for increased support in hospitals for breastfeeding mothers.

North Carolina health care facilities that have achieved the “baby friendly” designation are Mission Hospital in Asheville (in April 2010), Women’s Birth and Wellness Center in Chapel Hill (in June 2010), Vidant Medical Center in Greenville (December 2011), and North Carolina Women’s Hospital in Chapel Hill (March 2012). Several other facilities across the state are in the process of achieving the designation.

Mission Hospital’s journey to “baby friendly” status began in August 2008, when a group of staff members met to determine the best way to improve breastfeeding care. During this pivotal meeting, a common theme of inconsistent messaging emerged. The team reviewed the literature for evidence-based practices before developing a breastfeeding policy. This research resulted in the hospital signing

a letter of intent in January 2009 to become a baby-friendly hospital through implementation of the 10 steps to successful breastfeeding.

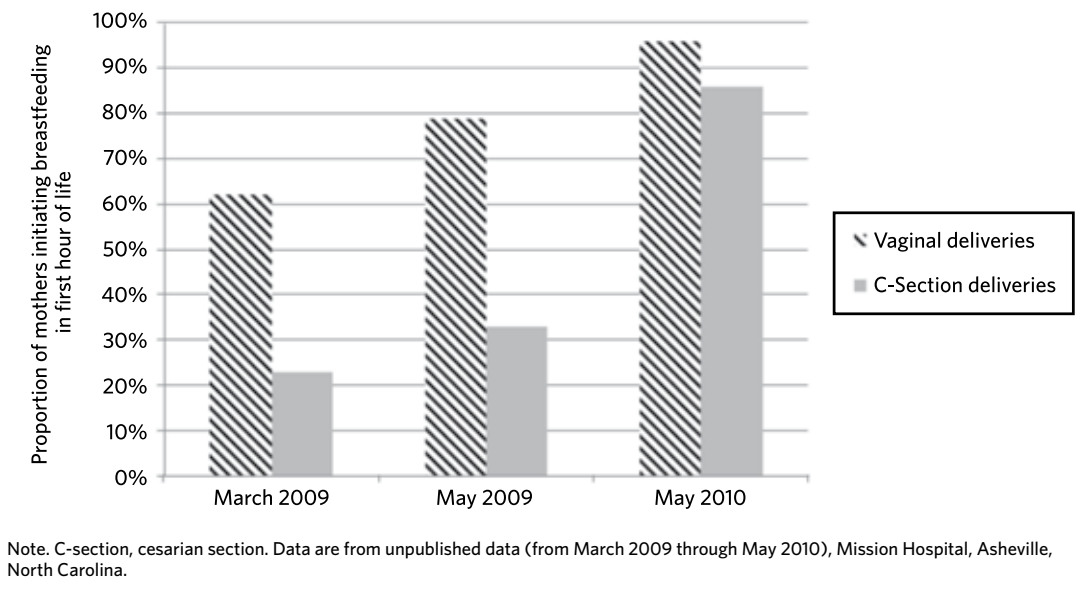
With strong support from hospital administrators, Mission Hospital set an ambitious timeline, initiating a 13-month plan of education and competency verification. One of the first interventions was to stop distributing formula bags to families. According to the North Carolina Breastfeeding Coalition, “Multiple studies show that when

TABLE 1.
Ten Steps to Successful Breastfeeding

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within half an hour of birth.
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practice rooming-in - allow mothers and infants to remain together - 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Reprinted with permission from the World Health Organization [13].

FIGURE 2.
Breastfeeding Initiation Rates Within the First Hour of Life at Mission Hospital in Asheville, North Carolina.



breastfeeding mothers are given commercial companies' marketing bags, they are more likely to start using formula—even if the formula samples have been removed from the bags" [15].

The next focus was the education of staff members and verification of their competency. This took the better part of 13 months to accomplish. We purchased an online education module that allowed staff members to complete this work at their own pace, followed by competency verification. This was the most important aspect of achieving our designation.

Strong commitment from hospital administrators and nursing staff was critical, as was finding physicians willing to champion the cause. Our team included obstetricians, pediatricians, and family physicians.

Part of the process of achieving "baby friendly" designation is documenting physician education regarding breastfeeding. We used an approved online resource for physician education. To reach a wide audience, we also scheduled continuing medical education conferences. Assuring that nurses, lactation consultants, and physicians received the latest education on breastfeeding made it possible for all caregivers to communicate a consistent message of support for mothers.

Some women will not be able to breastfeed, but this is rare. Some women will choose not to breastfeed, and that choice should be respected. It is important to discuss the benefits of breastfeeding early in pregnancy; this requires working closely with obstetrical providers. More women are choosing to breastfeed their babies since Mission Hospital began providing broad education to staff, coordinating the timing and content of our lactation education, and assuring that women have the support they need (Figure 2).

Sharing data was key to improving our hospital's perfor-

mance on breastfeeding quality measures. Staff appreciated the chance to see the progress made and to identify remaining challenges. Results are routinely posted in the unit and shared at staff meetings. The data shared include breastfeeding initiation; exclusive breastfeeding on discharge; and, for the mothers of babies who are transferred to the neonatal intensive care unit, initiation of breast pumping.

The challenges of changing the culture in a hospital setting can be overwhelming. Having a clear vision of the goal is crucial. Staff involvement is critical. The leadership at Mission Hospital made it clear that we were headed for the "baby friendly" designation, but the process was guided by staff. To succeed in bringing about change, frontline staff must be involved. Tracking and sharing results of the work keeps staff engaged in the change process.

Building strong community relationships with stakeholders outside the hospital is as important as the work done in the hospital. Surgeon General Regina M. Benjamin highlighted this in her report *The Surgeon General's Call to Action to Support Breastfeeding* (January 2011) [16]. The report outlines 20 action steps that families, communities, health care workers, employers, researchers, and public health professionals can take to promote breastfeeding.

The Patient Protection and Affordable Care Act includes provisions that support women and their families in reaching their breastfeeding goals [17]. It requires health plans to cover preventive services with no cost sharing, and specifies that these services must include breastfeeding support, supplies, and counseling. The act also requires employers to provide a reasonable amount of break time in a private place that is not a bathroom for breastfeeding mothers to express breast milk during the workday for 1 year after the birth of a child.

The trends in breastfeeding rates are encouraging. As

more hospitals attain the “baby friendly” designation, breastfeeding rates can reach the Healthy People 2020 goals. Providing education and support to mothers at the time of birth is important, but insufficient. North Carolina must continue efforts to spread the public health message of the benefits of breastfeeding and assure a supportive environment in the workplace and in the community. With a continued strong statewide effort, and with commitment on the part of the health care system to making changes in maternity practices, North Carolina will continue to see more infants nourished by their mother’s milk and enjoying the myriad health and social benefits it offers. **NCMJ**

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Sexually Transmitted Infections in Adolescents

Preeti Patel Matkins

Sexually transmitted infections (STIs) are very common in teenagers and young adults, with adolescents making up a disproportionate percentage of cases. This article reviews the epidemiology of STIs in North Carolina adolescents and summarizes current recommendations for screening, testing, and treatment. Successful strategies for maintaining confidentiality around screening, notification, billing, and treatment are also discussed.

Sexually transmitted infections (STI) are among the most common illnesses in teenagers and may lead to serious health problems. Consequences of STIs include ectopic pregnancy, pelvic inflammatory disease, infertility, chronic pain, and increased risk of exposure to other STIs, including HIV. Data from the 2011 Youth Risk Behavior Surveillance System survey show that 49.3% of North Carolina high school students report having ever had sexual intercourse [1]. National data provided by the Guttmacher Institute show that by age 15, 13% of teens have had intercourse, and by age 19, 70% of teens have done so [2]. Because people are marrying later, in their mid to late 20s on average, teens and young adults tend to have more partners before marriage, and their risk for unplanned pregnancy and STIs is thus increased [2]. There are 19 million new STIs diagnosed in the United States every year [3]. North Carolina ranks 17th among the states in the rate of chlamydial infections and 8th in the rate of gonorrhea infections [4]. People 15-24 years of age constitute only about 25% of those in the United States who have ever had sexual intercourse, but nearly half of all new STIs occur in this age group [5]. In 2000, infections with human papillomavirus (HPV), *Trichomonas vaginalis*, and *Chlamydia trachomatis* accounted for 88% of new STI cases [5].

Many STIs are asymptomatic, so screening is especially important to detect disease. Screening for STIs in adolescents and young adults requires that providers discuss personal issues and risk-taking behaviors as well as responsible decision making with teen patients. It is normal developmentally for teens to become more independent individuals and to be responsible about decision making. Parents exert the most influence on teen choices and expectations, but it is the role of the medical provider to assist in making teens aware of healthy choices. Many teens believe that a person with an STI will always have symptoms of disease. This myth and the normal adolescent thought that "it can't happen to me" underscore the need for medical providers to educate

adolescent patients about risk-taking behavior *before* they have engaged in any form of sexual contact.

A medical provider should include the family in the care of a teenager, but there are some topics that should be discussed privately with the teen. These discussions make teens aware of their responsibility for their own health and inform parents that another adult is speaking with their child about responsible choices. Decisions with teens should be collaborative, but they should also be developmentally sensitive. It is imperative both that teens feel safe in discussing confidential topics and that they be aware of the circumstances under which confidentiality may be breached. It is helpful to have information about practice policy with regard to teen confidentiality available to parents even before their child becomes a teenager, so that questions and concerns may be addressed.

Under North Carolina Statute 90-21.5, a minor "may give effective consent to a physician licensed to practice medicine in North Carolina for medical health services for the prevention, diagnosis and treatment of 1) venereal disease and other diseases reportable under G.S. 130A-135, 2) pregnancy, 3) abuse of controlled substances or alcohol, and 4) emotional disturbance"[6]. Adolescent confidential care is supported by the American Academy of Pediatrics (AAP), the Society for Adolescent Health and Medicine (SAHM), the American College of Obstetricians and Gynecologists (ACOG), the American Medical Association (AMA), and the American Academy of Family Practitioners. The law does not state that a provider cannot tell a guardian that an adolescent has been treated for an STI; it lets that decision be part of the physician-patient relationship. Common reasons for breaking confidentiality include medical emergencies, life-threatening conditions, and concern that a patient may cause harm to self, be harmed by others (physical or sexual abuse, or neglect), or have plans to harm or hurt others.

Some practices explain that if the provider has information about critical medical results, and set methods for reaching the patient (eg, calling the patient's cell phone number or calling the school nurse) have been unsuccessful-

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ful, the practice may contact a guardian and ask the guardian to tell the patient to contact the practice. In most cases, the results are not shared with the guardian until after the patient has been informed and has given consent for the physician to speak to the guardian. It may be helpful to have safeguards in place, such as a password given only to the patient, so that patients can call about their test results. More recently, giving online access to records and results has been problematic, because parents have sometimes been able to gain unintended access to a young person's results. Texting is another mode of communication. Many automated reminder systems can use texts. Text communication is patient-friendly, but privacy of the sender and patient confidentiality should be addressed. In all methods of communication, providers should ensure that confidential results remain confidential.

Specific screening recommendations vary by organization, and are summarized in Table 1. The Centers for Disease Control and Prevention (CDC) makes recommendations with the involvement of experts in the field, including rep-

resentatives from AAP, SAHM, ACOG, and the AMA, using data on prevalence, cost, and evidence [7, 8]. For example, the CDC does not recommend routine screening for *C. trachomatis* for all males, but it does make exceptions for areas of high prevalence and for high-risk populations such as adolescent males. Based on cost, comfort, and epidemiology, the CDC does not recommend routine screening for syphilis, bacterial vaginosis, hepatitis B, hepatitis A, or infection with *T. vaginalis* or with human papilloma virus. Again, there are exceptions for high-risk populations such as adolescents. Some medical practices do perform *T. vaginalis* screening in adolescents. The AAP and Bright Futures recommend routine screening for STIs in all sexually active teens [9]. The US Preventive Services Task Force (USPSTF) recommends counseling and education about STI prevention for all sexually active teens [10]. Bright Futures recommends gonorrhea and chlamydia testing for all sexually active teens, with HIV and syphilis screening for those who are at higher risk or live in a community where the prevalence is greater than 1% [12, 13]. Testing for other STIs such as *T. vaginalis*, herpes sim-

TABLE 1.
Routine Screening Recommendations for Sexually Transmitted Infections in Sexually Active, Asymptomatic Adolescents

Infectious agent	CDC ^a [7, 8]	Bright Futures [9]	USPSTF ^b [10]	ACOG [11]
<i>Chlamydia trachomatis</i>	Annual screening recommended for females and for high-risk males and males in areas of high prevalence	Annual screening recommended	Annual screening recommended for all females under 25 years of age	Annual screening recommended
<i>Neisseria gonorrhoeae</i>	Annual screening recommended	Annual screening recommended	Screening recommended for all females under 25 years of age	Annual screening recommended
HIV	Discussion and encouragement of testing recommended	Screening recommended in areas where prevalence is > 1%	Screening recommended for all pregnant females and for anyone engaging in high-risk sexual behavior	Recommended annually
Syphilis	Screening not recommended	Screening recommended in areas where prevalence is > 1%	Screening recommended for all pregnant females and for anyone at high risk ^c	Screening recommended if patient has been sexually assaulted or is HIV positive or pregnant
Herpes simplex virus	Screening not recommended	Examination recommended	Screening not recommended	Screening not recommended
Human papilloma virus	Screening not recommended; vaccination recommended	Examination and vaccination recommended	Balance of benefits and harms of screening cannot be determined; vaccination recommended	Screening not recommended; vaccination recommended
Hepatitis A	Screening not recommended; vaccination recommended	Vaccination recommended	Vaccination recommended	Screening not recommended; vaccination recommended
Hepatitis B	Screening not recommended; vaccination recommended	Vaccination recommended for all pregnant females; vaccination recommended for everyone	Screening recommended	Screening not recommended; vaccination recommended
<i>Trichomonas vaginalis</i> ^d	Screening not recommended	No recommendation	No recommendation	Screening not recommended

Note: CDC, Centers for Disease Control and Prevention; USPSTF, US Preventive Services Task Force; ACOG, American College of Obstetrics and Gynecology.

^aThe CDC recommends more thorough evaluation for pregnant teens and for males who have sex with males.

^bThe USPSTF advises physicians to consider demographics and social-contextual factors in making screening determinations and to consult with local public health officials and refer to epidemiologic data.

^cFemales and males at increased risk of syphilis are those who engage in high-risk sexual behavior or live in a community where prevalence is high.

^dMany practices that see adolescents screen for *T. vaginalis*.

TABLE 2.
CDC Treatment Guidelines for Sexually Transmitted Infections

Infectious agent	First-line treatment	Alternative treatment	Comments
<i>Chlamydia trachomatis</i>	A single dose of azithromycin 1 g orally OR doxycycline 100 mg orally twice a day for 7 days	Erythromycin base 500 mg orally 4 times a day for 7 days OR erythromycin ethylsuccinate 800 mg orally 4 times a day for 7 days OR levofloxacin 500 mg orally once a day for 7 days OR ofloxacin 300 mg orally twice a day for 7 days	
<i>Neisseria gonorrhoeae</i>	A single IM dose of ceftriaxone 250 mg PLUS a single dose of azithromycin 1 g orally, or doxycycline 100 mg orally twice a day for 7 days	If patient cannot present for ceftriaxone, a single dose of cefixime 400 mg orally may be substituted for it, but patient must then follow up for <i>N. gonorrhoeae</i> culture within 1 week	Penicillin, tetracycline, and quinolones are no longer treatment options for gonorrhea. Males who have sex with males must be treated with ceftriaxone plus azithromycin or doxycycline.
HIV	Referral to infectious disease specialist; treatment based on viral load and CD4, CD8 counts		
Syphilis (for treatment of tertiary or neurosyphilis, and for treatment of penicillin-allergic patients, see guidelines)	Benzathine penicillin G, 2.4 million units IM; 1 dose for early syphilis; 3 doses 1 week apart for late latent disease or latent disease of unknown duration	Quantitative nontreponemal serologic tests should be repeated at 6, 12, and 24 months	Treatment dose and duration based on duration of infection: primary, secondary, or early latent infection. CSF examination should be performed if titers increase 4-fold, or if an initially high titer ($\geq 1:32$) fails to decline at least 4-fold (ie, 2 dilutions) within 12-24 months of therapy, or if signs or symptoms attributable to syphilis develop.
Herpes simplex virus (for treatment of recurrent HSV, see guidelines)	Acyclovir 400 mg orally 3 times a day for 7-10 days OR acyclovir 200 mg orally 5 times a day for 7-10 days OR famciclovir 250 mg orally 3 times a day for 7-10 days OR valacyclovir 1 g orally twice a day for 7-10 days		Treatment can be extended if healing is incomplete after 10 days of therapy.
<i>Trichomonas vaginalis</i>	A single oral dose of metronidazole 2 g OR a single oral dose of tinidazole 2 g	Metronidazole 50 mg orally twice a day for 7 days	Patients should be counseled not to consume alcohol during treatment and until 24 hours after last dose of metronidazole or until 72 hours after last dose of tinidazole.

Note: IM, intramuscular; CSF, cerebrospinal fluid.

Source: 2010 CDC Sexually Transmitted Disease Treatment Guidelines [7].

^aCDC recommendations for treatment of *N. gonorrhoeae* were updated in August 2012 [8].

plex virus, or HPV is not recommended as part of routine screening.

Most organizations also encourage prevention of STIs through education and vaccination. The CDC and Bright Futures specifically recommend the following for all adolescents: immunization against HPV, hepatitis A, and hepatitis B; education about HIV infection, testing, transmission; and the incorporation of education about sexuality into patient care [12, 13]. Bright Futures and USPSTF also recommend education about STIs for all adolescents.

Testing for STIs is generally noninvasive. For screening for gonorrhea and chlamydia, nucleic acid amplification tests (NAATs) are the most sensitive method. Testing

can be done on urine or on cervical or vaginal swabs if the patient is female. It is important to note that the urine used for NAAT should not be obtained using the "clean catch" method. Testing for gonorrhea or chlamydia using rectal and oropharyngeal swabs has not been approved by the US Food and Drug Administration. *C. trachomatis* can be cultured if collected in viral media. *Neisseria gonorrhoeae* can be cultured on Thayer-Martin plates (other media allow for many other normal flora bacteria to grow and obscure *N. gonorrhoeae*). *T. vaginalis* can be seen on wet prep or detected with commercially available rapid tests. Syphilis and HIV testing is done on blood samples. Both a positive treponemal and nontreponemal test are required for the diagnosis

of syphilis. Positive results on rapid HIV testing or enzyme-linked immunoabsorbent assay (ELISA) should be verified by Western blot test [14].

The CDC's treatment guidelines for sexually transmitted disease [7] are the best resource for treatment of STIs. The guidelines are based on cost, efficacy, epidemiology, and resistance data. The CDC's treatment recommendations are summarized in Table 2. Due to the emergence of resistant *N. gonorrhoeae*, dual therapy with intramuscular ceftriaxone and oral azithromycin (or doxycycline) is now recommended [8]. Also, oral antibiotics are not the recommended treatment for gonorrhea [15]. If a patient cannot come in for an intramuscular injection, oral antibiotics may be used, but the recommendation is for any patient so treated to return for a culture for *N. gonorrhoeae* within 1 week. Oral antibiotics are not recommended for the treatment of gonorrhea in males who have sex with males. Patients should be counseled to have no sexual contact until 7 days after completion of treatment both for themselves and for their partners. Regardless of whether patients believe their sex partners have been treated, patients should be retested for gonorrhea and chlamydia within 12 weeks after treatment. It should be noted that NAAT tests will remain positive for up to 3 weeks after eradication of infection; for that reason, most practitioners wait at least 4 weeks after treatment if using NAAT as the test of treatment.

Many reinfections with STIs are the result of not treating sexual partners. Expedited partner treatment (EPT) is legal in North Carolina and is approved by the North Carolina Medical Board and the North Carolina Board of Pharmacy. Providers should document on the prescription that the patient is receiving EPT and should ask the pharmacist to verify allergies and educate female partners to seek care if they experience any abdominal pain (out of concern regarding the possibility of pelvic inflammatory disease). The EPT prescription should also recommend seeking treatment for further STI testing. The CDC guidelines state that use of EPT for gonorrhea is acceptable, and that if the partner cannot come in for treatment, use of cefixime plus azithromycin is acceptable except for males who have sex with males.

Notification of adolescent patients should respect their patient rights and follow North Carolina law. Issues of billing and confidentiality may make adhering to guidelines difficult. If laboratory tests ordered for a minor are included on statements sent to policyholders, it may be prudent to have a list of other venues for testing available. These resources may include health department STI clinics and community resources or organizations. Teens are very technologically savvy, and there are many Web sites and text-messaging hosts that may be helpful in educating them. Providers using electronic medical records may want to consider extra safeguards on confidential information. These safeguards may include building "walls" into some records or labeling certain notes "Confidential" in a large, boldface font, so that other professionals accessing the record are aware of the need

to retain patient confidentiality. Confidential information about adolescents should not be made available through online patient portals that might be accessed by parents.

In summary, STIs are a very common problem among sexually active adolescents. Knowledge among teens about transmission of and testing and treatment for STIs is poor. Providers are in a unique position to provide education, prevention, screening, and treatment of teens and young adults. Through education, providers can support patients' goals and influence and modify their risk-taking behaviors. **NCMJ**

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Providing Anticipatory Guidance to Children and Adolescents

Stephen W. North

Anticipatory guidance, a component of Bright Futures, refers to communicating with patients and caregivers to identify and provide information most needed. Providing reliable, appropriate, and culturally competent anticipatory guidance to children, adolescents, and their families at every visit is one of the most essential roles of a primary care provider.

Determining the right information for a specific patient can be quite challenging for a physician, given the large amount of information recommended by multiple agencies and various guidelines including those provided by Bright Futures [1]. Finding the best approach to providing anticipatory guidance for a patient and his or her family in a manner that respects their experience and knowledge is part of the art of medicine. It is not a skill learned quickly in an afternoon at a continuing medical education workshop.

In my own practice, at every visit I ask every child and adolescent how they are doing in school. The most frequent response is “good,” with “fine” coming in a close second. I could easily write “good” in the note and move on. Because I know that school performance, and more important, changes in school performance and involvement, are markers for multiple health issues, I always follow up with the question “And what does ‘good’ mean in your family?” The question almost always opens up the conversation with both the patient and the family, allowing me to better understand the daily activities of the patient and to tailor anticipatory guidance to his or her specific needs.

There are 2 essential steps in providing effective anticipatory guidance: talking with and listening to patients and families and taking the time to provide them with the information they need. Determining the needs of the patient and the family through questionnaires that they fill out before seeing you can be helpful. However, building the doctor-patient-family relationship through conversation is essential [2]. Conversations are based on open-ended questions. Too often, physicians instead want to move through a script for each visit. A direct observational study of 483 well-child visits with 52 providers using the Bright Futures guidelines demonstrated that fewer than half (38.9%) of the visits began with open-ended questions, and a quarter did not include any open-ended questions [3]. Although guidelines and questionnaires are of benefit, it is essential to view the

well-child check as a conversation about the health of the family rather than as a checklist (*Do you wear seatbelts? Do you eat vegetables 5 times a day?*) that needs to be completed before a patient can get his shots, a sticker, and a camp form.

The amount of time the physician spends with the patient is the greatest indicator of the quality of the anticipatory guidance provided during that visit. In a study of well-child checks for children aged 4-35 months [4], only 20.3% of parents reported spending more than 20 minutes with the physician. Longer visits increased the likelihood that a patient would receive developmental screening, that the parents would feel they had had enough time to ask the necessary questions, and that parents would recommend the doctor to other parents. Almost all providers feel pressure to see more patients in less time. In the setting of the traditional well-child check, we must work to take the time with our patients to answer their questions with high-quality information that can potentially reduce the frequency of office visits and improve health.

The Bright Futures guidelines specifically mention that they are “intended to be used selectively to invite discussion, gather information, address the needs and concerns of the family, and build partnership” [1]. I live in a rural mountain community where families frequently hunt together and ride four-wheelers. If I chose to follow the guidelines verbatim, I would make strong statements to almost every family I see stating that these activities are unsafe and should be avoided. Instead, I find it much more productive to ask patients what color their helmets are and where their guns are kept in their homes. It is important for providers to recognize that there is a bias inherent in any set of guidelines and that following them to the letter could be detrimental to relationships with families and patients.

Recognizing that the family—however it is defined for that particular patient—is the center of the medical decision-making process for children and adolescents is essential for improving acceptance of anticipatory guidance. It is

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Safe Kids North Carolina

Wayne Goodwin

Every year in North Carolina, approximately 200 children die from unintentional injuries, according to the North Carolina State Center for Health Statistics [1]. Through education and outreach, Safe Kids North Carolina works to prevent these injuries, which are the leading killer of children aged 14 years and younger. The organization focuses on a wide variety of risk areas, including child passenger safety, burn prevention, prevention of falls, pedestrian safety, poisoning prevention, water safety, and more.

Safe Kids North Carolina, which is housed within and staffed by the North Carolina Department of Insurance, helps spread important messages about injury prevention through a network of volunteers across the state. Currently, there are 38 local Safe Kids coalitions covering 67 counties in North Carolina. Because of partnerships with these local Safe Kids coalitions and other child safety advocates, Safe Kids North Carolina has been able to deliver comprehensive injury prevention programs to communities statewide.

According to the North Carolina Division of Public Health, motor vehicle-related injuries continue to be the leading cause of death and the second leading cause of hospitalizations. Safe Kids is working to improve child passenger safety by educating people about the proper use of child safety seats and restraints. Through the leadership of Safe Kids North Carolina and the Governor's Highway Safety Program, there are now more than 130 permanent checking stations where parents and caregivers can go to learn how to choose an appropriate child safety seat for their child and how to use it properly. Each checking station is staffed by a technician who has been certified in child passenger safety. Leaders in the fire service are common partners in this effort, offering their fire stations for use as checking stations and allowing their firefighters to receive the training to become certified safety seat technicians. Additionally, Safe Kids North Carolina aims to make child safety seats widely available to the public by implementing the Buckle Up Kids program in communities around the state. Active in 83 North Carolina counties, Buckle Up Kids provides qualifying families with a limited number of low-cost child restraints and education about how to use them.

Safe Kids North Carolina has also emerged as a statewide leader in preventing unintentional poisonings through its Operation Medicine Drop events. With the goal of keeping medications out of the hands of children, Safe Kids North Carolina engaged partners such as the US Drug Enforcement Administration, the State Bureau of

Investigation, and North Carolina Riverkeepers to coordinate events across the state to which people can bring unneeded or expired medications for safe, secure disposal. The group of stakeholders involved in Operation Medicine Drop continues to grow and now includes substance abuse prevention groups, law enforcement, and environmental protection advocates, who see a shared benefit in the safe disposal of medications. Since its inception in 2010, Operation Medicine Drop has grown exponentially, and to date, the initiative has collected and destroyed more than 30 million doses of medications through hundreds of drug take-back events held each year.

In addition to bringing safety programs directly into our communities, Safe Kids North Carolina has a strong relationship with media outlets throughout the state to promote childhood safety initiatives. Safe Kids staff members are regular guests on television and radio shows, and every year they hold press conferences and media events about fire prevention, water safety, and the dangers of hot cars. Safe Kids North Carolina has also embraced social media and online outreach as ways of communicating safety messages on a round-the-clock basis.

The vast majority of childhood injuries and deaths are preventable. Through the efforts described here and many others, Safe Kids North Carolina is a proactive force in protecting our state's most valuable resource—our children—and helping to establish lifelong safety habits in North Carolina's families. **NCMJ**

Wayne Goodwin insurance commissioner, North Carolina Department of Insurance, and chair, Safe Kids North Carolina, Raleigh, North Carolina.

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important to begin the visit with an open-ended question designed to find out what concerns the parents and child have and to use the information contained in their answers to gauge their level of knowledge. A 2011 study found that in pediatric practices that offer family-centered care, parents

are more receptive to anticipatory guidance, and pediatric patients have fewer unmet needs for health services [5].

The asynchronous developmental progress seen in adolescents poses another challenge to providers. Although adolescents all follow the same developmental pathway, each

progresses through these developmental stages in his or her own way. Bright Futures materials recommend 37 possible points to bring up with early adolescents and discuss during a particular well-child visit. Two 13-year-old boys in the 8th grade at the same school may need completely different types of information based on their activities, family situation, religious beliefs, and psychosocial context. In order for adolescents to remember the anticipatory guidance that is provided, the physician needs to make sure that it is relevant to the patient's life at that point. Focusing on eating better and exercising more will not resonate with a patient if the only thing he worries about each day is being bullied on the bus on the way home because he hasn't started to grow facial hair.

A unique challenge in working with adolescents is that they rarely come for preventive health visits. An analysis of data from the 2001-2004 Medical Expenditure Panel Survey demonstrated that only 38% of adolescents had had a preventive care visit in the previous 12 months [6]. Furthermore, being from a low-income community or being uninsured increased the risk of not receiving preventive health services. It could be argued that those populations are in greatest need of anticipatory guidance. Infrequency of visits, especially by higher-risk patients, makes it essential that risk assessment and anticipatory guidance be incorporated into all adolescent visits.

Using a consistent framework for blending open-ended questions into a conversation can be very helpful in identifying topics that need additional attention. The HEADS mnemonic (H, home environment; E, education, ethnicity, and employment; A, activities with peers, anxiety, and appetite; D, drugs [and alcohol and tobacco], depression, and delusions; S, suicide, safety, and sexuality) is an excellent and widely used risk-assessment tool that can help providers remember the topics that should be covered [7]. In order to provide relevant and meaningful anticipatory guidance to all adolescents, it is important to understand how they perceive themselves in their social context and to follow up on answers that are somewhat vague. Incorporating the HEADS mnemonic into an electronic health record template allows a provider to quickly include it in all adolescent visits.

The conversation that opens an adolescent preventive visit can be challenging to negotiate because of the complex biopsychosocial changes happening in the patient's life. Employing a strengths-based interview style—that is, focusing on exploring and discovering the patient's strengths and resources—can help create an environment in which both the parent and the patient feel more comfortable and subsequently provide more detailed information. Keep in mind that the information gathered is just as important for the patient's long-term health as is that information obtained when you auscultate the heart.

There are issues that adolescents may be less willing to talk about in front of their parents, but that need to be addressed. It is essential for the provider to create an environment in which the parents can discuss any specific con-

cerns they have and then leave the office, giving the patient some time alone with the physician to discuss private or confidential matters. Placing this in the context of supporting the adolescent's normal development and helping him or her become comfortable talking to a physician directly often helps offset any parental concerns. It is important to review what confidentiality means with the parents and the adolescent before asking the parents to leave the room. Wrapping up the visit with all parties present and sharing the majority of the anticipatory guidance with parent and teen reinforces the importance of the family in the overall health of the adolescent.

Even with the best guidelines and a conversational framework, we as providers often fail to address essential topics during adolescent visits. It is recommended that violence prevention be discussed at two-thirds of all adolescent visits. However, the physicians in the observational study of well-child visits referred to above [3] mentioned violence prevention in fewer than 1% of visits. Additionally, physicians often fail to provide needed anticipatory guidance around the transitions in health care that adolescents will experience—specifically, changes in health insurance status and transitions in care [8]. This raises the question of whether we as physicians tend to focus on those topics that we are more comfortable discussing and to avoid other topics despite their importance. How do we work to improve our comfort level with the potentially more important topics?

Providing patients and parents with information to take home is important. However, I find that our office's traditional handouts are frequently left in the exam room or are never taken from the front desk. To be more effective in delivering preventive health information to patients, we need to explore new communication methods. Parents who received baby books with stories containing positive health messages [9] or DVDs containing newborn anticipatory guidance [10] were found to have retained more knowledge of the specifically targeted topics [9, 10] and to feel more confident in caring for their child [10] than did those who received no books [9], noneducational books [9], or traditional paper handouts [10]. The informational handouts physicians provide are often filled with too much information. The handouts for adolescents that are used in the Bright Futures guidelines contain 37 bullet points, and in my experience, they are not an effective means of reaching this high-risk population. To effectively reach both parents and adolescents, we must make use of social media, text messaging, and videos to reinforce and expand the anticipatory guidance we provide in the office.

Asking open-ended questions and learning about the family are essential components of comprehensive preventive health care that provides appropriate anticipatory guidance. The challenge comes in making the time to do so during office visits, given the typical daily schedules of primary care physicians. Although it is not financially rewarding to do so, I find it necessary to take a minimum of 30 minutes for each

well-child check, and I take 45 minutes for adolescent well visits (which often get labeled as “sports physicals”).

As our state and country move toward a prevention model for health care, it is essential to improve the reimbursement for well-child checks. Unfortunately, measures of the quality and effectiveness of the anticipatory guidance provided during office visits have not been included in the 2014 Pediatric Recommended Core Measures listed by the Center for Medicare and Medicaid Services [11]. Because reimbursement is being guided more frequently by these and similar measures, it is essential that effective patient education be included. To achieve this, health care providers and public health officials must advocate for changes in these measures and for reimbursement policies that recognize the importance of physician-led health education. Providers need to be supported in taking the time necessary to provide quality care to patients and their families. **NCMJ**

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Behavioral Kernels and Brief Interventions: Teaching Parents Effective Behavior Management Strategies

Cheri J. Shapiro

Reducing the high prevalence of emotional and behavioral problems among youth requires that parents be given access to high-quality, effective parenting supports and interventions. Recently developed brief parenting interventions can be delivered without stigma in primary health care and other settings by a range of professionals.

Why should we be concerned about teaching parents effective behavior management strategies? Simply put, the quality of parenting is one of the most important influences on a child's development and well-being. However, recent research suggests that large numbers of youths and families are not faring well in this respect and may benefit from parenting support. Between 14% and 20% of young people (up to age 25) are estimated to have 1 or more mental, emotional, or behavioral disorders, with annual costs to society estimated at \$247 billion [1]. Although evidence-based prevention and intervention approaches for psychosocial problems are receiving increased attention and support at federal and state levels, the majority of youths and families in need do not access these services or participate in interventions that are helpful [2]. This dire state of affairs suggests the urgent need for strategies to reach a much broader segment of the population [3].

Brief parenting interventions can be disseminated to a broader degree and by a more diverse, multidisciplinary set of providers across a wider array of service settings than can interventions of greater length or intensity. Brief interventions can therefore reach many more families in need, which is necessary if we are to alter the high prevalence rates of emotional and behavioral disorders among youth. Primary care services not related to mental health services are critical for extending the reach of evidence-based interventions. Because primary care visits carry no stigma and are widely accessible, they are excellent points of access to information and support for managing a wide variety of concerns about children's social, emotional, and behavioral functioning.

Brief parenting interventions are also needed because of changes in behavioral health care delivery that will continue to evolve over the next decade. The majority of behavioral health care is now being and will continue to be provided by primary care physicians, not mental health care workers

[4]. In fact, because primary health care settings are the first place many individuals turn to for care, some of the largest health care providers (including the military) currently operate models of behavioral health care involving co-location with or integration with primary health care. A number of states, including North Carolina, are making significant strides toward such integration [5].

Establishing the infrastructure for integration of behavioral health services with primary care is a necessary but not sufficient first step in this process. Successfully reaching young people and families in need of behavioral health services also requires the availability of a range of short-term, effective, evidence-based interventions that can operate effectively in a primary care environment. This issue is exacerbated by the fact that evidence-based prevention and intervention approaches have not come into widespread use in the United States [6].

Behavioral Kernels

One way to reach many parents is through very brief elements of effective intervention that can be flexibly applied. Embry and colleagues [6] coined the term "evidence-based behavioral kernels" to describe very basic units of behavioral technology that have been demonstrated through research to be effective in changing behavior. These kernels represent the common elements embedded in effective evidence-based interventions [6, 7,]. Because kernels are (or can be) well defined, they are easily transmissible [8]. Examples of kernels include a wide range of well-known behavioral strategies such as verbal descriptive praise, warm greetings, time-out, praise notes, or nasal breathing.

Consider the common situation in which parents raise concerns about a child arguing with a sibling. The parents may not have thought about approaching this problem by identifying and increasing the rate of the behavior they would like to see instead of focusing on decreasing the behavior they do not want to see. In this example, the behav-

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ior the parents would like to see might be playing nicely with a sibling. The parents would then be encouraged to pay close attention when their children are playing together, and to verbally praise the children for cooperating or playing nicely with one another—to get close to the children, gain their attention, and tell them what it is specifically that the parents like (eg, “I really like the way both of you are playing the game together”). Noticing and acknowledging a positive behavior frequently at first, and then only occasionally, can help to encourage and maintain a new behavior.

Kernels are embedded in many effective behavioral family interventions and may be the driving force behind positive outcomes obtained with longer interventions. For example, in a large-scale study designed to reduce rates of child maltreatment at a population level—the US Triple P System Population Trial—more than 10,000 Triple P tip sheets on ways of managing common developmental challenges in children were distributed to families [9]. Tip sheets were distributed by providers to parents during the course of brief interventions (1-4 contacts); each tip sheet included targeted behavioral strategies (many of which were kernels) for preventing or managing the behavioral issue of concern (eg, noncompliance). In this manner, kernels were broadly distributed and may have played a role in the positive impact on maltreatment indicators seen at a population level [10].

Because kernels appear to be easy to understand and to transmit, they may be perceived to be simple interventions. However, to believe that being small and easily transmissible equates to being simple may be incorrect. Kernels are irreducible, meaning that if any element of the procedure or strategy is altered or removed, it will cease to be effective. Thus a complete understanding of the elements of the strategy and how to apply them is required for producing change. For example, “time outs” are an effective behavior management strategy only if “time in,” or the social context in which the behavior is embedded, is positive. A second consideration is the question of whether kernels are effective if they are separated from the larger intervention packages in which they are embedded [9].

The concept of kernels represents an ideal form of brief intervention that has the potential to be widely disseminated and thus to have substantial impact on the emotional and behavioral functioning of young people. Examples of several kernels, including praise notes, can be found at the Paxis Institute Web site (www.paxis.org). However, more work is needed to bring kernels into widespread use outside of the interventions in which they are often embedded. This work includes further development of materials that can be used to disseminate kernels directly, as well as research that examines how kernels are taught and implemented in real-world intervention settings. Fortunately, a number of evidence-based parenting interventions incorporate these kernels into brief interventions that are flexible enough to be delivered in primary care settings.

Brief Interventions

Brief interventions to address common developmental and behavioral challenges in children and adolescents are becoming more widespread. Primary examples include the brief interventions incorporated in the Triple P-Positive Parenting Program (Triple P) system of interventions. Triple P, a multilevel system of parenting support designed to promote positive parenting practices at a population level, is based on public health and community psychology approaches. Triple P consists of tiered interventions of increasing strength and intensity; brief Triple P interventions are specifically designed to be delivered in a wide variety of settings including primary care.

Several recent studies attest to the efficacy and effectiveness of these brief Triple P interventions for managing behavioral and emotional challenges. In a randomized controlled trial of a brief parenting intervention delivered over 3-4 sessions by child health nurses in a primary health care setting [11], 30 families with young children seeking advice about behavioral or developmental issues from 3 community health clinics were randomly assigned to intervention or to wait-list control conditions. Significant reductions were seen in the number of parent reports of child behavior problems, use of dysfunctional parenting strategies, parental anxiety, and parental stress, and these reductions were still present at 6-month follow up. No differences between groups were seen on direct observation of parent-child interactions; it is likely that this is because overall rates of behavior problems during the parent-child interactions were low. This study is significant because it demonstrates the feasibility of using health care staff as the agents of delivery and the potential outcomes that can be achieved.

Although brief one-on-one interventions are quite useful, in many settings small-group interventions may increase reach to parents. One recent study supports the efficacy of a brief parenting-discussion-group intervention for managing disobedience [12]. Sixty-seven parents of children aged 2-5 years residing in the Brisbane, Australia, metropolitan area were recruited based on their concerns about their child's disobedience and were randomly assigned to an intervention group or a waitlist control group. The intervention consisted of a single 2-hour discussion group with an average of 6 families per group; each family also received 2 follow-up telephone calls after the discussion group. Significant decreases were found in child behavioral problems and in the use of dysfunctional parenting strategies. Parents in the intervention group reported significantly greater levels of confidence in managing specific child behaviors and improved relationships with their parenting partners. These gains were maintained at 6-month follow-up.

Another method of delivering brief group interventions is via seminars, which provide the opportunity for larger numbers of parents to be exposed to brief interventions for management of children's behavioral and emotional problems.

Sanders and colleagues [13] examined the efficacy of a series of 3 seminars, each lasting 90 minutes, in changing parent and child behavior. The first seminar introduced parents to a range of positive parenting strategies, the second targeted management of externalizing behavior problems, and the third targeted resilience and managing internalizing behavior problems (eg, worries and fears). As part of a large-scale depression prevention effort known as Every Family, a randomized controlled study was conducted in which parents interested in attending seminars were randomized to the introductory seminar only, the seminar series, or a waitlist control condition. Significant reductions in child behavior problems for parents in both seminar conditions were found. Full seminar exposure resulted in significant reductions in dysfunctional parenting practices, as well as significantly reduced levels of parental conflict. Significant change in child behavior and parenting practices occurred with exposure to a single seminar only; however, exposure to all 3 seminars was needed for significant reductions in problematic parenting practices [13].

Sofronoff and colleagues [14] examined the initial efficacy of 2 seminars, each lasting 2 hours, which were developed as part of Stepping Stones Triple P, a Triple P variant developed for parents of children with disabilities aged 2-10 years [14]. Using a randomized, controlled trial design, significant reductions in child behavior problems, problematic parenting styles, and parental conflict were found that were maintained at 3-month follow-up. In addition, significantly increased parenting confidence was detected at follow-up that had not been evident at post-treatment.

Brief interventions have evidence of efficacy in helping parents make positive changes in their children's behavior and in their own functioning when delivered in a variety of flexible formats. These brief interventions are ideally suited for delivery in primary care settings by a range of professionals. However, continued research is needed to examine the effectiveness of these brief interventions in real-world delivery contexts.

Future research on brief interventions also needs to consider consumer preferences for delivery models. Accounting for parent preferences is an important factor in the development of new interventions, as parents are the agents of change for most effective interventions for youth behavior problems. Research is emerging in this area. Metzler and colleagues [15] used online survey methodology to examine parent preferences for receiving parenting information in a sample of 162 parents of children aged 3-6 years, and to obtain feedback about a prototype episode of an online version of Triple P. Parents preferred self-administered delivery formats (television, online) over home visits, therapist delivery, and group

formats, and they rated the video format as engaging and realistic [15]. Brief interventions delivered in a variety of ways that are not dependent on face-to-face contact with providers have the potential for population-level impact on rates of emotional and behavioral problems in youths. NCMJ

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The Importance of Routine Screening for Strengths and Risks in Primary Care of Children and Adolescents

Marian F. Earls

Providing a medical home for a child or adolescent and his or her family means establishing a longitudinal relationship between the primary care clinician (PCC) and the family. PCC's, by implementing routine screening and surveillance, have the opportunity at every encounter with the family to promote healthy development—motor, language, cognitive, and social-emotional.

Providers of primary health care for children have long recognized the importance of developmental screening and surveillance in helping families to optimize a child's acquisition of skills, to understand the child's behavior, and to facilitate learning. For young children who have developmental differences or delays, screening provides the opportunity for early identification and referral for intervention. From the time a child starts school through adolescence, screening promotes earlier identification of learning problems, behavior problems, and social-emotional or mental health issues—before these reach crisis level. For young people of all ages, screening, discussion, referral, and follow-up help maintain and enhance patient and family function.

Clinicians who care for children and adolescents have the opportunity at every encounter with the family to promote healthy motor, language, cognitive, and social-emotional development. The promotion of healthy development is a central emphasis of Bright Futures, a national initiative of the American Academy of Pediatrics (AAP) [1]. Bright Futures health promotion themes include family support, child development, and mental health.

When the family has a medical home, promotion of healthy development begins as early as the prenatal visit and continues throughout the longitudinal relationship that the primary care clinician (PCC) has with the child and family [2]. That longitudinal relationship is a key component of the "primary care advantage" described in the AAP policy statement regarding mental health competencies for pediatric primary care [3]. It is a dynamic relationship that engages parents as partners in the care of their child. This engagement begins early—with elicitation of strengths and weaknesses and screening for risk factors—and supports

and communicates an openness to discussion about concerns or issues as they arise.

From the beginning of well-child care, the PCC's relationship with the family is built on communication about the whole child, within the context of the family and the community (child care, school, etc). The PCC screens for psychosocial risks and strengths, and for the child's developmental and social-emotional skills. Screening is not a one-time event, but is done periodically over the course of the relationship (surveillance), building on the communication exchange.

Search Institute provides good information regarding family assets that optimize success and regarding factors that put children and families at risk [4]. Awareness of these allows for early recognition and early intervention, and for prevention of unwanted outcomes. Routine discussion of assets and risks is an essential promotional and preventive strategy. Opportunities for promotion and prevention in primary care practice are provided by prenatal visits, psychosocial screening (including screening for postpartum depression), developmental and behavioral screening and surveillance, and social-emotional and mental health screening for children and adolescents at risk.

The use of routine standardized screening tools at recommended intervals enhances surveillance and improves the ability to identify risk early. PCCs utilize the "primary care advantage" to partner with the family, providing assessment, encouragement, and support, linking them to resources, making referrals if necessary, and communicating and collaborating with specialists, schools, and other providers in the care of the child or adolescent.

Routine, formalized screening done periodically over the course of the PCC-family relationship is effective for identifying risk, for recognizing strengths and progress, and for maximizing developmental and behavioral health. When screening tools are parent-completed, it engages them as

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North Carolina's Health Check Program

Frank Skwara

The Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) provisions of the Social Security Act [1] define Medicaid's package of health benefits for beneficiaries under 21 years of age. Medicaid covers 35% of all children, and more than 60% of poor children nationwide. Through the EPSDT benefit, Medicaid has played a critical role in improving the health of our nation's low-income children. Under federal EPSDT requirements, states must provide outreach to children with actual or potential health problems; ensure the availability of health and developmental assessments and of vision, dental, and hearing services; and ensure that medically necessary treatments are available to children.

Health Check is North Carolina's comprehensive Medicaid well-child benefit. The goal of Health Check's prevention-oriented services is the early identification and treatment of conditions that can adversely impact children's healthy growth and development.

Low-income children are more likely to be born at a low birthweight, which is a significant risk factor for poor health over a lifetime. Impoverished children are more likely to be in fair or poor health, to experience significant environmental and interpersonal stress, to have problems with nutrition, to develop chronic medical conditions, and to suffer developmental delays or learning challenges [2]. For these children, early screening and intervention are essential, and these services are supported by North Carolina's Health Check Program.

Bright Futures' recommendations for preventive pediatric health care [3] are theory- and evidence-based guidelines specifying the content of such care and the intervals at which it should be offered. Providers are advised to perform basic psychosocial and behavioral assessments as well as developmental surveillance at all well-child preventive care visits. North Carolina's Health

Check program currently covers the preventive care services outlined in these Bright Futures recommendations and has been a national leader in implementing bundled rates for financing this menu of comprehensive wellness services.

Pediatric Preventive Care Challenges in North Carolina

All states are required to report their rates of participation in preventive services annually to the federal government's agency for Medicaid administration, the Center for Medicaid and Medicare Services (CMS). In North Carolina in federal fiscal year 2011, based on claims paid, 96% of Medicaid-eligible children younger than 1 year of age received screening and preventive care as recommended by Bright Futures. In 2011 only 84% of North Carolina children were still receiving all of the recommended care by the end of their second year of life, and by the end of their fifth year of life, only 75% were doing so [4].

School systems require vaccinations for enrollment, and parents demonstrate high rates of compliance with those requirements to ensure their children's participation in public education. After age 6 years, participation in wellness visits declines significantly, suggesting that parental burden and the incidence of childhood illness, rather than a wellness focus, have begun to drive frequency of visits to primary care providers. In 2011, North Carolina's wellness-visit participation rate for Medicaid-eligible children aged 6-14 years was reported to CMS as 45%. For children aged 15-18 years, the reported rate was 33% [4].

Preadolescence is a time of rapid social and emotional growth, when health attitudes and a sense of personal responsibility and empowerment take shape. This stage of growth is ripe with teachable moments. A predisposition to value relationships with mentors and helping profes-

experts on their child and helps make screening feasible in a busy practice. Also, adolescents may self-report, using screening tools that give them an opportunity to discuss their strengths and concerns. Screening is optimized by surveillance, because periodic screening gives a longitudinal perspective on developmental progress.

The need for screening and surveillance is consistent with what we know about development prenatally and thereafter: that experience has a significant impact on brain development (neurogenesis, cell migration, synapse formation, and remodeling); that growth, development, and behavior are inextricably linked; and that emotional development occurs in the context of relationship. Recent understanding of brain development has highlighted the importance of social-emotional development for language, memory, and cognitive skills. Experience affects brain development, both prenatally and postnatally. The implications for prevention and inter-

vention are profound. Therefore, screening is most effective when the whole child is considered. If practice "separates the head from the body," care is fragmented and crucial linkages may be missed.

Because children and adolescents develop in the context of the family, screening and surveillance also involve helping families build on strengths and minimize the impact of risk factors. Factors that increase risk for developmental, behavioral, and social-emotional problems include poverty, maternal depression, domestic violence, and substance abuse. Routinely and periodically asking parents and adolescents about these issues invites nonstigmatizing discussion and support, and it conveys the message that any of these issues can be brought up at another time as well. A conversation about the screening identifies the child's strengths and weaknesses, gives a template for anticipatory guidance, and elicits and respects parental concerns. In this

sions can be nurtured and enhanced during this developmental period.

The experience of personal health is the outcome of biological, psychological, and social factors. The presence of supportive mentors and teachers is critical if children are to build a foundation of health awareness and positive health attitudes that maintain well-being. Primary care providers offer exceptional human value in their important mentoring relationships with growing children. The dedicated and conscientious participation of primary care providers is a cornerstone of support for the learning and internalization of good health habits. Providers cannot accomplish this alone, however. The challenge of raising health-conscious children will require the commitment, enthusiasm, and coordinated efforts of an entire community of caring people.

Outreach to Preadolescent and Adolescent Populations

Statewide outreach to underserved and at-risk populations is a critical element of Medicaid's EPSDT program and integral to NC Health Check. The North Carolina Division of Public Health encourages highest-risk children and families to seek thorough health care. The North Carolina Division of Social Services informs families of the availability of critical health services and provides logistic support. Through contracts with North Carolina Community Care Networks, there are more than 60 local Health Check outreach coordinators throughout the state. Currently, their primary task is follow-up contact with children who have missed well-child appointments or have failed to schedule them.

Health Check has a unique opportunity to re-envision its strategies of outreach. Using the power of North Carolina's Children's Health Insurance Program Reauthorization Act (CHIPRA) quality demonstration grant, Health Check can carefully craft its future interventions to focus on the highest-risk subpopulations of Medicaid enrollees, while also ensuring that all beneficiaries receive appropriate and timely information on preventive services. Health Check is studying carefully model programs of outreach

to high-risk young people that are being implemented across the country, highlighting use of electronic media, local leaders, grandparents, schools, key arts and entertainment personalities, sports professionals, medical experts, and influential peer groups. North Carolina's Health Check Program and the North Carolina Community Care Networks are in the beginning stages of evaluating their current outreach efforts and are considering these model programs in other places for implementation in North Carolina. NCMJ

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way, parental self-efficacy and confidence is promoted. The sharing of age-appropriate books from an early age should be encouraged, because it has benefits for the parent-child relationship, develops language skills, and facilitates success in mastering early reading skills. Children with at-risk scores on screening measures should be referred to early-intervention services. For a parent whose child has a medical condition or developmental problem, a connection to a family support network can provide parent-to-parent support.

It is the PCC's role to elicit strengths and concerns. From an early age the child should participate in reporting his or her strengths and concerns. This builds the relationship with the child and prepares well for communication between the PCC and the adolescent. When social-emotional, behavioral, or mental health concerns are voiced, the AAP Task Force on Mental Health recommends employing a "com-

mon factors" approach and using motivational interviewing skills to engage the family in developing a plan for addressing the issue together and considering follow-up and referral if necessary [5, 6]. A common factors approach consists of techniques used to increase patients' optimism, feelings of well-being, and willingness to work toward improvement, regardless of the specific diagnosis or problem identified (for example, finding agreement on healthy activities/practices such as exercise, time outdoors, limits on media, balanced and consistent diet, sleep, one-on-one time with parents, reinforcement of strengths, open communication, pro-social peers).

The PCC does not need to become an expert at diagnosing and managing developmental and behavioral disorders or to become a mental health professional. Rather, the PCC has the role of sounding board, partner in finding information, facilitator to negotiate the system, resource for

Surveillance for Behavioral Health Problems and Developmental Disabilities in Pediatric Primary Care

Emma J. Miller

The Bright Futures initiative of the American Academy of Pediatrics (AAP) promotes the provision of health, developmental, and preventive services to address children's health needs in the context of family and community [1]. Social workers trained in integrated care can contribute to pediatric and family practices and help provide surveillance for a range of issues that place children and their families at risk. Social workers with training in infant mental health can better help behavioral health teams implement Bright Futures recommendations in the early years when surveillance is more frequent.

Both medical and nonmedical community agencies are involved in addressing the developmental context for children and youth with mental health problems and in providing assistance. Primary care practices and agencies providing educational instruction, early intervention, child mental health and substance abuse services, juvenile justice services, social services, and family education and support can help when caregivers and families are overwhelmed by many challenges. Therefore, a multidisciplinary approach is required because the issues and the interventions called for are often beyond the scope and expertise of a single discipline or practice or agency.

At the present time, there is movement toward an interdisciplinary approach via the integration of behavioral health with primary care. Earls and Spring [2] list the following as benefits of an integrated model of pediatric primary and behavioral health care: stigma reduction; family convenience; better communication between the primary care provider and the mental health provider, with opportunities to encourage therapeutic goals; improved adherence to treatment; and opportunities for the primary care provider and the mental health provider to learn from one another.

Collins and colleagues [3] foresee that administrative and service delivery structures will be streamlined in the name of cost containment and quality improvement. In their view, the coming decade will bring an opportunity to redesign primary care and mental health care so that they are delivered in a "holistic and patient-centered manner, using an integrated approach that is able to meet the full spectrum of a patient's physical and behavioral health care needs" [3]. Social workers integrated into primary pediatric practices can partner with families of children at every age to prevent problems and provide early intervention.

The 30-year-old field of infant mental health is multidisciplinary and has produced information applicable to a variety of health care settings. According to Zeanah and colleagues, unique features of infant mental health care include its "multidisciplinary nature, developmental orientation, multigenerational focus, and emphasis on prevention" [4].

Both infant mental health care and pediatric care recognize that parents and families play a pivotal role in the lives of children and have therefore adopted a 2-generational model of care. According to the AAP, "the health and well-being of children are inextricably linked to their parents' physical, emotional and social health, social circumstances, and child-rearing practices" [5]. The AAP also points out that "when a family's distress finds its voice in a child's symptoms, pediatricians are often parents' first source for help" [5]. This is true not just of pediatricians but of other primary care providers as well, especially when the practice serves as a medical home and provides periodic health supervision that engenders trust in the medical professionals and social workers who have established a

referrals for further assessment and interventions, and co-manager of care with other specialists. If the practice has integrated a mental health professional (eg, a licensed clinical social worker or a licensed professional counselor) into the medical home team, the PCC can do a "warm handoff" during the same visit when a screen is positive for a social-emotional, behavioral, or psychosocial issue.

Anticipatory guidance that addresses these issues in a timely fashion and an atmosphere of openness to parental concerns are tools that a PCC can use to promote success. Using well-child care visits to focus on the child in the family, employing screening tools, and making the discussion of sometimes uncomfortable topics a matter of routine will establish the practice as a resource for information, support, referral, and connection to other community providers.

Community Care of North Carolina (CCNC), which consists of 14 regional community care networks serving low-income children and adults, has facilitated wide-

spread implementation of screening for developmental and behavioral issues through several quality initiatives. These include the Assuring Better Child Health and Development (ABCD) program, 2 initiatives for mental health integration in primary care, the establishment of behavioral teams in every network, and Medical Home Learning Collaboratives funded through the North Carolina's Children's Health Insurance Program Reauthorization Act (CHIPRA) Quality Demonstration Grant.

The ABCD program began in 2000. North Carolina was in the first group of states to receive funding from The Commonwealth Fund to promote the provision of developmental services in primary care for the period of early childhood. The CCNC infrastructure facilitated piloting and spread of the ABCD program, so statewide implementation was well on its way in just a few years [7, 8]. In 2007, North Carolina led the nation in rates of developmental and behavioral screening for children 0-5 years of age [9]. As a result

relationship with the family.

Anticipatory guidance is an element of medical homes under comprehensive care, and Bright Futures offers recommendations regarding what the content of such guidance should be and when it should be offered [6]. The Michigan Association of Infant Mental Health takes an approach similar to that of Bright Futures, saying that infant mental health interventions are "designed to support children and families within the context of relationships and communities" (7).

In their webinar on primary and behavioral health integration in pediatrics [2], Earls and Spring identify 4 opportunities for health promotion and prevention in primary care: the prenatal visit, psychosocial and maternal depression screening, developmental and behavioral screening and surveillance, and social/emotional screening for children identified as being at risk. Such opportunities are also present during office visits for preventive care. Establishing surveillance in the workflow of a medical practice helps a family understand, from infancy onwards, that regular monitoring of health and development is a usual part of care. Clinical social workers with training in infant mental health can assist practices, making possible greater parent satisfaction and ensuring appropriate surveillance in the younger years and beyond. This redistribution of surveillance responsibilities eases providers' time constraints, and provides opportunities for the clinical social workers to provide assessment, diagnosis, and treatment should mental health or substance abuse problems become apparent.

The AAP Report of the Task Force on the Family [5] acknowledges that some primary care providers may not be willing or ready "to provide care that considers and encompasses the family." Barriers cited include lack of the following: training, experience, referral networks, reimbursement, and time. Social workers can be a solution, because they can coordinate services, link the family to community resources, and mediate feedback from those community resources to the primary care provider. NCMJ

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of ABCD, children with developmental needs are identified earlier. Referrals to CCNC's Early Intervention Program are on average made at an earlier age and have more than quintupled since 2004. Since 2010, routine screening for autism at the 18-month and 24-month well-child visits has been incorporated into the ABCD Project.

But early screening is not just about finding problems. An equally important benefit is that discussion of screening between parents and the PCC supports parents in developing parenting skills, promotes child and family strengths, and enhances parents' understanding of healthy development. With better understanding of development, parents report better ability to manage their child's behavior and to have appropriate expectations.

Medical practices that are involved in the Medical Home Learning Collaboratives as part of CHIPRA are focusing on developmental services and behavioral, social-emotional, and mental health services for patients 0-20 years of age

and their families. They are using routine screening and, very importantly, are building systems in their practices and networks for communication, referral, and linkages to community resources. They have implemented processes in their practices to use screening tools for postpartum depression and for assessment of developmental concerns, strengths, and risks for school-age and adolescent patients, in addition to the ABCD screening they were already doing. They have developed relationships with other professionals in order to co-manage care for Children and Youth with Special Health Care Needs (CYSHCN).

Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) is the federal regulatory guideline that lists all the medically necessary health care services that Medicaid must provide to Medicaid-eligible children. EPSDT has general requirements for a comprehensive health and developmental history, a physical health development assessment, and a mental health development assessment. States may be more

or less specific about these requirements. NC Health Check (NC EPSDT), in accordance with Bright Futures (periodicity schedule and guidelines from the American Academy of Pediatrics for preventive care), requires general developmental and behavioral screening at specified well-child visits for ages 0-5 years, as well as routine autism screening at the 18-month and 24-month visits. In addition, routine screening of social-emotional development and mental health risk is recommended for school-age children and adolescents. A few years ago, Health Check recognized the need for annual preventive visits for these latter 2 populations and changed the EPSDT periodicity schedule to reflect this. More recently, Health Check has added recommendations for screening school-age children and adolescents for strengths and risks. CCNC quality measures now include an EPSDT Profile that reports quarterly data on EPSDT screening components and on the EPSDT rates themselves. These Quality Measures and Feedback (QMAF) indicators have been expanded to include not only rates for well visits, dental visits, and dental varnishing, but also rates for EPSDT components such as body mass index, vision, and hearing, and rates for ABCD screening, autism screening, and screening for school-age children and adolescents.

In summary, screening and surveillance need to be a regular part of well-child care. Growth, development, and behavior are inextricably linked. Using parent-completed and patient-completed questionnaires from the beginning of the family-PCC relationship includes parents as experts on their child and provides the basis for the establishment of the medical home for the child and family. Finally, in linking family, medical practice, and community, collaborative relationships among providers in the community constitute best practice. In North Carolina, both CCNC and Health Check have embraced these principles and supported their integration into primary care. That said, there is still considerable work to be done in assuring that these services occur reli-

ably in all practices that serve children and adolescents, and in promoting families' knowledge of and request for these services. **NCMJ**

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Immunizations for Preteens

Emmanuel B. Walter, Richard J. Chung

As a part of health supervision visits, all preteens should receive the combined tetanus, diphtheria, and pertussis vaccine, the meningococcal conjugate vaccine, the human papillomavirus vaccine series, and an annual influenza vaccine. Because levels of vaccine coverage among preteens are generally suboptimal, strategies for improving coverage should be devised and implemented.

Immunizations are a major component of health supervision visits for children and adolescents. Because immunization recommendations change frequently, Bright Futures, an initiative of the American Academy of Pediatrics (AAP) that promotes the health of children and adolescents, has issued guidelines that refer providers to the Web sites of the Centers for Disease Control and Prevention (CDC) [1] and the AAP [2] for the most up-to-date immunization schedules. For no other age group have routine immunization recommendations evolved more rapidly in the past 8 years than for preteens. (See Figure 1 for a list of vaccines recommended for those 11-12 years of age.) This advancement resulted from the development of a number of novel vaccines, including meningococcal conjugate vaccine; tetanus, diphtheria, pertussis vaccine; and human papillomavirus vaccine. In addition, an annual influenza vaccine is now recommended for everyone, including preteens. The discussion that follows will highlight the rationale for recommending vaccines during the preteen period. Challenges for immunizing North Carolina preteens will also be described, and potential strategies for improving preteen vaccine coverage will be considered.

Meningococcal Disease

Meningococcal disease, caused by *Neisseria meningitidis* bacteria, most commonly presents as meningitis but may also present with bacteremia or septicemia. The case-fatality rate of invasive disease is about 10%, and survivors often suffer from such sequelae as hearing loss, limb loss, or neurologic impairment [3]. Disease incidence is highest among children during the first year of life and climbs again during the teenage years. Serogroups C, Y, and W-135 cause about 75% of disease among persons 11 years of age or older [3]. The vast majority of disease among teens can be prevented by vaccination. Prior to 2000, the annual number of reported cases of invasive meningococcal disease in the US ranged from 1,300 to 3,500. Since 2001, the annual number of cases has steadily decreased from 2,333 in 2001 to 833 in

FIGURE 1.
Immunizations Universally Recommended for North Carolina Preteens 11-12 Years of Age

Meningococcal conjugate vaccine
First dose (to be followed by a second dose at age 16 years).
Tetanus, diphtheria, pertussis vaccine
Human papillomavirus vaccine
3 doses
Females - either HPV4 or HPV2
Males - HPV4
Influenza vaccine
Yearly

2010 [3, 4]. In 2010, only 14 cases were reported in North Carolina, and 11 of those cases were caused by serogroups included in the current vaccine [4]. Although meningococcal disease is uncommon, vaccination is critical, because the consequences of infection can be devastating.

In 2005 the US Food and Drug Administration (FDA) approved the first of the 2 currently licensed quadrivalent meningococcal conjugate (MCV4) vaccines, which target serogroups A, C, Y, and W-135. Either of the 2 vaccines can be used to routinely immunize children 11 or 12 years of age. It was subsequently recognized that immunity following a single dose of MCV4 administered at this age is short-lived, leaving some older adolescents unprotected from meningococcal infection when exposed. Therefore, in 2011 the CDC began recommending a second dose of MCV4 vaccine for routine administration starting at age 16 years [5].

Pertussis

Pertussis most frequently manifests in preteens as a prolonged and severe cough illness [6]. The early phase of the illness, characterized by rhinorrhea, low-grade fever, and mild cough, is indistinguishable from upper respiratory infections from other causes. As the illness progresses, the preteen child will typically experience coughing fits and post-tussive emesis. Sleep is often disrupted, and school absenteeism is common. Over the course of many weeks to

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several months, the coughing fits become less frequent and eventually resolve.

A key concern related to pertussis infection in preteens is transmission of infection to school classmates and younger siblings. This may result in classroom and school outbreaks. Furthermore, infected preteens can serve as a reservoir of infection, posing risk to infants and newborns, who are most vulnerable to severe infection.

Since the early 1980s, the incidence of pertussis has gradually increased [4]. A recent outbreak in California resulted in more than 9,000 cases, 809 hospitalizations, and 10 infant deaths [7]. High rates of disease were noted among preteens, and a recent evaluation of data from that outbreak suggests that the protection from disease conferred by a fifth dose of diphtheria, tetanus, and acellular pertussis (DTaP) vaccine is short-lived [8]. Data from the North Carolina Electronic Disease Surveillance System show that 2012 has so far witnessed the largest number of pertussis cases seen in the state during the past 6 years, with the majority occurring in children and adolescents 6-17 years of age, many of whom were appropriately vaccinated (Figure 2).

Current measures for controlling pertussis include vaccination of infants and preschool-age children with DTaP according to the recommended childhood immunization schedule, as well as routine vaccination of preteens and unvaccinated adolescents and adults with tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine. Since 2006, 2 Tdap vaccines have been approved and recommended for preteens 11-12 years of age. In 2008, the state of North Carolina mandated that all children enrolled in public school receive a dose of Tdap vaccine before entering sixth grade, or by age 12 years for those not attending public schools [9]. Further studies are needed to elucidate the optimal timing for pertussis vaccination to

assure protection across the lifespan. Improved vaccines that induce long-lasting protection against pertussis also need to be developed.

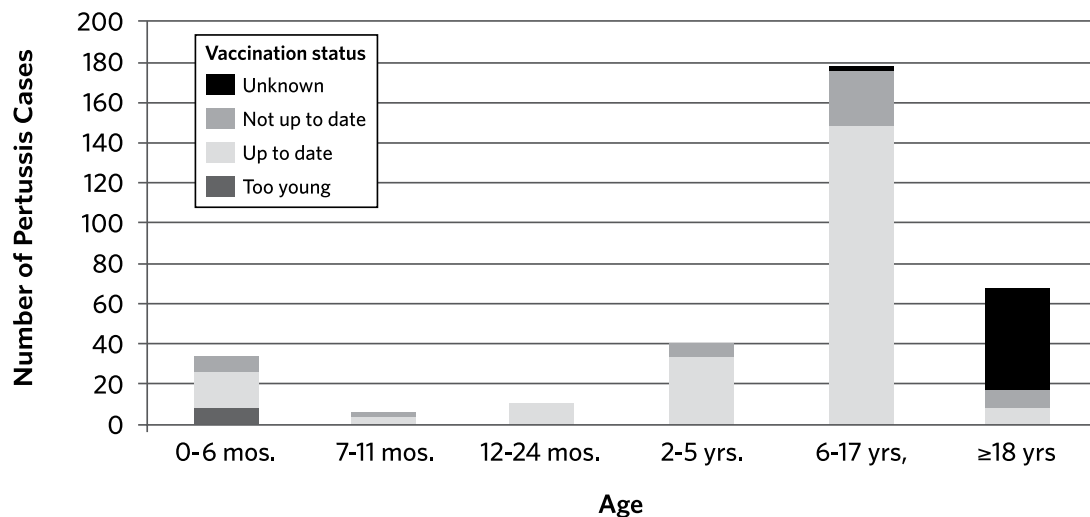
Human Papillomavirus

Human papillomavirus (HPV) infection is the most common sexually transmitted infection in the United States. More than 6 million persons in the United States become infected with HPV each year, with the vast majority of new infections occurring among persons 15-24 years of age [3]. Although infection is typically transient, persistent infection with oncogenic HPV types is the most important risk factor for development of precancerous or malignant lesions of the cervix, anus, or genitals [10]. HPV types 16 and 18 cause approximately 70% of cancers of the cervix, anus, or genitals [3]. There is also increasing recognition that many head and neck cancers are associated with HPV infection [11]. Other HPV types, in particular types 6 and 11, are responsible for 90% of genital warts [3].

In the United States, there are more than 12,000 incident cervical cancer cases and 4,000 deaths due to cervical cancer annually [12]. In North Carolina, the rate of cervical cancer is consistent with the national average, but within the state there are 20 counties with a disease incidence that is higher than the highest rate estimated for any of the 50 states [13]. The best methods of preventing cervical cancer include cervical cancer screening and vaccination. Given pockets of higher disease incidence, more intensive efforts at increasing vaccination and screening in some North Carolina counties is warranted.

A quadrivalent human papilloma virus (HPV4) vaccine was approved by the FDA in 2006 and quickly recommended for routine administration to females starting at age 11-12 years. Although a permissive recommendation for

FIGURE 2.
Pertussis Cases Reported in North Carolina During the First 8 Months of 2012, by Age and Vaccination Status



Source: Data are from the North Carolina Electronic Disease Surveillance System provided by the North Carolina Immunization Branch.

Coping With a Pertussis Outbreak in Alamance County, North Carolina

Kathleen Shapley-Quinn

At its peak prevalence in the United States in the 1930s, pertussis (whooping cough) affected as many as 265,000 people per year, killing thousands of infants [1]. With the introduction of a combination vaccine for diphtheria, pertussis, and tetanus (DPT) in the mid 1940s, the number of annual cases gradually decreased, until fewer than 2,000 were being recorded in the 1970s [1]. Since that time, though, the incidence of pertussis has been on the rise, and more than 30,000 cases were reported during the first 9 months of 2012 [2].

Why the resurgence? DPT vaccine, which contains whole-cell pertussis, is very effective but also has an unacceptable side-effect profile. A newer vaccine, DTaP, which has an acellular pertussis component, began gradually replacing the whole-cell vaccine in the 1990s. Although DTaP has fewer side effects than DPT, the immunity it confers is less durable. The acellular vaccine initially provides 98% protection against disease when it is administered to children 4-5 years of age in a 5-dose series, but protection wanes to 71% over the next 5 years [3]. As a result, children 7-10 years of age become susceptible to pertussis, which is also present in the adult population where it often goes undiagnosed. Communities are therefore at increased risk for outbreaks.

Alamance County, North Carolina, experienced such an outbreak recently. In December 2011, a child attending elementary school was diagnosed with pertussis, and investigation of the child's contacts (schoolmates, fellow school-bus riders, and family members) soon identified many children who had pertussis-like symptoms. Health department nurses spent hundreds of hours talking with families to clarify which children and adults met the case

definition for pertussis. Laboratory testing with culture and/or polymerase chain reaction technology was used whenever possible to confirm diagnoses. Contacts in additional schools were identified, and additional unrelated (not epidemiologically linked) cases of pertussis in the community were found by health care providers. A total of 166 cases were diagnosed between December 2011 and August 2012, most of them children in the Alamance-Burlington school system. A total of 24 schools were affected.

Inadequate vaccination rates are often blamed for such outbreaks, so it is notable that school records showed that 100% of students in the Alamance-Burlington school system had been appropriately vaccinated. Furthermore, among children with proven disease, 100% of those 3-12 years of age were up to date on their vaccinations, as were 93% of those 13-17 years of age.

Initial responses to the outbreak followed Centers for Disease Control and Prevention (CDC) guidelines [4], which call for administration of prophylaxis to all close contacts of each case—that is, household contacts and those who had spent at least 15 minutes within 3 feet of the ill individual. Furthermore, when 2 or more cases of pertussis were identified in a classroom or on a school bus, all of the children in that classroom or on that bus were considered close contacts. Hundreds of courses of prophylactic antibiotics were prescribed during the first weeks of the outbreak.

Our public health partners in the Immunization Branch and the Communicable Disease Branch of the North Carolina Department of Health and Human Services worked closely with us throughout this effort. We were becoming frustrated with the burdensome strategy for containment,

administration of HPV4 to males followed in 2010, a full routine recommendation for its use among males at age 11-12 years did not occur until 2011. In 2010, a bivalent human papilloma virus (HPV2) vaccine was also approved for use in females. Both vaccines are administered in 3 doses over a period of 6 months.

The 2 HPV vaccines differ both in composition and in indications for use. HPV4 contains purified virus-like particles from the major capsid protein of HPV types 6, 11, 16, and 18, whereas HPV2 contains virus-like particles from the major capsid protein of HPV types 16 and 18. Both HPV4 and HPV2 are indicated for the prevention of cervical cancer and precancerous cervical lesions in women. HPV4 is also indicated for prevention of genital warts, anal cancers, and precancerous anal lesions in both males and females. To be most effective, HPV vaccine should be administered prior to acquisition of infection. Because a significant proportion of adolescents will become sexually active during their mid to late teens and the potential risk for HPV exposure is high,

the best time to initiate the vaccine series is during the pre-teen years. Preteen vaccination also assures the best chance for vaccine series completion in order to achieve optimal protection from infection prior to virus exposure [1, 2].

Other Considerations for Vaccination of Preteens

All 3 routinely recommended preteen vaccinations (MCV4, Tdap, and HPV) can be administered at the same health care visit, thereby decreasing the need for additional visits other than those to complete the 3-dose HPV series and to receive the MCV4 booster at age 16. Preteens should also receive an annual influenza vaccine. Although most preteens can receive the intramuscular inactivated influenza vaccine, an alternative for those without underlying long-term health problems such as asthma is the intranasal administration of live attenuated influenza vaccine. The preteen health care visit also provides an opportunity to assess whether or not preteens are up to date for other immunizations. All preteens should have previously received 2 doses

which did not appear to be effective, so our state partners soon linked us with pertussis experts at the CDC, who reviewed our approach.

CDC staff informed us that broad-scale prophylaxis for pertussis is ineffective at curbing outbreaks and that they are therefore developing new guidelines. Alamance County implemented this unofficial guidance from the CDC, which focuses on protection of those at highest risk: close contacts to a pertussis case who have a weakened immune system or chronic lung disease, or who live with a woman who is more than 20 weeks pregnant or an infant who is younger than 12 months. This narrowed focus freed our nursing staff to begin the potentially more effective strategy of widespread pertussis vaccination. We administered Tdap vaccine to thousands of people, including parents and staff members of schools and child care centers, and offered vaccination at multiple community events.

Despite its imperfect nature, vaccination is one of our most effective prevention strategies. North Carolina state law requires DTaP vaccination at the ages of 2 months, 4 months, 6 months, and 15-18 months, with a booster dose at age 4-5 years. In addition, administration of Tdap vaccine, which contains a reduced amount of diphtheria toxin, is now mandated for entrance into the sixth grade and is strongly recommended for every adult.

Immunizing caregivers of infants is especially important. Fewer than 50% of pertussis infections in infants have a known source, but when the source is known, in 80% of cases it is a parent, sibling, or other close family member [3]. Women who are pregnant can be given Tdap vaccine after the 20th week of pregnancy and should receive it immediately after giving birth at the latest. In Alamance County, we partnered with local hospitals and obstetricians to ensure Tdap vaccination of all new mothers, and we also strongly encouraged their family members to be vaccinated.

By October 2012, Alamance County pertussis rates had

returned to baseline. We keep our fingers crossed. Our hope is that other North Carolina counties will undertake robust vaccination programs in order to avoid experiencing a similar outbreak. In addition, local health departments and the North Carolina Division of Public Health should continue to work together to determine optimal responses, including use of new strategies based on emerging information about pertussis control. **NCMJ**

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of vaccine(s) for measles, mumps, rubella, and varicella and 3 doses of hepatitis B vaccine [1, 2].

Teen Vaccination Coverage

In 2011, 77.8% of North Carolina adolescents 13-17 years of age had received Tdap vaccine and 65.9% had received 1 or more doses of MCV4 vaccine as shown in Figure 3 [12]. In addition, 54.4% of females 13-17 years of age had received 1 or more doses of HPV vaccine, but only 32.3% had received the full recommended complement of 3 doses [14]. It is encouraging that state trends in teen vaccine coverage have mirrored national trends by showing steady increases in Tdap and MCV4 coverage over the past 4 years [14-17].

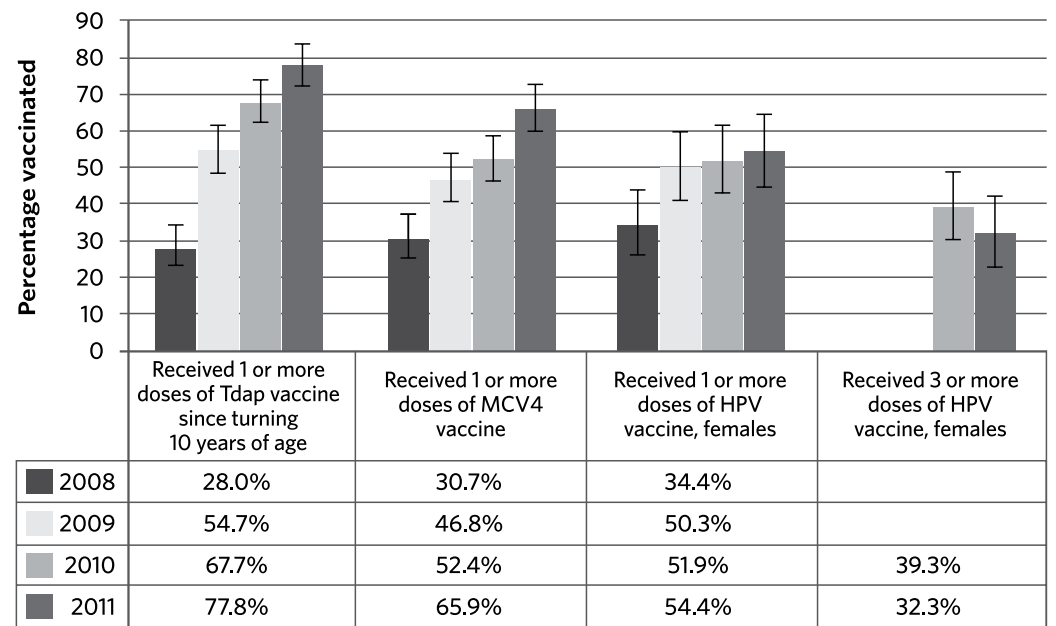
Unfortunately, increases in HPV coverage among adolescent females lag considerably behind those for other teen vaccines. Routine HPV vaccination of males was recommended only recently, so it is too soon to comment on coverage level in that group. National data suggest that younger teens are less likely to have received at least 1 dose

of HPV vaccine. These data reflect the reluctance of many parents to vaccinate their preteens. Some parents prefer to defer vaccination based on their assessment of their child's experience with sexual activity. Likewise, health care providers often reinforce the parents wish to defer vaccination. Providers delay preteen HPV vaccination for a number of different reasons including discomfort discussing sexuality with parents and preteens, a belief that HPV is not a significant health concern for their younger patients, and concern about parental resistance to HPV vaccination [18]. Health care providers should acknowledge the parents' perspectives but also point out that preventive measures such as the HPV vaccine are best implemented well in advance of any potential infectious exposures.

Improving Delivery of Vaccines to Preteens

Although the barriers to preteen vaccination are many, efforts to mitigate these obstacles are similarly numerous [19]. Preteens present for routine care less frequently than

FIGURE 3.
Meningococcal, Pertussis, and Humana Papillomavirus Vaccination Coverage of North Carolina Adolescents 13-17 Years of Age, 2008-2011



Note. The error bars indicate 95% confidence intervals. Tdap, tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine; MCV4, quadrivalent meningococcal conjugate vaccine; HPV, human papillomavirus vaccine (either quadrivalent or bivalent). Source: Data are from the National Immunization Survey-Teen (NIS-Teen), United States, 2008-2011.

do younger children and therefore have fewer opportunities to be immunized in general. The concept of annual health supervision visits for preteens is not as familiar to parents and guardians as the slate of frequent visits that characterize early childhood. In addition, parents may not be aware of the various health needs of preteens or of the existence of a preteen vaccination schedule. These obstacles to immunization may be compounded by the inherent conflict between typical clinical office schedules and the busy lives of preteens and adolescents, who often navigate a variety of obligations related to school, family, and other activities. Shifting services to align with the needs of preteens and adolescents may mitigate these issues but would also require fundamental changes to practice patterns. To help alleviate such obstacles, it may be important to add points of access such as schools or other community settings.

Furthermore, the expanded vaccination platform in the preteen years is still a recent development and may not be implemented seamlessly in some settings. Clinicians often lack awareness of current recommendations regarding the types of immunizations, the numbers of doses recommended, the recommended ages of initiation, and the timing of continuation. Immunizations can and should be offered during any clinical encounter, including acute care visits when possible. Again, doing this may require a shift in fundamental practice patterns, which currently limit immunization efforts to health supervision settings.

Finally, although vaccination mandates are known to be

effective in increasing coverage, neither MCV4 vaccination nor HPV vaccination is mandated in North Carolina. As of this writing, only 12 states mandate receipt of MCV4 vaccine and a single dose of HPV vaccine, whereas 34 have mandates for receipt of Tdap vaccine [20]. This deficit is often compounded by misinformation, particularly about vaccine safety, in the media and among many peers and adults. The value of vaccinations is also often understated, given the general lack of experience with historically devastating illnesses that are now vaccine-preventable. Stigma, particularly related to the HPV vaccine, continues to confound immunization efforts. Finally, cultural and religious exemptions often pose a barrier to extending vaccination coverage. Effective messaging to educate and address the public regarding the benefits of preteen immunizations is needed.

Adolescent vaccination is a constantly evolving and immensely impactful realm of preventive care for young people. Collectively, the 3 vaccinations highlighted in this commentary constitute a tremendous advance in personal and public health. All preteens should receive should receive an annual influenza vaccine, the Tdap vaccine, MCV4, and the 3-dose HPV vaccine series. Female preteens may receive either HPV4 or HPV2 while male preteens should only receive HPV4. The fact that large numbers of adolescents have not received these vaccines is very troubling. Despite various barriers, ongoing efforts to increase vaccine coverage are promising and convey a sense that the future for preteens and adolescents in this regard is indeed bright. NCMJ

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Even healthy kids of any age can get seriously sick from the flu, and they can spread it to family, friends and others.

Everyone 6 months of age and older should get a flu vaccine every year.

Get your kids vaccinated—call their doctor, nurse or clinic.

Spread popcorn. Not flu.

For more information, visit: <http://www.flu.gov>



U.S. Department of Health and Human Services
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Running the Numbers

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

Sexual Behaviors and Substance Use Behaviors Among North Carolina's High School Students: Implications for Health Care Providers Wanting to Reach Teens at Risk

Parents of adolescents, health care professionals, teachers, school administrators, and community organizations are all concerned about health risk behaviors among adolescents. Use of alcohol, tobacco, and other drugs, lack of physical activity, sexual risk-taking, and behaviors that put students at risk for injuries have been identified by the Centers for Disease Control and Prevention (CDC) as priority areas for surveillance and intervention for adolescents. These behaviors represent significant preventable causes of morbidity and mortality for adolescents [1]. In addition to compromising the current health status of young people, risk behaviors initiated during adolescence result in adverse health consequences in adulthood and in significant social and financial costs [2].

As we come into a new age of health care reform, it is essential that improvements in the health of children continue. Collecting data on issues that have a significant impact on students and families is critical to understanding the health needs of students. Healthy children learn better, and as data continue to show correlations between youth risk behaviors and academic performance [3-5], it becomes imperative that we develop prevention strategies that minimize these risks and create healthy environments for youth. Identification of health risk behaviors among youth is integral to guiding our efforts to reduce these behaviors and to improve the health of adolescents and young adults, in part by identifying health care needs in this population.

In North Carolina, population-based surveys of high school students suggest that during their high school years, most students engage in multiple behaviors that put their health and safety at risk [1, 6, 7]. In 2009, 74% of all deaths among North Carolinians aged 15-24 years resulted from only

4 causes: motor vehicle injuries, other intentional injuries, homicide, and suicide [8]. These leading causes of death are linked to risk behaviors including use of alcohol or drugs, the carrying of weapons, and failure to wear a seatbelt [9].

The CDC conducts a biennial Youth Risk Behavior Survey (YRBS) to monitor trends in key health risk behaviors among our nation's youth. In addition to this national survey, there are also local surveys conducted by states and other entities. The North Carolina YRBS is conducted with oversight and coordination by the North Carolina Department of Public Instruction in collaboration with the Division of Public Health, North Carolina Department of Health and Human Services. This survey has been conducted in the state since 1993 and provides statewide data on a variety of mental and physical health and academic outcomes for high school students. The state data can be compared with national YRBS data to give a picture of how North Carolina high school students are behaving in relation to their peers throughout the United States.

We first present data on sexual and substance-use risk behaviors in North Carolina and in the nation as a whole, and then we present results showing associations of these risk behaviors with students' demographic and academic characteristics. Finally, we conclude with a discussion of the implications of these results for health care providers in North Carolina who have opportunities

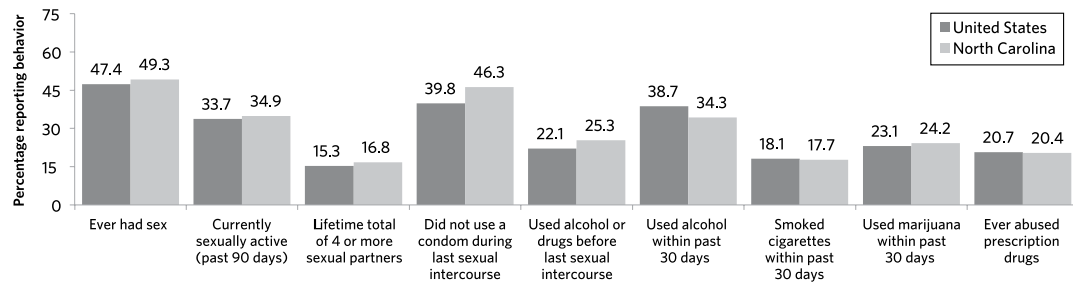
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FIGURE 1.
Selected Risk Behaviors Among High School Students in North Carolina and Nationwide in 2011.



Note. Data are from the 2011 United States and North Carolina Youth Risk Behavior Surveys [10, 11]. Percentages are weighted to account for the complex sampling design of the survey.

to identify and assist teens engaging in these risk behaviors.

Figure 1, which depicts results of the 2011 YRBS nationwide [10] and in North Carolina [11], shows the prevalence of sexual behaviors and substance use behaviors among high school students. The first 5 sets of bars in the figure show the prevalence of sexual risk behaviors in the United States and in North Carolina. For most of the sexual risk behaviors, North Carolina adolescents report behavior similar to that seen in the nation as a whole. In North Carolina in 2011, 49.3% (95% CI, 44.6-53.9) of high school students reported ever having had sexual intercourse. A smaller proportion, 34.9% (95% CI, 31.4-38.6), reported having had sex in the 3 months before the survey. About 1 in 6 students (16.8% [95% CI, 13.8-20.3]) had had 4 or more sexual partners in their lifetime. Strikingly, in both the country as a whole and in North Carolina, about 1 in 4 sexually active high school students (in North Carolina, 25.3% [95% CI, 22.2-28.8]) reported having using alcohol or another drug before their most recent sexual encounter. Condom use was the only behavior in which North Carolina high school students differed significantly from teens nationally. Among high school students in North Carolina who were currently sexually active, 46.3% (95% CI, 42.1-50.6) did not use a condom the last time they had intercourse. This proportion is significantly ($P = 0.01$) greater than that found among high school students nationally, only 39.8% (95% CI, 37.1-42.5) of whom failed to use a condom.

The right-hand portion of Figure 1 shows the prevalence of substance use behaviors, both in North Carolina and in the United States as a whole.

These results show that although most high school students are not engaging in substance use, sizable proportions are using alcohol (in North Carolina, 34.3% [95% CI, 31.5-37.3] reported having done so in the past 30 days), and to a lesser extent, using marijuana (in North Carolina, 24.2% [95% CI, 21.7-26.9]) reported having done so in the past 30 days), abusing prescription drugs (in North Carolina, 20.4% [95% CI, 17.3-23.9] reported ever having done so), and smoking cigarettes (in North Carolina, 17.7% [95% CI, 14.9-20.9] had smoked within the past 30 days). The relatively low prevalence of current cigarette use is of importance, as it reflects a continuation of the decline in overall tobacco use among high school students in North Carolina and nationally.

Among North Carolina's high school students, what groups of students are most at risk of engaging in these behaviors? We performed logistic regression analyses to assess the associations of each of the health risk behavior outcomes with student demographic and academic characteristics. The results for sexual risk behaviors are shown in Table 1, and the results for substance use are shown in Table 2. First, with regard to sexual risk behaviors, girls are more likely than boys to be currently sexually active and are less likely to report that a condom was used during their most recent sexual encounter. However, girls are less likely than boys to report having used alcohol or drugs before their most recent sexual encounter. For most of the sexual risk behaviors (ie, ever had sex, currently sexually active, and lifetime total of 4 or more sexual partners), older students are more likely than younger students to have engaged in the

TABLE 1.
Associations Between Demographic and Academic Characteristics and Sexual Risk Behaviors Reported by North Carolina High School Students on the 2011 Youth Risk Behavior Survey

Demographic and Academic Characteristics	Health Risk Behaviors				
	Ever had sex AOR (95% CI)	Currently sexually active (past 90 days) AOR (95% CI)	Lifetime total of 4 or more sexual partners AOR (95% CI)	Condom use during last intercourse AOR (95% CI)	Alcohol/drug use before last intercourse AOR (95% CI)
Sex					
Male (Ref)	1.0	1.0	1.0	1.0	Ref
Female	0.915 (0.790-1.059)	1.303** (1.088-1.562)	0.751 (0.510-1.107)	0.654* (0.460-0.930)	0.581** (0.414-0.816)
Grade level					
Grade 9 (Ref)	1.0	1.0	1.0	1.0	1.0
Grade 10	1.431** (1.048-1.956)	1.561** (1.137-2.141)	1.173 (0.671-2.050)	1.183 (0.655-2.134)	1.090 (0.589-2.015)
Grade 11	2.700** (1.955-3.728)	2.721** (2.059-3.595)	2.380** (1.509-3.754)	0.761 (0.447-1.294)	1.123 (0.671-1.879)
Grade 12	4.096** (3.027-5.541)	4.015** (3.129-5.151)	3.198** (1.887-5.421)	0.783 (0.445-1.378)	1.266 (0.772-2.075)
Race/ethnicity					
White (Ref)	1.0	1.0	1.0	1.0	1.0
Black/African American	1.588** (1.148-2.198)	1.156 (0.899-1.488)	2.193** (1.405-3.423)	0.870 (0.564-1.342)	0.710 (0.431-1.172)
Hispanic/Latino	0.788 (0.548-1.132)	0.817 (0.534-1.249)	1.575* (1.022-2.425)	0.645 (0.346-1.201)	1.563 (0.745-3.279)
Other/multiple race/ethnicity	1.132 (0.697-1.838)	1.231 (0.753-2.012)	1.511** (0.897-2.546)	0.661 (0.394-1.109)	0.893 (0.443-1.798)
Self-reported grades					
Mostly As (Ref)	1.0	1.0	1.0	1.0	1.0
Mostly Bs	2.382** (1.789-3.170)	2.294** (1.764-2.984)	2.007* (1.170-3.445)	0.735 (0.503-1.072)	1.600 (0.842-3.036)
Mostly Cs	3.884** (2.945-5.117)	3.379** (2.662-4.290)	4.515** (2.465-8.270)	0.604* (0.406-0.899)	2.785* (1.290-6.012)
Mostly Ds/Fs	5.921** (3.569-9.823)	4.632** (2.791-7.688)	6.421** (3.616-11.402)	0.830 (0.410-1.680)	5.000** (1.895-13.192)

Note. AOR, adjusted odds ratio; CI, confidence interval; Ref, reference group. Values > 1 indicate increased likelihood (odds) of behavior; values < 1 indicate reduced likelihood. Values significantly different from the reference group value are marked with a single asterisk if P is less than 0.05 and with 2 asterisks if P is less than 0.01. All variables are self-reported by respondents. Adjusted odds ratios adjust for sex, grade level, race/ethnicity, and grades, and include survey weights to account for the complex sampling design of the survey. Data were from the North Carolina Youth Risk Behavior Survey for 2011 [11].

behavior. With regard to race or ethnicity, African Americans are more likely than their white peers to report having had sex in their lifetime. Students in all nonwhite racial or ethnic groups are more likely to report having had a total of 4 or more sexual partners in their lifetime than are white students. Finally, in assessing the associations of risk behaviors with academic achievement, we found that self-reported grades were highly associated with each of the sexual risk behaviors. Compared with students who reported receiving grades that were mostly As, students who reported receiving grades that were mostly Bs, Cs, Ds, or Fs were 2-6 times as likely to report that they have ever had sex, were currently sexually active, had had a total of 4 or more sexual partners in their lifetime, or used alcohol or drugs before their most recent sexual encounter. They were also less likely to report hav-

ing used a condom the last time they had sex.

When we look at substance use, there are some similarities and differences between substances in the characteristics of students more likely to use them. For alcohol use and cigarette use, there is no significant difference between girls and boys in likelihood of use. However, girls are less likely than boys to use marijuana or to abuse prescription drugs. In contrast to the pattern observed for sexual risk behaviors, our results show that nonwhite racial or ethnic groups were generally less likely to engage in substance use: African-American students were significantly less likely to engage in alcohol use, cigarette smoking, and prescription drug abuse than were their white peers. Hispanic students were also less likely to abuse prescription drugs than were white students. Each of the substance-use behaviors examined was more likely to

TABLE 2.
Associations Between Demographic and Academic Characteristics and Substance Use Risk Behaviors
Reported by North Carolina High School Students on the 2011 Youth Risk Behavior Survey

Demographic and Academic Characteristics	Health Risk Behaviors			
	Alcohol use (past 30 days) AOR (95% CI)	Cigarette smoking (past 30 days) AOR (95% CI)	Marijuana use (past 30 days) AOR (95% CI)	Prescription drug abuse (lifetime) AOR (95% CI)
Sex				
Male (Ref)	1.0	1.0	1.0	1.0
Female	1.069 (0.814-1.405)	0.854 (0.607-1.200)	0.593** (0.437-0.805)	0.770* (0.616-0.963)
Grade level				
Grade 9 (Ref)	1.0	1.0	1.0	1.0
Grade 10	1.246 (0.841-1.848)	1.094 (0.736-1.624)	1.455 (0.933-2.271)	1.097 (0.752-1.601)
Grade 11	1.893** (1.333-2.688)	1.335 (0.858-2.079)	1.857** (1.295-2.664)	1.217 (0.803-1.844)
Grade 12	2.034** (1.460-2.834)	2.272** (1.406-3.669)	1.598** (1.183-2.160)	1.739* (1.149-2.631)
Race/ethnicity				
White (Ref)	1.0	1.0	1.0	1.0
Black/African American	0.447** (0.337-0.593)	0.386** (0.260-0.572)	1.108 (0.817-1.503)	0.354** (0.254-0.493)
Hispanic/Latino	1.038 (0.775-1.392)	0.883 (0.594-1.314)	0.840 (0.562-1.256)	0.648* (0.459-0.914)
Other/multiple race/ethnicity	0.807 (0.775-1.392)	1.020 (0.525-1.981)	1.249 (0.789-1.977)	0.944 (0.678-1.313)
Self-reported grades				
Mostly As (Ref)	1.0	1.0	1.0	1.0
Mostly Bs	1.848** (1.341-2.546)	2.120** (1.444-3.112)	1.570** (1.202-2.050)	1.448** (1.118-1.876)
Mostly Cs	4.127** (2.749-6.198)	5.111** (3.201-8.158)	3.758** (2.295-6.154)	2.975** (2.143-4.131)
Mostly Ds/Fs	7.287** (3.729-14.238)	10.189** (5.721-18.148)	7.040** (3.647-13.590)	4.401** (2.345-8.260)

Note. AOR, adjusted odds ratio; CI, confidence interval; Ref, reference group. Values > 1 indicate increased likelihood (odds) of behavior; values < 1 indicate reduced likelihood. Values significantly different from the reference group value are marked with a single asterisk if P is less than 0.05 and with 2 asterisks if P is less than 0.01. All variables are self-reported by respondents. Adjusted odds ratios adjust for sex, grade level, race/ethnicity, and grades, and include survey weights to account for the complex sampling design of the survey. Data were from the North Carolina Youth Risk Behavior Survey for 2011 [11].

be found among students in higher grades, particularly among 12th-grade students as compared with 9th graders. Finally, for each of these substance-use behaviors, students who reported lower grades were more likely to engage in the behavior than were students who reported receiving mostly As in school.

Discussion

Data from the 2011 North Carolina YRBS [11] were examined to establish the prevalence of key sexual and substance use behaviors among North Carolina's high school students, and to investigate associations of those behaviors with influential demographic characteristics (gender, race or ethnicity, and grade level) and academic achievement. Our results showed that these characteristics are frequently associated with the likelihood of engaging in these serious risks behaviors. In general,

male students are more likely to engage in the selected health risk behaviors than are female students. Grade level also is important for many of the behaviors, with risk behaviors being engaged in by a greater proportion of students in higher grades. Race or ethnicity is also associated with risk, but not in a uniform way. Sexual risk behaviors appear to be more likely among some nonwhite groups of students, but substance use is generally more likely among white students. Finally, our results underscore the critical associations between health behaviors and academic achievement: For each of the risk behaviors examined, students with poor grades in school were more likely to have engaged in the risk behavior.

This brief analysis provides important insights into adolescent risk behavior among high school students and should be helpful to professionals needing to conceptualize such risk behavior as

they work to improve the health and well-being of youth. Our results on the prevalence of sexual risk behaviors, for example, highlight the importance of screening adolescents for sexually transmitted infections in primary care settings, as is recommended by the Bright Futures guidelines of the American Academy of Pediatrics. Also consistent with the Bright Futures guidelines are our findings suggesting that psychosocial/behavioral and drug and alcohol assessment are needed within the school-age populations. There is no single clear "risk profile" that health care providers can use to identify youth potentially engaging in these risk behaviors, but there are signs including academic problems, that may put health care providers on the alert. Health care providers, teachers, school administrators, and parents should be aware of the potential for adolescents to engage in these risk behaviors and should work together to prevent that. NCMJ

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Spotlight on the Safety Net

A Community Collaboration

Wayne Initiative for School Health

The Wayne Initiative for School Health (WISH) seeks to improve adolescent health in Wayne County by offering comprehensive health services to middle and high school students at onsite school-based health centers. Some parents bring their children to the pediatrician for all recommended health services; however, for a variety of psychosocial and economic reasons, some school-aged children do not often come to the pediatrician for regular health supervision visits [1]. In 1997, The Duke Endowment approached Wayne Memorial Hospital about a grant opportunity aimed to provide children with health care services regardless of whether they had insurance and to help enroll eligible children into Medicaid or Health Choice. At this time, Wayne County had the 9th highest number of uninsured school-aged children in North Carolina [1].

The community's solution was to offer user-friendly comprehensive health services for school-aged children through the Wayne Initiative for School Health (WISH) program, which established school-based health centers in Wayne County Public Schools. Prior to establishing this program, a planning team gathered community input, considered the available community resources, and sought additional funding opportunities; the WISH program was then established as a 501(c)(3) non-profit corporation. With funding from both The Duke Endowment and the Robert Wood Johnson Foundation, the WISH program began with 2 school-based health centers at Brogden Middle School and Wayne Middle High Academy.

The school-based health centers are open during school hours and are staffed by nurses, physician's assistants, and nurse practitioners who provide on-site comprehensive primary care to enrolled students. At the schools with WISH centers, 93% of students have obtained the parental consent necessary to receive services from WISH staff, and 88% of students use the center in a given year. No students are turned away due to lack of health insurance or lack of ability to pay, and stu-

dents' families are given the opportunity to meet with North Carolina Department of Social Services (DSS) eligibility specialists at the school in order to help eligible students enroll in Medicaid or Health Choice.

The WISH centers' staff members are able to provide many of the recommended services for adolescent health supervision as recommended by the 3rd edition of the Bright Futures guidelines. In addition to offering health assessments, immunizations, and dental screenings, partnering organizations such as Wayne County Health Department provide counselors and health educators to discuss relevant issues such as nutrition, physical activity, substance use, and sexual health. Any services recommended by the Bright Futures guidelines that staff members cannot provide are available via referral. For example, mental health services are provided by a handful of local mental health agencies that send counselors to the center.

Between 2000 and 2006, the WISH program opened 4 additional centers at Dillard Middle School, Mt. Olive Middle School, Goldsboro High School, and Southern Wayne High School. The WISH centers now serve 6 of the 31 public schools in Wayne County. All 6 WISH centers are credentialed by the North Carolina Department of Health and Human Services.

In order to most effectively reach and serve uninsured adolescents, schools are selected for the program based on determined need for a school-based health center. A combination of middle and high schools has been selected to best address the needs of the early adolescent population and to allow for continuity of treatment. Wayne County

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also has a school nurse program, which concentrates staff in elementary schools. Although school nurses are more limited in the services they can provide, the school nurse program and the WISH program together help to provide health care to Wayne County youth between kindergarten and grade 12.

The WISH program is an exemplary demonstration of how community collaboration can improve accessibility and quality of child health services in a community. The WISH program has an impressive number of partners including Wayne Memorial Hospital, Wayne County Schools, the Wayne County Health Department, Goldsboro Pediatrics, Eastpointe Mental Health, Wayne Department of Social Services, Communities in Schools, Wayne County Commissioners, and the Goldsboro City Council. The collaboration includes both funding support and in-kind contributions. Wayne County Schools provide the space for the centers, as well as ongoing maintenance of the facilities. The centers' staff members are employed through Wayne Memorial Hospital in order to provide them with affordable benefits. Local pediatricians provide medical oversight and on-call services to students 24 hours a day, 7 days a week. Shared electronic

medical records enable continuity of care for students seen in either the school health centers or Goldsboro Pediatrics' offices. And, as previously mentioned, the local DSS and the Wayne County Health Department both regularly offer the services of their staff.

Schools with WISH clinics have seen increased insurance enrollment, decreased teen pregnancy, decreased absentee rates, higher end-of-grade test scores, and better management of students' diabetes and asthma. The successful results achieved by the WISH centers would not have been possible without this strong collaborative effort on behalf of Wayne County's adolescents. With the goal of keeping their kids healthy, Wayne County has united to make WISH school-based health centers a community success. **NCMJ**

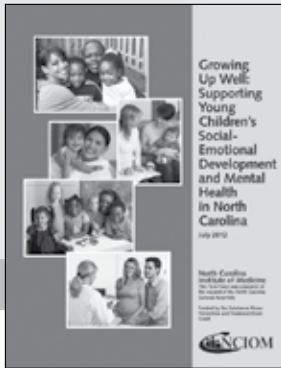
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Growing Up Well:

Supporting Young Children's Social-Emotional Development and Mental Health in North Carolina

July 2012

The future of North Carolina's growth and prosperity depends on our ability to promote the health and well-being of our children. Research shows that wise investments in children and families can lead to future savings, better health, and increased productivity.¹ Health in the earliest years—beginning with a mother's pre-conception health—provides the foundation upon which future development depends. Children with good health and a strong sense of well-being are more likely to grow into adaptable, functioning adults equipped with the kinds of tools needed to contribute positively to their communities.² Young children's social-emotional well-being, or mental health, affects how children relate to and interact with others, how they learn, and how well they are able to manage their emotions.³ Children need nurturing relationships, environments, and experiences during their earliest years to develop a foundation strong enough to support more advanced physical, cognitive, and social-emotional skills.^{4,5}

New scientific evidence from multiple fields, including neuroscience, biology, genetics, and the behavioral and social sciences, confirms that developmental and biological disruptions during the prenatal period and formative years can impair healthy functioning, increase vulnerability to health problems later in life, and change the actual structure of a young child's developing brain.^{6,7} Significant adversity in early childhood, including trauma, abuse, living with a parent with a substance use disorder, or being raised in persistent poverty, can cause toxic stress which disrupts a young child's brain circuitry and other organ and metabolic systems.⁷ In the absence of protective factors such as nurturing and responsive relationships with caregivers, these disruptions produce changes in the body and brain that lead to lifelong impairments in both physical and

mental health. Children exposed to toxic stress have impaired functioning in the areas of the brain that are critical for the development of linguistic, cognitive, and social-emotional skills.⁸ Impoverishment and adverse early experiences, in the absence of protective factors, can lead to difficulty learning, difficulty forming healthy relationships, and lifelong physical and mental health problems.^{6,7} Further, failure to address these issues at an early age can lead to much larger expenses to society in later life physical health, mental health, education, and criminal justice.

The North Carolina General Assembly (NCGA) recognized the need to examine the social-emotional and mental health needs of North Carolina's youngest children. In 2010, the NCGA asked the North Carolina Institute of Medicine (NCIOM) to convene a task force to study the adequacy of the current systems serving the mental health, social, and emotional needs of young children and their families.^a Funding support for the Task Force was provided by the North Carolina Department of Health and Human Services (DHHS) Division of Mental Health, Developmental Disabilities, and Substance Abuse Services (DMH/DD/SAS) through the North Carolina Substance Abuse Prevention and Treatment Block Grant from the Substance Abuse and Mental Health Services Administration. The Task Force on the Mental Health, Social, and Emotional Needs of Young Children and Their Families included 43 Task Force and Steering Committee members including legislators, state and local agency representatives, service providers, and community representatives. The Task Force met 15 times between March 2011 and June 2012.

The Task Force determined that North Carolina needs to invest in substantial and sustained evidence-based

a. Section 16.1 of Session Law 2010-152

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prevention, promotion, and intervention services in order to ensure our youngest children have a solid foundation for future development. Extensive evidence shows that effective programs and services that target young children's social-emotional and mental health can change the trajectory of children's lives and have the potential to generate savings and benefits to society that more than repay their costs.^{1,9} This knowledge should inform and undergird all decision-making with regard to spending and programs intended to affect children and their families. This report identifies short- and long-term strategies for addressing these problems through systemic changes, and greater interaction and cooperation among the systems, agencies, and individuals who interact with children ages 0-5 and their families.

Creating a More Coordinated, Integrated System to Meet the Social-Emotional and Mental Health Needs of Young Children and Their Families

The Task Force recognized the need for a more comprehensive, coordinated, and cohesive infrastructure and system to meet the health needs of young children and their families. **The Early Childhood Advisory Council (ECAC), a statewide council with the mission to strengthen the efficiency and effectiveness of services for young children and their families, should operationalize a cross-systems plan to develop a comprehensive, coordinated system for young children's mental health.** As part of this cross-systems plan, **the state should examine the current system of care for children ages 0-5 to ensure children at risk of or those with already identified social-emotional and mental health needs have a health home that addresses the physical, social-emotional, and mental health needs of the child.** The Task Force also recognized that we are more likely to experience positive results if we **implement evidence-based strategies, those strategies with a proven track record of positive outcomes, to positively influence young children's social-emotional development and services to meet young children's mental health needs.** Evidence-based interventions aimed at improving the social-emotional and mental health of young children often have a positive impact on a wide range of child outcomes. Furthermore, **the state needs to develop a system to collect data to measure young children's social-emotional and mental**

health needs, identify gaps in services, and monitor the effectiveness of interventions. With better coordination and collaboration, a solid infrastructure, data, and the strategic use of evidence-based strategies, we can meet the social-emotional and mental health needs of young children and their families.

Promoting Awareness and Understanding of the Importance of Young Children's Social-Emotional and Mental Health

Research from multiple fields confirms that all aspects of young children's development, including brain development, depend on the nature and reliability of young children's relationships with their caregivers and the quality of their environment.⁸ Research has also identified many evidence-based steps that individuals, communities, organizations, and the state can take to ensure young children have the kinds of nurturing, supportive relationships and safe, stable environments that promote social-emotional development. However, the Task Force recognized that this information is not widely known or used in practice. Therefore, **the ECAC, in collaboration with DHHS, should develop and implement a communications strategy to raise awareness of the importance of young children's social-emotional and mental health.** In addition to increasing public awareness, parents, caregivers, and providers need education on effective ways to improve young children's well-being and methods for intervening when there are problems. To reach this goal, **DPH should continue to support the implementation of the Triple P—Positive Parenting Program which educates parents, caregivers, and providers on how to promote young children's social-emotional development.** To help parents and other caregivers access effective programs and services, **the North Carolina Infant/Young Child Mental Health Association (NCIMHA) and other partners should develop and maintain a web-based clearinghouse of information on programs and services available to children and families with social-emotional and mental health needs at the state and county level.** Without knowledge of the importance of the early years and effective interventions, parents, teachers, care providers, health providers, policy makers, legislative, executive, and judicial branches of government, and others will not pursue or employ effective strategies to improve the social-emotional and mental health of young children.

Improving Treatment to Meet the Social-Emotional and Mental Health Needs of Young Children and Their Families

Providing effective, evidence-based interventions and treatment during the prenatal and early childhood periods of life can significantly improve individuals' lifelong physical and mental health.^{6,7,10} While much is being done in North Carolina to improve care for women and young children, more could be done to meet the social-emotional and mental health needs of young children and their families. **Community Care of North Carolina, the North Carolina Obstetrical and Gynecological Society, and other partners should identify or develop best practices to ensure appropriate transitions of care for women and young children among health care providers. Furthermore, the state should examine ways to expand the array of treatment options for pregnant women and mothers with mental health and substance use disorders. To improve the quality of care, the state should identify evidence-based screening tools, triage, assessment, referral protocols and clinical treatment guidelines, and develop a system of value-based payments for women and young children with mental health needs.**

Ensuring a Well-Prepared Workforce

Young children and their families interact with people with multiple professional backgrounds and training. However, the Task Force recognized that two groups of trained professionals—health care professionals and those involved in early care and education—are uniquely involved in the social-emotional development of young children. Individuals in these workforces come from diverse backgrounds with varying education and training requirements. There is a need to ensure that these professionals understand the importance of social-emotional development and how to foster such development. Much more could be done to ensure these professionals have the understanding, knowledge, and skills required to promote young children's social-emotional development and to intervene when development veers off course or lags. **The ECAC should ensure that early educator professional development standards are aligned with the social-emotional domains of the North Carolina Early Learning Development Standards, which define expectations for early care and education programs serving children ages 3-5.** In order to address clinical workforce needs, the NCIMHA should work with the

state and others to identify training needs and to address barriers to developing an effective mental health workforce which meets the clinical needs of young children ages 0-5.

Conclusion

Young children's social-emotional development and mental health influence every critical developmental task of the first five years whether physical, cognitive, linguistic, or social-emotional. Positive social-emotional development and mental health provides the foundation for future development and learning. The absence of positive social-emotional development and mental health has been shown to have a significant negative impact on both short- and long-term cognitive development and physical and mental health. This knowledge must inform and undergird all of North Carolina's investments in its citizens if the state is to grow and prosper. North Carolina has already seen the benefits from making significant investments in the health and well-being of young children, particularly around physical and cognitive development. North Carolina also has a long history of supporting physical health by providing health care coverage for low-income pregnant women and children through the Medicaid program and cognitive development through school readiness programs such as Smart Start, Early Head Start, Head Start, and the NC-PreK program. The benefits of these investments would grow further if investments in the social-emotional development and mental health of young children were strengthened. Investments such as the ones described in this report to support the social-emotional development and mental health of young children and their families have the potential to prevent a wide range of adverse outcomes as well as generate large economic returns for all of North Carolina.

The Task Force recommendations include many strategies that could be pursued at the state, county, and local levels. Taken together, they provide guidance on how to create the kind of comprehensive, integrated system that is needed to support the social-emotional development and mental health of all young children. To make a real difference, North Carolina needs to engage simultaneously in multiple strategies. Implementation of the recommendations will have a meaningful impact on the lives of North Carolina's youngest children and their families as well as generate large economic returns for all of 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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Access to Care and Preventive Health

Promoting and improving the health and well-being of our children is critical to North Carolina's future. Health during childhood impacts not only adult health, but also educational attainment, employment, and social and economic status. Preventive and primary care are essential to improving the health and well-being of North Carolina's 2.3 million children ages 0-18.

While children and families may face multiple barriers to accessing health care, the foremost barrier is the lack of health insurance. In North Carolina, children who lack health insurance are more likely to forego or delay care and have less access to health care services. Many children (9.4% or approximately 216,000) in North Carolina are uninsured. In North Carolina, Medicaid and Health Choice, North Carolina's State Child Health Insurance Program, provide health care coverage for children whose family income falls below 200% of the federal poverty guidelines, or \$46,000 for a family of four. In 2011, these two programs provided health care coverage for almost half of the children in our state (1,093,504).

Although having health care coverage is necessary for gaining access to affordable health care services, having health insurance does not guarantee that an individual will receive preventive and primary care services. In North Carolina, Medicaid and Health Choice provide coverage for all annual well-child visits for preventives care under Bright Futures, the child health supervision guidelines developed by the American Academy of Pediatrics. Preventive care visits provide opportunities for immunizations, developmental and health screenings, early detection of emerging concerns, and an opportunity to offer parents health education and advice. Similarly, Medicaid and Health Choice provide coverage for a preventive dental care visit every six months, which follows the recommendations of the American Academy of Pediatric Dentistry. Although these services are covered, data show that approximately four-in-ten Medicaid-enrolled children do not receive the recommended levels of preventive care.

North Carolina's Community Care of North Carolina (CCNC) system of managed care for individuals enrolled in public health insurance is working to address the non-financial barriers to care through the use of the medical home model, patient and family education, expanding provider networks, and care managers. Medicaid, Health Choice, CCNC and other efforts to provide access to preventive and primary care play a critical role in providing children the care they need to remain healthy.

Grade	Health Indicator	Current Year	Benchmark Year	Percent Change	Trend
Insurance Coverage		2011	2006		
B	Percent of all children (ages 0-18) uninsured ⁺	9.4%	13.6%	-30.9%	Better
	Percent of children below 200% of poverty uninsured ⁺	12.8%	-	-	-
	Number of children covered by public health insurance (Medicaid or Health Choice) (in December)	1,093,504	864,664	26.5%	Better
	Percent of Medicaid-enrolled children receiving preventive care ⁺	56.8%	-	-	-
Breastfeeding		2009	2004		
C	Percent of infants ever breastfed	68.2%	73.0%	-6.6%	Worse
	Percent of infants breastfed at least six months	38.3%	40.9%	-6.4%	Worse
Immunization Rates		2011	2006		
C	Percent of children with appropriate immunizations:				
	Ages 19-35 months ¹	75.3%	81.9%	-8.1%	Worse
	At school entry ⁺	97.1%	97.3%	-0.2%	No Change
Early Intervention		2011	2006		
A	Number of children (ages 0-3) enrolled in early intervention services to reduce effects of developmental delay, emotional disturbance, and/or chronic illness ⁺	19,523	15,160	28.8%	Better
Environmental Health		2010	2005		
A	Lead: Percent of children (ages 1-2): ²				
	Screened for elevated blood levels	51.3%	40.6%	26.4%	Better
	Found to have elevated blood lead levels	0.4%	0.9%	-55.6%	Better
	Asthma:	2011	2006		
	Percent of children ever diagnosed	17.5%	17.1%	2.3%	No Change
Hospital discharges per 100,000 children (ages 0-14) (2010, 2005)	166.0	207.9	-20.2%	Better	
Dental Health		2010	2005		
C	Percent of children: ⁺				
	With untreated tooth decay (kindergarten)	15.0%	22.0%	-31.8%	Better
	With one or more sealants (grade 5)	44.0%	43.0%	2.3%	No Change
	Percent of Medicaid-eligible children enrolled for at least 6 months who use dental services:	2011	2006		
	Ages 1-5	58.0%	47.0%	23.4%	Better
	Ages 6-14	64.0%	55.0%	16.4%	Better
Ages 15-20	49.0%	44.0%	11.4%	Better	

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Health Risk Behaviors

Access to affordable, quality health care is important when considering the health and well-being of our children, but health care alone is not enough to improve health outcomes. Children's health and well-being are also impacted by their family's income, educational achievement, race, ethnicity, and other environmental factors.

The relationship between income and health is quite strong; individuals with lower incomes have poorer outcomes on almost every indicator of health, including access to care, health behaviors, disease, and mortality. Growing up in a family living in poverty or near poverty negatively impacts a child's health throughout his or her life because the conditions that shape health in childhood influence opportunities for health throughout life. Education and health outcomes are also tightly intertwined; success in school and the number of years of schooling impact health across the lifespan. People with more years of education are more likely to live longer, healthier lives, have healthier children, and are less likely to engage in risky health behaviors. Policies that aim to reduce poverty and or promote education are critical components of health policy.

4-Year Cohort Graduation Rate Report 2008-09 Entering 9th Graders Graduating in 2011-12 or Earlier; State Wide Results

Subgroup	Percent
All Students	80.4
Male	76.5
Female	84.6
American Indian	73.7
Asian	87.5
Black	74.7
Hispanic	73.0
Two or More Races	80.6
White	84.7
Economically Disadvantaged	74.7
Limited English Proficient	50.0
Students With Disabilities	59.9

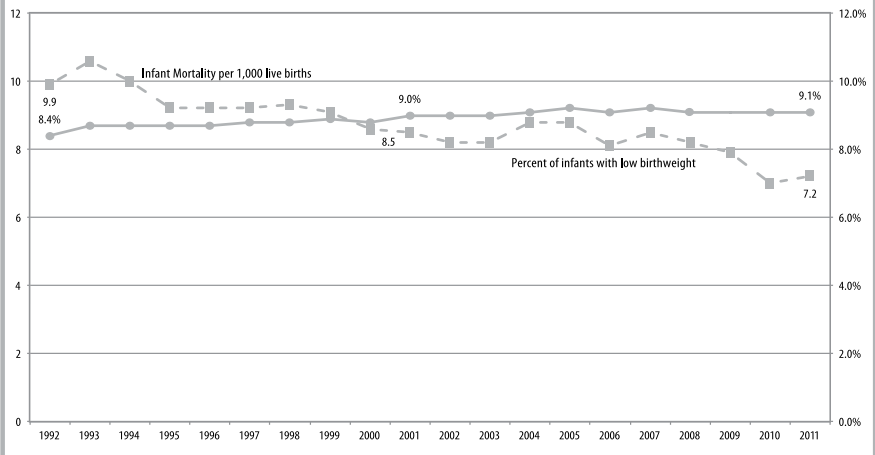
Grade	Health Indicator	Current Year	Benchmark Year	Percent Change	Trend
High School Graduation		2012	2007		
B	Percent of high school students graduating on time with their peers ⁺	80.4%	69.5%	15.7%	Better
Child Poverty		2011	2006		
D	The percent of children in poverty				
	Ages 0-5	30.3%	23.6%	28.4%	Worse
	Ages 0-18	25.6%	20.2%	26.7%	Worse
Teen Pregnancy		2011	2006		
C	Number of pregnancies per 1,000 girls (ages 15-17):	21.4	35.1	-39.0%	Better
Weight Related		2011	2006		
D	Percent of Children:				
	Meeting the recommended guidelines of 60 minutes or more of exercise 6 or 7 days a week				
	Ages 2-9	30.8%	-	-	-
	Ages 10-17	27.5%	-	-	-
	Meeting the recommended guidelines of two or fewer hours of screen time every day ³				
	Ages 2-9	81.4%	-	-	-
	Ages 10-17	60.6%	-	-	-
	Ages 10-17 who are overweight or obese ⁴	30.6%	30.9%	-1.0%	No Change
Tobacco Use		2011	2007		
C	Percent of students (grades 9-12) who used the following in the past 30 days:				
	Cigarettes	15.5%	19.0%	-18.4%	Better
	Smokeless tobacco	6.6%	8.6%	-23.3%	Better
Alcohol & Substance Abuse		2011	2007		
D	Percent of students (grades 9-12) who used the following:				
	Marijuana (past 30 days)	24.2%	19.1%	26.7%	Worse
	Alcohol (including beer) (past 30 days)	34.3%	37.7%	-9.0%	Better
	Cocaine (lifetime)	7.1%	7.0%	1.4%	No Change
	Methamphetamines (lifetime)	4.1%	4.0%	2.5%	No Change
	Prescription drugs without a doctor's prescription (lifetime)	20.4%	17.0%	20.0%	Worse

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Death and Injury

Ensuring the health and safety of children is critical to our state's current and future well-being. The most significant markers of children's health and safety are the infant and child death rates. North Carolina's infant and child death rates have been steadily decreasing over the past thirty years. This is due primarily to a significant decrease in our infant mortality rate from almost 15 per 1,000 live births in 1980 to 7 per 1,000 in 2011. The key drivers of infant mortality are complications of prematurity, infections, and birth defects. Rates of infant mortality have declined due to advances in the care of premature infants and birth defects. Although North Carolina has seen significant declines in infant mortality over the past twenty years, there has been a slight increase in the percentage of infants born with low birthweights, from 8.4% to 9.1%. Low birthweight is most often due to prematurity. Prematurity is associated with higher rates of brain injury, developmental delay, chronic lung disease, and eye disease. Due to significant advances in the care of premature infants, more premature babies survive infancy than did previously. Improving outcomes for premature infants has been a monumental advance. However, given the costs and long-term health and developmental consequences of prematurity, more attention needs to be paid to preventing premature births.

North Carolina Infant Mortality Rates; Low Birthweight by Year



Finding successful ways to reverse this trend are critical to improving the health and well-being of our children. North Carolina has implemented a number of public health and medical interventions associated with decreases in prematurity. For example North Carolina has programs supporting increased intervals between pregnancies, reducing elective c-sections, smoking cessation among pregnant women, and progesterone injections for pregnant women with a history of premature delivery. However access to such programs and interventions are limited, and population rates of low birthweight continue to increase. Community Care of North Carolina's new Pregnancy Medical Home Initiative seeks to address these risk factors and others and will reach all pregnant women receiving Medicaid. Innovative approaches like the Pregnancy Medical Home Initiative are needed for North Carolina to improve outcomes for all infants.

Grade	Health Indicator	Current Year	Benchmark Year	Percent Change	Trend
	Birth Outcomes	2011	2006		
B	Number of infant deaths per 1,000 live births	7.2	8.1	-11.1%	Better
	Percent of infants born weighing less than 5 lbs., 8 ozs (2,500 grams)	9.1%	9.1%	0.0%	No Change
	Child Fatality	2011	2006		
B	Number of deaths (ages 0-17) per 100,000	57.4	73.2	-21.7	Better
	Number of deaths:				
	Motor Vehicle-related	98	163	-	-
	Drowning	20	23	-	-
	Fire/Burn	7	15	-	-
	Bicycle	2	6	-	-
	Suicide	23	21	-	-
	Homicide	43	65	-	-
Firearm	41	45	-	-	
	Child Abuse and Neglect	2011	2006		
C	Number of children: ⁴				
	Child abuse and neglect reports investigated ⁴	71,361	70,225	-	-
	Substantiated as victims of abuse or neglect ⁵	10,263	-	-	-
	Recommended services ⁵	29,051	-	-	-
	Recurrence of Maltreatment	7.7%	7.3%	4.5%	No Change
	Confirmed child deaths due to abuse	24	34	-	-

For 18 years, the *North Carolina Child Health Report Card* has tracked the health and well-being of children and youth in our state. The report card compiles more than 40 indicators of child health and safety into one easy-to-read document that helps policymakers, health professionals, the media, and concerned citizens monitor children's health outcomes, identify emerging trends, and plan future investments.

The Report Card presents data for the most current year available, usually 2011, and a comparison year, or benchmark, usually 2006.

Because of space constraints, data by race and ethnicity is presented for just one indicator—cohort graduation rate. It is important to note that large racial and ethnic disparities exist for many of the indicators included. In general children of color have poorer health status and experience poorer health outcomes than their peers. These disparities are not new, and while some are slowly shrinking (e.g. late or no prenatal care), others are actually increasing (e.g. poverty, teen pregnancy). Significant improvements in child health can only be achieved if we address these disparities in health status, care, and outcomes. Additional disparity data for select indicators can be found in the corresponding county-level data cards that are available on Action for Children North Carolina's website www.ncchild.org.

**“If our American way of life fails the child,
it fails us all.”—Pearl S. Buck**

North Carolina's future prosperity depends on the health and well-being of the next generation. When children grow up healthy, safe, and connected to the resources that enable them to thrive, they are better prepared to reach their full potential and succeed in school, work, and life.

A substantial body of research shows that children's health outcomes are shaped by a wide array of social, economic and environmental factors. Child health was once thought to be the product of quality medical care, individual behaviors, and genetics; however, research now shows that where a child lives, family income, and parental education all exert powerful influences on a child's overall health status.

The Report Card offers keen insights into the socioeconomic factors that influence child health in North Carolina:

- In the aftermath of the economic downturn, more children now live in poverty than ever before. Poverty presents a significant threat to healthy growth and development, and is associated with reduced health outcomes.
- As more children and families slipped into poverty during the recent economic downturn, Medicaid and North Carolina Health Choice helped preserve children's access to health insurance. Children enrolled in public health insurance programs are more likely to receive preventive care and well-child screenings than their uninsured peers.
- Just over eight in ten high school freshmen graduate with their peers four years later. The number of students graduating from high school on time has increased significantly in recent years—a clear success for the state. And yet, a closer look at the data shows wide disparities by gender, race, ethnicity, economic status and other factors.
- All children deserve a healthy start in life. The percentage of infants born at a low birth weight, which is an important indicator of maternal health, prenatal care and environmental quality, remains unacceptably high in North Carolina.

As our understanding of the fundamental factors that shape children's health outcomes continues to evolve, so too must our strategies to improve the health of children and youth in North Carolina. Promoting positive physical, mental, and behavioral health is critical, but doing so in isolation ignores the significant impact of other factors. Health providers, social service providers, educators, and others have embraced this expanded understanding of factors shaping children's health. In communities across the state, agencies are collaborating across sectors to build coalitions to tackle the economic, social, and environmental factors that impact health outcomes. Increasingly, public, private and nonprofit organizations are choosing collaboration over isolation, exploring the areas where their work overlaps and their impact can be amplified through new partnerships. The trend of increased collaboration is encouraging, indicating a growing commitment to implement strategies to improve child health in innovative ways. Such strategies include evidence-based programs, policies, and services that promote economically secure families and high-quality education as part of a comprehensive approach to improving children's health and well-being in North Carolina.

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Data Notes 2012 Child Health Report Card

1. Immunization is measured for children 19-35 months of age using the 4:3:1:3:3:1 measure.
 2. Elevated blood lead level is defined as 5 micrograms per deciliter or greater. This definition has been revised from 10 micrograms per deciliter or greater.
 3. Screen time includes TV, videos, or DVDs OR playing video games, computer games or using the Internet.
 4. Overweight is defined as a body mass index equal to or greater than the 85th percentile using federal guidelines; obese is defined as equal to or greater than the 95th percentile.
 5. Findings represent exclusive counts of reports investigated in a state fiscal year. The number substantiated includes those substantiated of abuse, neglect, or abuse and neglect.
- * Data for indicators followed by a * sign are fiscal or school year data ending in the year given. For example, immunization rates at school entry labeled 2010 are for the 2009-2010 school year.

Grades and Trends

Grades are assigned by a group of health experts to bring attention to the current status of each indicator of child health and safety. Grades reflect the state of children in North Carolina and are not meant to judge the state agency or agencies providing the data or the service. Agencies like those responsible for child protection and dental health have made a great deal of progress in recent years that are not reflected in these grades. The grades reflect how well our children are doing, not agency performance. Grades are a subjective measure of how well children in North Carolina are faring in a particular area.

Data trends are described as "Better," "Worse," or "No Change". Indicators with trends described as "Better" or "Worse" experienced a change of more than 5% during the period. A percentage change of 5% or less is described as "No Change." Percent change and trends have not been given for population count data involving small numbers of cases. Due to data limitations, only the indicators for alcohol and drug use have been tested for statistical significance. Grades and trends are based on North Carolina's performance year-to-year and what level of child health and safety North Carolina should aspire to, regardless of how we compare nationally.

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Healthy North Carolina 2020 and Social Determinants of Health

Laura Emerson Edwards

To the Editor—The September/October 2012 issue of the NCMJ focuses on social determinants of health such as poverty, education, and housing. These influences on health are significant factors in the lives of North Carolina's residents, and they contribute to our state's overall health ranking of 33rd in the nation [1]. The Healthy North Carolina 2020 objectives recognize the important role that social determinants play [2]. Income level, educational attainment status, and quality of housing all contribute to health status and ultimately to life expectancy [3]. Individuals dealing with the challenges of poverty are more likely to engage in risky behaviors that negatively impact health outcomes [4]. All of these determinants factor into known barriers to accessing appropriate health care along with higher utilization of emergency departments and more hospitalizations [5].

North Carolina is making progress in addressing some key social determinants. A recent report shows that over 80% of high school students graduate in four years—North Carolina's highest rate ever [6]. However, the percent of households spending more than 30% of their income on rental housing has increased from 41.8% in 2008 to 47.9% in 2011 [7], and there has not been any improvement in the percentage of individuals living in poverty [8]. And while North Carolinians have reached a higher average life expectancy (78.2 years in 2011), the percentage of adults who report feeling that they are in good, very good or excellent health has not changed significantly. [2, 9, 10].

Quality of life is shaped by many factors—environment, education, and family—and it is an intangible but critical component of health. It is essential that North Carolina continue its efforts to support students in graduating from high school, find more ways to promote affordable housing, and enhance outreach programs that can provide individuals and families with the help they need to live healthier lives.

Healthy NC 2020 serves as our state's health improvement plan, which will address and improve our state's most pressing health priorities. Using the Healthy North Carolina 2020 objectives as a unifying vision across programs, divisions, organizations, and communities, North Carolina can achieve the population health improvements that will lead to "a better state of health" for all. More information about Healthy North Carolina 2020 is available at <http://publichealth.nc.gov/hnc2020/>. NCMJ

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Invisible Children

Meggan Goodpasture, V. Denise Everett, Martha Gagliano, Aditee P. Narayan, Sara Sinal

A series of severe child abuse cases in the state, all involving children who were reportedly homeschooled, are cause for concern. We review 4 such cases and the regulations regarding homeschooling in the state of North Carolina, exploring potential deficits in the system and suggesting ways of addressing them.

In early 2010, the Committee on Child Abuse and Neglect (CCAN) of the North Carolina Pediatric Society became concerned about a series of high-profile cases of severe child abuse. In several of these cases, the victim had long escaped attention because he or she was reportedly being homeschooled. The committee is composed of volunteers, including pediatric clinicians, board-certified child abuse pediatricians, and representatives from multiple North Carolina agencies, including the North Carolina Division of Social Services (DSS). Committee members decided to become more educated about the home school community by partnering with representatives of North Carolinians for Home Education, an organization that advocates for home schools across the state, and with the state agency that regulates home schools, the North Carolina Division of Non-Public Education (DNPE). After meeting multiple times, the group found consensus in a common commitment to the welfare and protection of children. Together participants grappled with the problem of “invisible children”—children whose parents intentionally hide them from their communities, sometimes under the guise of homeschooling.

As members of CCAN who participated in that series of discussions, we decided to write this article to document what was learned by the committee. We hope that other clinicians serving children in North Carolina will find the information useful. We want to emphasize that we do not mean to imply that children who are homeschooled are at increased risk of abuse. Rather, our goal is to illustrate through a series of cases that some caretakers take advantage of the laws that protect homeschooling to isolate their children, which allows abuse to go undetected.

Cases Involving Abuse or Neglect of Homeschooled Children

In June 2008, a television station affiliated with ABC News reported that 13-year-old Tyler McMillan had died in Edgecombe County, North Carolina, after being tied to a tree for nearly 18 hours on one of the hottest days of the

year. Tyler’s father told police that he tied his son to the tree, and left him there overnight, because he was being disobedient. Arrest warrants listed injuries that included bruising to the wrist, cuts to the entire body, and missing flesh from the buttocks. Tyler’s body temperature was 105.6 degrees Fahrenheit when he was taken to the hospital, and the autopsy report described insect bites over his arms and legs, and marks on his wrists and ankles consistent with plastic ties. His parents were charged with first-degree murder and felony child abuse. School officials reported to local news reporters that they had no record of the children in the McMillan family attending local schools. Neighbors reportedly said that Tyler and his 7- and 9-year-old siblings were homeschooled. The North Carolina DNPE was contacted and found no records indicating that this family had a registered home school listed under the name of either of Tyler’s parents, Brice and Sandra McMillan.

In another case, a 10-year-old girl, enrolled in a home school that was properly listed with the North Carolina DNPE, was found to be the victim of sexual abuse. The family was using a well-respected curriculum, and the child was progressing academically. Her father was very controlling, and severely limited the family’s contact with the community. Statements from the child reflected the extent to which her father kept her from seeing other people or even doing common things, such as going out for ice cream. The patient detailed how her father forced her to engage in sexual activities many times. Physical examination, including genital examination, found no signs of trauma; however, signs of trauma on physical examination are absent in most cases of sexual abuse. After disclosing the abuse, the patient began therapy and expressed relief that the father was no longer in the home, doing “those things.”

In 2008, ABC News affiliate station WTVD-TV in Raleigh, North Carolina, reported the tragic death of 4-year-old Sean Paddock. Sean’s adoptive mother, Lynn Paddock, was accused of having punished him by wrapping him in blankets so tightly that he suffocated. Lynn Paddock’s stepdaughter and her 5 adopted children all testified at her trial

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and described the horrific physical and emotional abuse that occurred in their home. According to their testimony, Mrs. Paddock duct-taped the children's mouths, forced them to eat their own vomit and feces, beat them with polyvinyl chloride (PVC) pipe, put soap in their eyes, withheld food for days, forced them to sit for hours with their legs crossed and their hands on their heads, and forced them to jump on a mini-trampoline for hours. Community members had been concerned about abuse in the Paddock home in the past, and DSS had previously investigated the family. In June of 2008, a jury found Lynn Paddock guilty of first-degree murder by torture and felony child abuse in the death of her 4-year-old adoptive son, Sean. It was later revealed that older children in the family were homeschooled. The North Carolina Child Fatality Review Team, which is responsible for reviewing all child deaths in the state, released findings and recommendations in June of 2008. According to those findings and DNPE's web site, Lynn Paddock had a registered home school, Benjamin Street School. The Child Fatality Review Team also noted that because DNPE has limited funding and oversight resources, it is unable to make site visits to monitor and support home schools' compliance with state policies and regulations.

In another case, a 13-year-old boy sought the help of his former guidance counselor after he was removed from public school, supposedly to be homeschooled. Public records confirm that the family had registered him as being homeschooled. The child reported that his year of homeschooling had consisted of his parents prompting him to write in a journal. However, he stated that he had not done this for several weeks. The family had a previous report for physical abuse, an allegation that was not substantiated by Child Protective Services. However, the boy ultimately broke out of his home, hid until daylight, and then sought out his former counselor. He reported multiple instances of abuse and neglect, including being locked in a windowless room for 24 hours at a time and going hungry because of insufficient food. Ultimately, it was determined that he had been starved and had not been receiving adequate medical care, and that the family had never implemented intensive behavioral treatment and an Individual Educational Plan recommended to them by a private psychologist. The child was removed from the home and the parents were convicted on charges of child abuse/neglect.

Gaps in the Monitoring of Home Schools in North Carolina

Unfortunately, these highly publicized tragedies highlight an experience that is too commonly encountered by physicians caring for children who have been abused and neglected. Homeschooling is not to blame for the horrific acts described above. It is quite clear that homeschooling requires a tremendous amount of dedication of both time and resources by parents to provide a quality education and that many children achieve excellence in this educational

setting [1]. However, we are concerned about potential gaps in the system that may put some children at risk. Our goal is to review the current requirements for home schools in North Carolina, and to provide recommendations for those who provide care and services to homeschooled children in our state. Ultimately, we hope to better equip our community with the tools needed to help minimize the risks that some children may face.

As members of CCAN, we first collected information to help us better understand the scope of this problem. A primary concern of ours is the underfunding and understaffing of the North Carolina agency responsible for monitoring home schools. The North Carolina DNPE exists by authority of North Carolina General Statutes 561, 563(b), and 566(a) to administer the requirements of Article 39, Chapter 115C of the statutes, which govern nonpublic schools, including home schools [2, 3]. DNPE is responsible for monitoring compliance with those laws.

Current North Carolina law provides a clear framework for homeschooling but does not require home schools to meet any achievement standards. Additionally, current staffing does not allow any significant enforcement of the existing requirements. In 2010, at the time of our committee's review, DNPE had 6 staff members, 3 of whom were clerical workers, and it was responsible for monitoring 45,000 home schools that had an estimated 80,000 students. Staff members have explained that they have personal face-to-face contact with some families that voluntarily come to an advertised meeting place to meet with the DNPE. In a given year, contact is made with approximately 300 families in this manner. This does not involve a visit to the home school or a visit to the home by the DNPE, but rather a meeting between the DNPE and the chief administrator of the home school at a designated location in the community. Clearly, DNPE has been innovative in their approach to meeting with as many families as possible, given the limited resources that they have been provided. However, it is critical to emphasize that 300 families constitute less than 1% of registered home schools in North Carolina. Although it is true that DNPE can send a letter to the home school to request that they be allowed to visit and review records, due to staffing limitations this rarely occurs. We learned through communication with DNPE in 2010 that no one on the staff had physically been to the home of a homeschooled child to conduct a home visit as part of the monitoring process since the year 2000. DNPE does routinely request that home schools make records available for inspection by mail. Of the 45,000 schools, test scores and attendance records are sent in for only approximately 7,000 schools yearly. Although DNPE truly wants to provide oversight that is adequate and effective, the resource constraints are significant.

Under North Carolina law, parents are required to notify DNPE that they are going to establish a home school. Parents establishing a home school are required to have a high school diploma, and to keep attendance records and

immunization records. Homeschooled children are required to take national standardized achievement tests annually; however, the law does not specify which tests must be taken, nor does it mandate that the student achieve a certain minimum score on any nationally standardized test in order for the guardian to be legally permitted to continue to home-school that student in the future [3].

We learned that DNPE lists home schools by the name of the chief administrator or by the name of the school—not by the child’s name. If an individual would like to confirm that a home school is registered with DNPE, they can do so through the DNPE Web site, where the registered home schools are listed under the administrator’s name [3]. However, there is no mechanism by which anyone, including DNPE, can look up any individual child to determine what nonpublic school that child attends, or whether he or she attends any school at all.

There is a 2-family limit on home schools. However, there is no limit on the number of children who are allowed to attend; therefore, the number of students enrolled may vary based on family size. . Every month, a list of closed home schools is published on the DNPE Web site. Although in the past individual letters were sent to school superintendents regarding home school closures, this practice has been stopped due to the cost of sending a large number of letters every month. The posted closings on the Web site allow school social workers to check this information if the need arises.

Although DNPE is responsible for monitoring schools that are registered as home schools, if a school is not registered, DNPE has no authority over it. If there is concern that a child is enrolled in neither a home school nor a public school, to whom should a report be made? Medical professionals are clearly bound by confidentiality rules that make it difficult to report such a concern to regulatory bodies such as the personnel responsible for handling truancy in the public school system. According to the Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule, personal health information cannot be provided without consent from the patient or guardian [4]. Exceptions are made in cases of suspected child abuse and neglect, where specific NC statutes require reports to DSS [5]. In such circumstances, when reporting suspicions of abuse or neglect to DSS, consent from the family is not needed. However, these statutes do not specifically allow physicians to report concerns to other state or community agencies including DNPE without parental consent. Information regarding DSS’s handling of reports involving educational neglect can be found in section 1407 of chapter 8 of the online DSS manual [6]. The manual states that matters of truancy and educational neglect should be screened out and not investigated; however, the manual further states that an exception to this rule exists when a caregiver is contributing to truancy.

We recognize that additional information needs to be gathered, and that continued sharing of data between

TABLE 1.
Recommendations for Protecting Children Against Child Abuse and Neglect

Recommendations for clinicians and medical team members	<ol style="list-style-type: none"> 1. Consider asking these helpful questions when interviewing families about homeschooling: What curriculum do you use? What is your typical daily schedule? Is your family involved in any co-ops or enrichment activities? 2. Become familiar with state laws regarding homeschooling. 3. If you have concerns, contact the North Carolina Department of Non-Public Education (DNPE) to determine whether a home school is registered. Due to confidentiality rules, a report regarding concerns about a home school cannot be made to DNPE unless consent is first obtained from the family. 4. If the child’s home school is not registered, after obtaining parental consent, report the child to the public school system as being truant. 5. If you suspect educational neglect or child abuse, report this to the North Carolina Division of Social Services (DSS) and emphasize that you are concerned that the caretaker is contributing to the child’s truancy (no consent needed). 6. Look for opportunities to explore potential research regarding the impact of homeschooling on child maltreatment. <p><i>Due to Health Insurance Portability and Accountability Act confidentiality rules, without parental consent a clinician is only allowed to make a report to DSS, and not to truancy personnel associated with the public school system or to DNPE.</i></p>
Recommendations for members of homeschooling communities	<ol style="list-style-type: none"> 1. Become familiar with signs of child maltreatment, and if you suspect child abuse or neglect, including educational neglect, report it to DSS. 2. If you suspect educational neglect in another homeschooling family, make a report to DNPE.
Recommendations for government regulatory agencies	<ol style="list-style-type: none"> 1. Require that all school-aged children be registered by name and date of birth by the Department of Public Instruction and/or DNPE. 2. Ensure that this information is kept confidential and protected so that it is not considered to be a matter of public record.” Allow access to county departments of social services and to law enforcement agencies for purposes of investigation. 3. Establish a method by which community members can anonymously report suspected educational neglect to DNPE. 4. Find additional resources to ensure appropriate monitoring and oversight, including home visits for home schools. 5. Become familiar with signs of child maltreatment and report any concern about child abuse or neglect, including educational neglect, to DSS. 6. Work to establish clearly defined roles and formal collaborations between different agencies, including DNPE, the public school system, and DSS, to ensure that concerns reported by community members are adequately addressed.

experts across disciplines may help address some of the questions we raise here. Such information gathering may be best orchestrated by a task force composed of individuals offering an even broader base of expertise than that found in our committee. We propose that the organization of such a task force may be the best next step. However, we would also like to offer some recommendations (see Table 1) for consideration while further data are being collected.

Recommendations for State Supervision of Home Schools

We recommend that the adequacy of available resources to ensure appropriate monitoring and oversight of home schools be assessed and that additional resources be allocated as needed. Furthermore, consideration should be given to requiring home visits for all home schools. We believe that if DNPE is to improve supervision of children who are homeschooled, increased funding and staffing are needed. We also propose that students be registered. An additional requirement to register homeschooled children by name and date of birth may help to create an opportunity for contact with a family, and therefore an opportunity to recognize signs of abuse or neglect. Additionally, failure to comply with this requirement may serve as a red flag for investigating agencies, such as DSS, when abuse or neglect is suspected. Furthermore, we recommend that DNPE make available an anonymous method of reporting abuses of the nonpublic education system. If a home school has been deemed noncompliant with DNPE's requirements and has been removed from the list of home schools, a process should be in place for reporting the decertification of the school to the appropriate investigating body—either DSS or the people who are responsible for handling truancy in the public school system. Cooperation and communication between these different regulatory entities is critical to ensure that concerns brought forth by community members or clinicians are addressed. Clearly defined roles and formal collaborations between different agencies, including DNPE, the public school system, and DSS should be established.

Recommendations for Health Care Providers

Clinicians can ask questions of families that homeschool their children just as they ask questions about a child's performance in a public or private school. Asking the name of the school and the name of the administrator is a starting point. Also asking about grade level, yearly testing, and the type of curriculum being used can be helpful. Clinicians who want to see whether a child is enrolled in a registered school can contact DNPE (contact information is available at <http://www.ncdnpe.org/hhh102.aspx>) and give them the name of the school or its principal and get confirmation that the school is registered. To avoid a breach in confidentiality, we recommend obtaining consent from the parent before checking with DNPE. If a clinician is concerned about educational neglect or obtains confirmation that the child is not

in a registered home school, the child should be reported to DSS. Such a report to DSS does not require parental consent, and the reporter should emphasize specific concern that the caregiver is contributing to truancy [5]. Although reports of truancy can also be made to the public school system, doing so requires that patient information be disclosed, which also requires parental consent.

Recommendations for the Homeschooling Community

There are 3 major home school associations in North Carolina that offer families support as well as instruction regarding the current laws and regulations governing home schools. Although these home school associations are not regulatory agencies, they do offer homeschooling families such resources as enrichment activities for students. Collaborations, including co-ops and support groups, are often organized. Our discussions with the leadership of the home school parent group North Carolinians for Home Education have led us to believe that parents who are doing a good job of educating their children may come into contact with parents who are not adequately homeschooling their children or who may be abusing them. We propose that education of the home school community regarding child maltreatment be offered through these organizations and through community support groups. Such education would assist community members in recognizing the signs of child abuse and make them aware of their duty as citizens to report it.

Discussion

It is important to recognize that home school advocates may feel unjustly linked to child abuse. We want to be clear that we consider this problem one of child maltreatment presented under the pretext of homeschooling. Concern has been expressed that inappropriately connecting child abuse and homeschooling may lead to discrimination, infringement of parental rights, and invasion of privacy. It is true that children in the private or public school setting, as well as in a home school setting, may be abused. It is also true that when children in public and private schools are abused, the abuse sometimes goes undetected. It has been stated by home school advocates that increased regulation for home schools would not ensure that child abuse could always be identified. In fact, in 2 of the cases discussed above, other community members had seen signs of abuse, and DSS had previously been involved. Although we certainly recognize that undetected child abuse can occur in any educational setting, we recommend that documentation of each homeschooled child's name and age and the location of their home school be required. Although we know that regulation is not a panacea, we propose this as a compromise that would help protect abused children who might otherwise escape recognition, while also protecting the rights of families to educate their children at home.

Research exploring any potential link between homeschooling and child maltreatment should be carried out. Despite the heated debate, there is a surprising paucity of evidence on this topic in the medical literature. We recognize that the community exposure offered by the public school system has long served as a safety net for children [7, 8].

The Fourth National Incidence Study of Child Abuse and Neglect, which is a congressionally mandated research effort to assess the incidence of child abuse and neglect in the United States, does look at children enrolled in school versus those not enrolled. However, it is important to note that this data does not differentiate between types of school, placing children who attend home school, those who attend public school, and those who attend private school all in the same category. This national study highlights that teachers and school personnel play a large role in reporting child abuse and neglect [9]. With school personnel being a primary source for professional reporting of child abuse, the impact of homeschooling on child maltreatment reporting should be explored. Again, we want to emphasize that we recognize that at this point there is no data to support or refute the claim that homeschooling increases a child's risk of being mistreated. We suggest, however, that further data needs to be gathered, and that identifying a child by name, date of birth, and school enrollment would assist in that process.

In summary, families that homeschool their children are to be commended for their great dedication to their children and for their efforts to produce both excellent students and citizens in the home school setting. The merit of homeschooling is not the question at hand. Rather, the question is this: How can we as health care providers team with the homeschooling community and the state of North Carolina to help prevent child maltreatment and educational neglect? Additionally, how can we prevent abusive caretakers from manipulating the current homeschooling regulations to hide abused children? Clearly, collaboration among all parties is paramount in our attempt to end the exploitation and abuse of these invisible children. **NCMJ**

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