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WMJ

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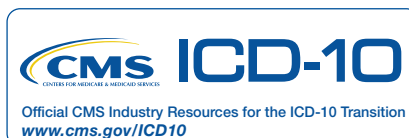
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COVER THEME HUNGER

Not having enough food or access to healthy foods is a reality many patients face. Indeed, one of the ironies of food in our society is that we struggle with the tension between too little of it for some and the wrong kind or its negative effects for others. This issue of *WMJ* features articles that explore the implications of our connections to food on patients and the physicians and others who care for them.

Cover design by
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The mission of *WMJ* is to provide a vehicle for professional communication and continuing education for Midwest physicians and other health professionals. *WMJ* is published by the Wisconsin Medical Society.

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The Busy Doctor Stereotype

Thomas J. James, Medical College of Wisconsin

Editor's note: The following editorial was originally published in WMJ, Volume 73, p. 10, May 1974.

Today most physicians are faced with increasing demands upon their time. While the number of people seeking medical care continues to spiral upwards, the recruitment of physicians into the primary care fields has not kept pace with this rise. One product of this increase in the number of patients per physician has been the stereotype of the "busy doctor." That is, the physician who appears as if there were always something more urgent than the immediate situation to attend to. The unfortunate results of this type of image have been increasingly apparent. A study conducted by the California Medical Association (1960) found that a majority of adult urban patients were critical of their physicians' attitudes towards them, particularly in a lack of demonstrated human warmth and in the failure to demonstrate "real" concern for their patients' well-being. It is apparent that the "busy doctor" stereotype has hurt the medical profession's image, but more importantly it has created a communications gap between the physician and his patient.

The importance of well developed physician-patient relationships cannot be understated. The patient who feels that his physician is genuinely interested, not only in his physical well-being, but also in him as a person, is more likely to communicate openly and honestly. This patient undoubtedly would also be much more cooperative during treatment. This type of relationship would tend to increase the efficiency and effectiveness of the physician's interactions with his patients. A prime example of this would be in the treatment of psychogenic illness. Moreover, a

physician who is in tune with his patient's personality and life situation would be better able to differentiate between psychosomatic symptoms and the often subtle symptoms seen during the early course of physical disease.

The physician would also benefit from improved physician-patient relationships. Ferber (1968) interviewed physicians who had incorporated a concern for their patient's psychological well-being into their practices and found that the actual overall amount of time spent with patients decreased in most cases. Presumably this effect was due to the fact that patients who had an opportunity for a complete, psychologically satisfying office visit made fewer requests for return visits, house calls, and other services. Moreover these physicians clearly indicated that their satisfaction with their practices increased and that emotional strain decreased. As one physician put it, "I'm increasing my patient's comfort and self-awareness, and I'm expanding my own." It is also interesting to note that, in general, the physician's earnings were not affected.

It's time for physicians to cast-off the "busy doctor" stereotype. With the probable benefits that both the physician and patient could reap, the physician must direct the style of his practice and not let the demands of practice determine his style. Clearly, the physician who functions best is the one who sets his own limits and paces his practice in relation to his available time, his emotional tolerance, and the physical and psychological needs of his patients.

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The Food and School Issue

John J. Frey III, MD, Medical Editor

Most of the articles in this issue of the *WMJ* have a direct or indirect connection with food—where we buy it and how it affects our lives. One of the ironies of food in our society, of course, is that we are struggling with the tension between too little of it for many people and the wrong kind of food for many others.

Food insecurity is a term that might be familiar, but Guerrero and colleagues,¹ in their statewide study of food insecurity, operationalize it by asking how many people feel they have had difficulty having enough food for their family. Their findings make the issue quite real. Looking at a population or community without asking that question might mislead us into thinking that visible sources for food means there will be little food insecurity. All of us, whether in cities or rural practices, will find food insecurity at what most of us would consider a surprisingly high rate if we ask our patients.

In addition to poverty, Guerrero and colleagues' analysis shows a cluster of variables that affect financial access to food: younger, less educated women who are uninsured and already have a much higher burden of illness and poorer self-reported health status, are a cohort who need more help in many ways, including food. One of the more surprising findings in this study was that there are no significant urban/rural differences regarding the prevalence of food insecurity. Hunger and inadequate nutrition are a reality in all communities. Just because one lives in an agricultural area or is surrounded by big box grocery stores doesn't mean there is better access to food.

A second study by Tolzman and colleagues²

takes the level of analysis deeper on the city level by looking at people who live in one of the designated "food desert" areas of La Crosse, Wisconsin. They look at one component of food insecurity—ready access to sources of food—and surveyed residents of areas that suffer from lack of access. Not surprisingly, they found that over a third of respondents have

financial resources, including federal supplements, they will go hungry. That food pantries and community meal services continue to be stressed, even in light of an improving economy, is evidence of disparity in our communities that affect health. Once again, the people in the SHOW study who had the highest levels of food insecurity were disproportionately bur-

...although most of the national attention
has been on obesity as an "epidemic," another
underlying and more perverse social issue
that affects health is simply not having enough food
to make it through the day, week, or month.

limited access to food and, more disturbingly, almost 15% of respondents admitted to hunger being an issue on a regular basis.

One lesson for clinicians from this study is that even in a city with a 4.7% unemployment rate like La Crosse, there are neighborhoods where food insecurity is a serious and immediate problem. Combining the data from the Survey of the Health of Wisconsin (SHOW) and the La Crosse community study should make all of us aware that, although most of the national attention has been on obesity as an "epidemic," another underlying and more perverse social issue that affects health is simply not having enough food to make it through the day, week, or month. Most data connect the two by demonstrating that even if access is addressed, unless people have enough

dened with poor health. Food and health go together, and the solutions are at the community level, not in our health systems. Physicians have a role, but it means moving outside of our hospitals and clinics and advocating for solutions that have a chance at improving the lives of our patients who struggle with basic human needs.

Another paper in this issue deals with the more familiar food-related clinical problem of obesity in children. Chelvakumar and colleagues³ describe a survey and followup chart review of a network of pediatric practice sites to determine to what extent those practices take basic measurements to determine obesity (they do it well), to what extent they document those data (they fall short), and to what extent pediatric clinicians say they give advice to

patients and families about improving nutrition and exercise compared to what is documented in their patients' charts (they do a poor job). The authors wanted to establish a baseline so that, in an era of electronic medical records and large practices with multiple clinicians caring for populations of children, improved documentation will become less of an issue of billing and more a way of looking at the success of interventions in the clinical environment. Without the ability to identify at-risk children and families in practices, there is no way to approach them with ideas and programs or measure whether those programs are effective.

Then we move to the study by Eldredge and colleagues,⁴ who partnered with the school system of the Archdiocese of Milwaukee to assess the readiness of schools to respond to possible food-related emergencies and whether schools had policies that might decrease the likelihood of such emergencies. What they found was humbling. A quarter of schools responding to their survey lacked policies for food allergies. When they added action plans (accommodations for food allergic children) to the mix, they found that a quarter of schools did not record a student with a food allergy or have an action

plan in place, and a third of schools responding to the survey had no training for anaphylaxis treatment. So there was a long way to go. But the best outcome of the study was the creation of an online training program for school personnel on policies, plans and treatment for food allergies, which is the best thing investigators can hope for: that their findings stimulate change and improvement. When they repeat their study there undoubtedly will be real progress.

Staying on school emergency readiness, the survey of high school athletic directors by Harer and Yaeger⁵ about CPR training of first responders to collapse showed that only a third of schools require CPR training for coaches. Athletic directors strongly favor CPR training for coaches but identify time as a factor in not getting trained. It would seem that they might be able to find the time while they implement that training. In the study, participants reported that 29% of schools had had a student collapse and 25% had had an adult collapse. If community physicians are looking for somewhere to help their communities in an important way, work with the schools to bring CPR training to coaches and staff.

Finally, one of the best titles for a paper in recent memory is a case report about a patient with carbonated drink-related syncope, by Witcik and Meskin.⁶ "Pop and Drop" is real, and we need to start asking patients with syncope whether they noticed patterns of drinking or eating when it happened.

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Urban-Rural and Regional Variability in the Prevalence of Food Insecurity: the Survey of the Health of Wisconsin

Natalie Guerrero; Matthew C Walsh, MPH, PhD; Kristen C Malecki, MPH, PhD; F. Javier Nieto, MD, MPH, PhD

ABSTRACT

Background: Food insecurity is a public health concern estimated to affect 18 million American households nationally, which can result in chronic nutritional deficiencies and other health risks. The relationships between food insecurity and specific demographic and geographic factors in Wisconsin are not well documented. The goals of this paper are to investigate sociodemographic and geographic features associated with food insecurity in a representative sample of Wisconsin adults.

Methods: This study used data from the Survey of the Health of Wisconsin (SHOW). SHOW annually collects health-related data on a representative sample of Wisconsin residents. Between 2008-2012, 2,947 participants were enrolled in the SHOW study. The presence of food insecurity was defined based on the participant's affirmative answer to the question "In the last 12 months, have you been concerned about having enough food for you or your family?"

Results: After adjustment for age, race, and gender, 13.2% (95% CI, 10.8%-15.1%) of participants reported food insecurity, 56.7% (95% CI, 50.6%-62.7%) of whom were female. Food insecurity did not statistically differ by region ($P=0.30$). The adjusted prevalence of food insecurity in the urban core, other urban, and rural areas was 14.1%, 6.5%, and 10.5%, respectively. These differences were not statistically significant ($P=0.13$) and, for urban core and rural areas, persisted even when accounting for level of economic hardship in the community.

Conclusions: The prevalence of food insecurity is substantial, affecting an estimated 740,000 or more Wisconsin residents. The prevalence was similarly high in all urbanicity levels and across all state public health regions in Wisconsin. Food insecurity is a common problem with potentially serious health consequences affecting populations across the entire state.

INTRODUCTION

Food insecurity is a complex economic and public health issue. Defined as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways,"¹ food insecurity has

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a variety of health implications. It is associated with chronic diseases and poor metabolic control,^{2,3} decreased mental health and cognitive performance,⁴⁻⁶ medication underuse and cost-related nonadherence,^{7,8} and less healthful eating.⁹

Food insecurity is a public health concern nationally and across different regions of the United States. It is estimated that 18 million American households have experienced food insecurity.¹⁰ In 2006, the United States Department of Agriculture (USDA) introduced new language defining the severity ranges of food insecurity.¹¹ Old labels of food security and food insecurity with and without hunger were replaced by high, marginal, low, and very low food security (Table 1). According to 1999-2006 estimates from the National Health and Nutrition Examination Survey (NHANES), about 21.5% of Americans were characterized as having marginal, low, or very low food security.¹² The relationships between food insecurity and specific

demographic and geographic factors in Wisconsin have not yet been investigated.

In order to take on a focused research effort on these issues in Wisconsin, it is important to first investigate characteristics of the state's food insecure population and the prevalence of food insecurity in different geographic areas and urbanicity levels across the state. We used data from the 2008-2012 waves of the Survey of the Health of Wisconsin (SHOW) to investigate sociodemographic and regional differences in food insecurity. We hypothesized that the prevalence of food insecurity would be similar across state public health regions and would be different across various levels of urbanicity within the state (ie, higher in urban areas). No previous study, of which we are aware, has directly investigated differences in food insecurity between areas of varying urbanicity and geography within a particular state, and such results could be key components in future attempts to develop

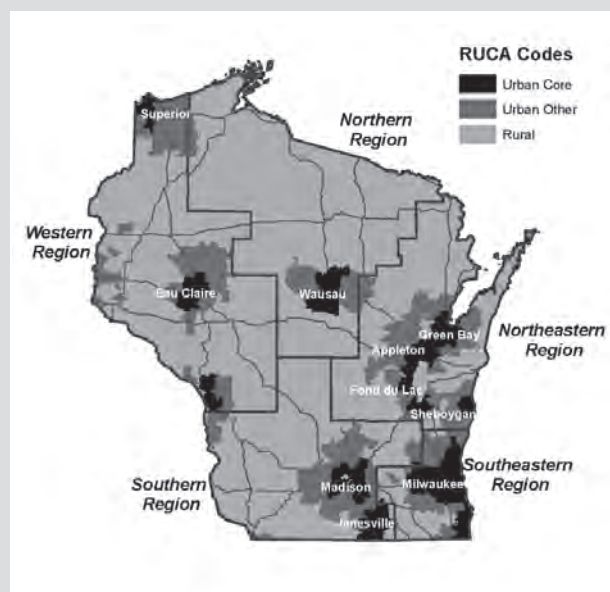
Table 1. Definitions of Food Security from the United States Department of Agriculture

Current Label ^a	Previous Label	Definition
High food security	Food security	Household had no problems or anxiety about consistently accessing adequate food.
Marginal food security	Food security	Household had problems or anxiety at times about accessing adequate food. These problems did not limit the quality, quantity or variety of food intake.
Low food security	Food insecurity	Household reduced the quality or variety of food intake without hunger, but the quantity was not substantially disrupted.
Very low food security	Food insecurity with hunger	Household altered eating patterns of one or more members because the household lacked money and other resources for food.

^aCurrent labels were adopted in 2006 after guidance from the Committee on National Statistics of the National Academies.¹¹

Food Insecurity

The presence of food insecurity was defined based on the participant's affirmative answer to the question "In the last 12 months, have you been concerned about having enough food for you or your family?" This question is aligned with items included in the USDA Food Security Survey Module used in NHANES to estimate individuals with low and very low food security. After excluding those participants who did not answer this food security question, the sample size for the analyses reported here was 2,552.

Figure 1. Rural-Urban Classification of Census Block Groups in Wisconsin

targeted policies and address food insecurity in Wisconsin and elsewhere.

METHODS

Data Collection

The SHOW is an examination-based health survey that between 2008 and 2012 recruited a representative sample of 2,947 Wisconsin residents. The SHOW study rationale and methods have been previously described.¹³ Briefly, a 2-stage cluster sampling method was used to randomly select census block groups and households in order to recruit study participants age 21-74 years. Participants were surveyed about their health, demographics, behaviors, and lifestyle. Participants also completed a physical exam measuring anthropometrics and blood pressure, and provided blood and urine samples for future analyses.

Predictors and Covariates

Participants were assigned into 5 public health regions of the state according to the categorization used by the Wisconsin Department of Health Services. They also were assigned into 3 urbanicity categories based on the University of Washington Rural-Urban Commuting Area (RUCA) Code corresponding to their census block group.¹⁴ Urban core describes a location in or very near the center of a largely populated area, while urban other describes a location that is suburban and distinct from a primarily rural or urban core area. All other RUCA code groups were placed into a single rural category. This resulted in a 3-category classification including urban core, urban other, and rural (Figure 1).

In order to characterize the socioeconomic level at the census group level, US Census 2000 data was used to calculate the "economic hardship index (EHI)."¹⁵⁻¹⁷ A standardized value from 0 to 100 for every Wisconsin census block group was computed for each of the following 6 indicators: unemployment, dependency, education, income, crowded housing, and poverty. The EHI was calculated as the average of these 6 scores. The tertiles of the EHI were used to classify census block groups in thirds of economic hardship (low, medium, and high).

Sociodemographic information collected from participants included highest level of education completed, household income, type of health insurance, and race and ethnicity. Educational level was assessed based on the participant's reported years of education completed and categorized into a binary variable by comparing the participants who received up to a high school diploma or equivalent to all other participants. Income was classified into 4 categories: those who earned <200%, between 200%-299%, between 300%-499%, and ≥500% of the federal poverty line (FPL). Income was also analyzed as a binary variable by comparing the population who earned less than 200% of the FPL to all other participants. The various types of health insurance used by participants were categorized into private, public Medicaid, and

public Medicare. Participants who had no insurance in the previous 12 months were considered to have no health insurance.

Information on participants' general health included derived measures of self-reported health, diabetes, and hypertension. Participants were asked to describe their health status as excellent, very good, good, fair, or poor. Health status was made into a binary variable by comparing participants who rated their health as fair or poor to all other participants. Diabetes was defined based on hemoglobin A1C $\geq 6.5\%$ or self-reported physician-diagnosed diabetes. Hypertension was identified in participants with systolic pressure ≥ 140 mmHg, diastolic pressure ≥ 90 mmHg, or who reported currently taking an antihypertensive medication.

Data Analysis

SAS version 9.3 software (SAS Institute, Cary, North Carolina) was used to conduct data analyses. All statistical analyses accounted for the complex survey design used by the SHOW study. Logistic regression models (PROC SURVEYLOGISTIC) were used to estimate crude and adjusted odds ratios (OR) and 95% confidence intervals (CI) of food insecurity according to level of urbanicity, health region, and other sociodemographic variables. The adjusted prevalence of food insecurity by urbanicity further stratified according to levels (tertiles) of economic hardship index was also calculated. Direct standardization to the Wisconsin population using US census data was used to obtain Wisconsin sociodemographic adjusted prevalences.

RESULTS

Table 2 provides the gender, age, and race-adjusted characteristics of SHOW participants who answered the food security item. A total of 13.2% (95% CI, 10.8%-15.1%) of respondents reported food insecurity, 56.7% (95% CI, 50.6%-62.7%) of whom were female. Those reporting food insecurity were younger on average (mean age 41.1) than those who were food secure (mean age 46.1). This difference was statistically significant ($P < 0.0001$). The proportion of minority racial groups among those reporting food insecurity (24.2%) was higher than among those who did not (10.0%, $P < 0.001$). Mean body mass index (BMI) was about 1 kg/m² higher in food insecure than in food secure participants, but the difference was not statistically significant ($P = 0.12$). Likewise, diabetes prevalence was almost 80% higher among food insecure (10.2%) than among secure subjects (5.7%), but the difference was only borderline statistically significant ($P = 0.07$). Participants reporting food insecurity had significantly lower socioeconomic status as reflected by a lower educational level ($P = 0.002$) and lower income ($P < 0.001$), as well as worse self-reported health status ($P < 0.001$).

Table 3 shows the gender-, age-, and race-adjusted prevalence of food insecurity for each of the 5 Wisconsin health regions. The percentage of those participants assigned to the Southeast, South,

Table 2. Characteristics of Eligible SHOW Participants by Food Security Status, Survey of the Health of Wisconsin 2008-2012^a

	Secure n=2,246	Insecure n=306	P-value
Female (%)	49.4	56.7	0.04
Age, mean years	46.1	41.1	<0.001
Self-reported race			
White, non-Hispanic (%)	90.0	75.8	<0.001
BMI, mean kg/m ²	29.5	30.6	0.12
Diabetes ^b (%)	5.7	10.2	0.07
Hypertension ^b (%)	29.4	23.8	0.1
Education			
High school diploma or less (%)	24.9	35.9	0.002
Income			
<200% federal poverty level (%)	25.5	60.1	<0.001
No health insurance ^b (%)	5.7	16.1	<.0001
Self-reported health status			
Fair or poor (%)	8.6	22.3	<0.001

^a Estimates adjusted for age, gender, and race.

^b Diabetes: Hemoglobin A1C ≥ 6.5 or self-reported diabetes; hypertension: systolic blood pressure ≥ 140 mmHg, diastolic blood pressure ≥ 90 mmHg, or currently taking antihypertensive medication; no health insurance: no health insurance at any time in the previous 12 months.

West, North, and Northeast health regions who reported food insecurity was 13.8%, 9.5%, 9.5%, 8.7%, and 14.1% respectively. These differences were not statistically significant ($P = 0.30$). The adjusted prevalence of food insecurity in the urban core, urban other, and rural areas of Wisconsin was 14.1%, 6.5%, and 10.5% respectively. These differences also were not statistically significant ($P = 0.13$). Age-, gender-, and race-adjusted pairwise analysis, comparing urban and rural areas also showed no statistically significant differences in the prevalence of food insecurity ($P = 0.18$). The prevalence of food insecurity did not vary significantly within either urban core or rural areas when stratified according to level of economic hardship at the census block group (Table 3). Within other urban (mostly suburban) areas, however, the prevalence of food insecurity was significantly higher with increasing level of economic hardship ($P < 0.001$).

The results of multivariate logistic regression analyses on the relation between urbanicity and the odds of food insecurity are presented in Table 4. The age-, gender-, and race-adjusted odds ratio of food insecurity was about 33% higher in participants from urban areas compared to rural areas (a not statistically significant odds ratio, 95% CI, 0.9-2.1). In the full model that also included both education and income levels, food insecurity was still elevated in urban areas, but this elevation was not statistically significant. In the full model only low income level was a significant predictor of food insecurity. Participants reporting household income $< 200\%$ and 200%-299% of the FPL had significantly increased odds of reporting food insecurity compared to participants reporting household income $> 500\%$ of the FPL even after adjusting for all the other covariates in the model.

Table 3. Regional Variation of Food Insecurity, Survey of the Health of Wisconsin 2008-2012^a

	Number	Food insecure ^a (%)	P-value
Health Region			
Southeast	701	13.8	0.30
South	543	9.5	
West	398	9.5	
North	374	8.7	
Northeast	543	14.1	
Urbanicity (RUCA)			
Urban core	1210	14.1	0.13
Other urban	384	6.5	
Rural	965	10.5	
Urbanicity Stratified According to Tertiles of Economic Hardship Index at the Census Block Group Level			
Urban Core			
Low economic hardship	537	13.3	0.17
Middle economic hardship	227	15.7	
High economic hardship	391	15.2	
Other Urban			
Low economic hardship	132	0.0	<0.001
Middle economic hardship	200	6.3	
High economic hardship	51	19.7	
Rural			
Low economic hardship	186	10.4	0.63
Middle economic hardship	389	10.9	
High economic hardship	389	8.4	

^aEstimates adjusted for age, gender, and race.

DISCUSSION

Our results show that more than 1 in every 10 Wisconsin residents (about 13%) surveyed between 2008 and 2012 reported being “concerned about having enough food” for the family sometime in the previous year before the survey. This result may be underestimating the true prevalence of food insecurity if that is defined more broadly to include individuals with potentially limited food access, ie, what the USDA and other national studies consider “marginal food security” (see also Table 1).^{1,11,18}

Our findings are consistent with another recent Wisconsin telephone-based survey that reported a 15.8% prevalence of food insecurity that also used a similar 1-question proxy to the 18-question USDA Household Food Screener to estimate food insecurity.¹⁸ The USDA Household Food Security Questionnaire was added to the SHOW survey in 2012. Using SHOW data from 2012, we estimate that 26.5% of Wisconsin residents have marginal, low, or very low food security (95% CI, 20.1%-32.9%). This measure is more comparable to the 21.5% estimate obtained by NHANES that also used the USDA Household Food Security Questionnaire and reported on the percentage of respondents with marginal, low, and very low food security.^{1,18} The 21.5% estimate was obtained using 1999-2006 data, so additional adjustment to account for the economic recession likely would make these estimates more comparable. The more stringent food insecurity

measure used in this study highly correlates with low and very low food security definitions used by the USDA ($r=0.93$).

Notably, the prevalence of food insecurity was not significantly different across the 5 designated public health regions of Wisconsin, suggesting that this is a concern throughout the entire state. Although slightly higher in urban areas, the difference in prevalence of food insecurity between rural and urban areas was not statistically significant across the state. To our knowledge, only one other study has directly compared food insecurity prevalence between urban and rural populations within a particular geographical area in Texas, and results of that study suggested that the rural populations had a greater prevalence of food insecurity compared to urban populations.¹⁹ These results contribute to this ongoing field of study by demonstrating that, rather than exclusively an urban problem, rural areas also are affected extensively by poverty and food insecurity.

A particularly important contribution of this study is the inclusion of the other urban, or suburban, category. While a number of studies have reported the prevalence of food insecurity in rural and urban populations, most have failed to report information on suburban populations. Although hunger in suburban families has very often been overlooked, our results suggest that food insecurity in suburban areas, although less prevalent than in urban or rural areas, is present (affecting about 6.5% of suburban residents overall and almost 1 of every 5 residents in “other urban” areas with high economic hardship). This is probably a reflection of the changing demographic landscape and potential move of more affluent younger individuals into urban cores. In fact, in this study there were no statistically significant differences between urbanicity levels, suggesting the problem is pervasive regardless of geography. Findings are consistent with a previous study conducted in 2010 that estimated 6.2 million suburban households were food insecure.¹⁸ It will be important to continue to study all populations regardless of urbanicity level in future studies of food insecurity.

One potential limitation of our study is that, because urbanicity levels were defined using RUCA codes, a significant level of heterogeneity within each assigned urbanicity group may exist. For example, a close scrutiny of the map in Figure 1 will reveal that “urban core” areas in our study included not only inner city Milwaukee (low SES, high proportion of non-white minority population) but also parts of Ozaukee and Waukesha—some of the wealthiest “urban” areas of the state—as well as areas of Superior or Eau Claire in the North. In order to address this potential limitation, we conducted analyses stratified according to the level of economic hardship as calculated from US census data at the census block group level. The results of these analyses (Table 3) revealed that, with the exception of “other urban” areas, the prevalence of food insecurity

did not vary significantly across different levels of economic hardship within strata of urban or rural areas.

Results from our analyses of the correlates of food insecurity in Wisconsin (Table 2) confirm those previously shown in national studies and local studies in other parts of the United States. A greater percentage of food insecure compared to secure participants were female, in agreement with results from a longitudinal national sample of young adults showing that food insecurity is more common among women than men.²⁰ There was a greater percentage of non-Hispanic African-American and Hispanic participants among the food insecure compared to food secure population, which has been a trend in previous studies.^{2,3,21} Socioeconomic characteristics including less education and lower income have been associated with food insecurity previously.^{2,3,21} Similarly, results of this analysis indicated that a greater percentage of the food insecure population earned up to a high school diploma or equivalent and had an income that was less than 200% of the federal poverty line. In addition, a greater percentage of food insecure SHOW participants reported fair or poor health and had worse mental health compared to food secure participants. Lower health status and mental disorders previously have been associated with food insecurity.^{4,22-24} There are discrepancies in the literature regarding the relationships between food insecurity, age, and BMI. Results from this analysis indicate that the food insecure population was younger in age and had a non-statistically significant greater BMI than the food secure population, which confirms several studies with similar results.^{2,3,20,21,25,26}

Over the last decade there has been increasing attention to the social and economic environment where individuals live as an important determinant of their mental and physical well-being. Given the potentially serious health consequences of food insecurity, health care organizations—especially those providing primary health care—might consider screening for food security as part of standard care.²⁷ Adding a simple screening question such as the one used in this study (“[are you sometimes] concerned about having enough food for you or your family?”) could be of value not only to better understand the patient’s social circumstances but also to identify the possible need for referral to a social worker or other social services for

Table 4. Odds Ratios and 95% Confidence Intervals for Food Insecurity Adjusted by Various Sets of Covariates, Survey of the Health of Wisconsin 2008-2012

	Adjusted for demographics ^a			Fully Adjusted ^a		
	OR	95% CI	P-Value	OR	95% CI	P-Value
Urbanicity						
Urban	1.33	0.85-2.08		1.57	0.94-2.65	
Other urban	0.57	0.24-1.38		0.73	0.29-1.86	
Rural	1	Reference	0.13	1	Reference	0.14
Age (1 year increase)	0.97	0.96-0.99	<0.001	0.99	0.97-1.00	0.08
Gender (female vs male)	1.34	1.00-1.79	0.05	1.31	0.96-1.79	0.09
Race						
White, non-Hispanic	1	Reference		1.00	Reference	
African American, non-Hispanic	3.52	2.02-6.11		1.88	0.86-4.10	
Hispanic	3.10	1.61-5.97		3.10	1.32-7.28	
Other race	1.35	0.50-3.65	<0.001	1.12	0.46-2.77	0.06
Education						
<High school diploma				1.38	0.64-2.98	
High school diploma or equivalent				1.50	0.84-2.69	
Some college				1.58	1.00-2.49	
≥ 4 year college				1	Reference	0.26
Poverty Income Ratio						
<200% FPL				13.39	7.06-25.42	
200-299 %FPL				9.53	5.14-17.69	
300-499% FPL				2.02	0.92-4.42	
≥ 500% FPL				1.0	Reference	<0.001

^aDemographic variables: age, gender, and race; fully adjusted model added socioeconomic variables (education, income).

assistance. Importantly, because the problem appears to be pervasive across all geographical areas of the state as suggested by our data, this recommendation should not be limited to residents in certain locations.

CONCLUSION

Demographic associations with food insecurity in Wisconsin are consistent with those found in national surveys. Interestingly, there were no significant differences in food insecurity prevalence across public health regions or varying levels of urbanicity (urban, suburban, or rural). Perhaps counter to perceptions that food security is only an urban-poor problem, the prevalence of food insecurity was similarly high (non-statistically different) across all urbanicity levels. Overall, food insecurity is a common problem with potentially serious health consequences affecting more than an estimated 740,000 Wisconsin residents—or close to 1.5 million—if a less stringent definition that includes “marginal” food insecurity were used. Consideration of routine screening for food insecurity as part of standard care could be considered in primary health care settings.

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Perceived Barriers to Accessing Adequate Nutrition Among Food Insecure Households Within a Food Desert

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ABSTRACT

Objectives: The US Department of Agriculture has identified an area in La Crosse, Wisconsin as a food desert—a low-income area with a low level of access to a grocery store or healthy, affordable food outlet. The purpose of this study was to determine the prevalence and potential predictors of severe food insecurity in this area.

Methods: Questionnaires assessing food insecurity and perceived barriers to accessing adequate nutrition were sent out to 2,068 households located within the food desert in La Crosse. Data was analyzed to examine correlations between severe food insecurity and demographics, certain health behaviors, and perceived barriers to nutrition.

Results: Overall food insecurity existed in 33.9% of households: severe food insecurity with hunger in 14.6%, and without hunger in 19.3%. Significant correlations to severe food insecurity included health insurance status (Medicaid vs private insurance, OR 3.5), renting a home (OR 5.23), identifying the cost of healthy foods as a significant barrier (OR 2.97), having no transportation to a store (OR 3.09), not having enough money (OR 22.88), and currently smoking (OR 3.60).

Conclusion: Severe food insecurity was much higher in this population than expected. Clinicians should consider the patient's ability to access and afford healthy food as part of the patient's health history, as well as considering individual and population solutions.

BACKGROUND

While the majority of households in the United States enjoy having consistent, dependable access to enough food for active, healthy living, ie, “food security,” a portion experience food insecurity.¹ Food insecurity indicates there are insufficient resources to purchase the amount and kind of food needed for the individual or members of the household. Severe food insecurity means that some

members of a household experience hunger, reduced food intake, or a disruption in eating patterns due to a lack of resources.¹ The United States Department of Agriculture's (USDA) annual survey in 2011 found that 14.9% of households experienced food insecurity; 5.7% experienced severe food insecurity.¹ Regionally, the Midwest demonstrated a lower prevalence of food insecurity, (13.5% of households).¹ Coleman-Jensen et al² showed the prevalence in Wisconsin to be even lower at 11.3%.

One environmental factor that may influence or be related to food insecurity is poor access to adequate nutrition. Access can be defined as the distance to the nearest grocery store; having a vehicle to get to food outlets; or the availability of healthy, affordable foods in the neighborhood. Vehicle ownership is important individual-level information in determining

one's ability to access adequate nutrition. Access to a vehicle remains a top determinant in obtaining proper nutrition at a more affordable price.³ Other factors that may be related to food insecurity include the perceived cost of healthy foods; the presence of behaviors such as smoking and drinking, which may divert finances that instead could be used for purchasing food items; or inadequate housing.⁴ Housing concerns may be tied to neighborhood characteristics (eg, availability of grocery stores) or may be side effects of other issues like low income rather than a cause of food insecurity.⁵

A “food desert” is a low-income census tract (poverty rate of 20% or greater, or a median family income at or below 80% of the area median family income) wherein at least 33% of the population lives more than 1 mile from the nearest grocery store in an urban area or 10 miles from a grocery store in a rural tract.⁶ While hunger is not a new concept, food deserts and food insecurity are relatively new terms. It is important to better under-

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Table 1. Demographics of Participants

Characteristic	Frequency	Percent
Response Rate by Census Block Group		
550630003.002	136/532 ^a	25.6 ^b
550630009.001	112/405	27.7
550630009.002	151/558	27.1
550630009.003	77/228	33.8
550630009.004	99/345	28.7
Gender		
Male	161	28.5
Female	405	71.6
Age		
18-39	267	46.4
40-64	208	36.2
65+	100	17.4
Race		
White	510	88.7
Black	9	1.6
Native American	6	1.0
Hmong	11	1.9
Other	39	6.9
Education		
Did not graduate high school	41	7.3
High school graduate	168	29.7
Vocational/some college	169	29.9
College or advance degree	187	33.1
Rent or Own		
Rent	390	68.8
Own	177	31.2
Years Lived in Current Home		
<1 year	148	26.0
1-2 years	121	21.3
3-5 years	87	15.3
>5 years	213	37.4
Work for Pay		
Yes	369	65.5
No	194	34.5
Household Income		
<\$10,000	106	19.2
\$10-25,000	238	43.2
\$25,001-50,000	138	25.1
>\$50,000	69	12.5
Number of Kids in Household		
0	442	78.1
1-2	101	17.7
3+	23	4.2
Type of Health Insurance		
Private insurance	271	48.5
Medicaid	131	23.5
Medicare	67	12.0
None	89	16.0

^aNumber responded/number of valid addresses with the Census Block Group.

^bResponse rate by Census Block Group.

stand the causes and severity of food insecurity in order to better address them at population and individual levels.

A food desert was identified by the USDA within the city of La Crosse, Wisconsin.⁶ The purpose of this study was to determine the prevalence and severity of food insecurity in this census tract.

Table 2. Food Insecurity Rates

Food Security Status	Frequency	Percent
Food secure	380	66.1
Food insecure	195	33.9
Moderate: Food insecure without hunger	111	19.3
Severe: Food insecure with hunger	84	14.6

Further, we examined the correlations as possible explanations to severe food insecurity and the perceived barriers in accessing adequate nutrition among these households.

METHODS

Setting/Population

Participants in this study all resided in a food desert in La Crosse as defined by the USDA⁶ based on US census tract data from the year 2000.⁷ According to 2010 census data, the 5 census blocks included in this food desert consist of 2,362 households and a population of 5,006. A list of household addresses within the identified food desert was obtained from the city of La Crosse's Planning Department. The list was edited to remove any commercial businesses, duplicate addresses, and assisted living and skilled nursing facilities that provide all meals to residents. Surveys from vacant and nonexistent homes that were returned unopened were omitted from the denominator, bringing the final number to 2,068 eligible households. This study had approval from both Gundersen Health System and the University of Wisconsin-La Crosse's Institutional Review Boards (IRB).

Instrumentation/Data Collection

Questions used to determine food security status were taken from the USDA Community Food Security Assessment Toolkit by Cohen,⁸ which has proven validity and reliability. Other questions were adopted from a regional health assessment survey titled COMPASS NOW 2012,⁹ as well as from previous research designed to determine potential barriers to obtaining adequate nutrition.¹⁰⁻¹¹

Questionnaires were sent to every address on the mailing list in November, 2012. A postcard informing the heads of households of the upcoming survey and participation incentive was mailed 1 week prior to the questionnaire mailing. One completed questionnaire per household was requested. A reminder postcard was sent 2 weeks following the initial mailing. Participants were given the option of completing the questionnaire online or filling out a paper copy and returning it in a postage-paid envelope. If participants completed the questionnaire, they could choose to receive a \$5 gift card to 1 of 4 local establishments that offer food products. They were asked to write their address on a separate card (included) and to mail it back with their completed survey. This card was returned to them with their selected gift card.

All data was entered into the online survey collection system and downloaded into a spreadsheet and uploaded into SAS (SAS

Institute, Cary, North Carolina) for statistical analysis. Addresses were checked to remove any duplicate completed surveys from both the paper and online databases. Data went through a process to recode and correct illogical responses. Determining food insecurity status was based on scoring used in the USDA *Guide to Measuring Household Food Security*.¹²

Analysis Methods

For analysis purposes, we modeled the most severe level of food insecurity: food insecurity with hunger. To determine if a relationship existed between food insecurity and demographic, health behaviors, and perceived barriers to food access, univariate analyses were completed using chi-square. Multivariate analyses were completed using logistic regression with a *P* value of <0.05 indicating statistical significance. A logistic regression using backward stepwise elimination was used to remove variables that were not significantly related to severe food insecurity, leaving only those variables that significantly increased the odds of a household being food insecure with hunger.

RESULTS

Out of 2,068 potential households, 575 (27.8%) completed and returned the questionnaire. Response rate varied among the 5 census blocks (Table 1). However, the rate of food insecurity was not significantly different by block. A majority of respondents were white. Over two-thirds had less than a college degree and over one-third had a high school education or less. Thirty-one percent of participants owned their place of residence. Over 25% of the participants had lived in their current residence for less than 1 year. Sixty-two percent of respondents had an annual household income of \$25,000 or less; however, nearly half had private health insurance.

Some level of food insecurity was present in 33.9% of households, with 14.6% having the most severe level of food insecurity (Table 2). Univariate analysis revealed several variables significantly related to severe food insecurity (Table 3). These included several demographic variables: age, race, income, education, health insurance status, home ownership, and employment status. Although the rate of food insecurity was highest in the poorest group, only 3% of respondents over age 65 years were food insecure. Examining age and income combined, we found that 2 out of 68 of those respondents over age 65 earning less than \$25,000/year were food insecure with hunger. Self-reported potential barriers to accessing healthy food that were found to be significantly related to severe food insecurity included no access to a working vehicle, not having a way to get to the store (often/sometimes true), not having enough money (often/sometimes true), cost of healthy food (significant/somewhat a barrier), kinds of food wanted not available (often/sometimes true), and not having access to a working stove (often/sometimes true). Overall, 76% of those who reported they did not have access to a work-

Table 3. Demographics and Predictors Related to Food Insecurity with Hunger (Univariate Analysis)

Characteristic	Percent Food Insecure with Hunger	
Demographics		
Age of respondent		<i>P</i> =0.0001
18-39	16.1	
40-64	18.1	
65+	3.2	
Race		<i>P</i> =0.0429
White	13.7	
Non-white	21.5	
Household annual income		<i>P</i> =0.0001
<\$10,000	28.3	
\$10-25,000	17.7	
\$25,001-50,000	5.8	
>\$50,000	2.9	
Education		<i>P</i> =0.0001
No high school diploma	26.8	
High school graduate	17.9	
Vocational/some college	17.8	
College or advanced degree	6.4	
Health insurance status		<i>P</i> =0.0001
No insurance	23.6	
Medicaid	29.8	
Medicare	3.0	
Private insurance	6.6	
Rent/own home		<i>P</i> =0.0001
Rent	19.7	
Own	3.4	
Work for pay		<i>P</i> =0.0001
No	24.1	
Retired	4.0	
Yes	13.8	
Potential Barriers to Accessing Food		
Access to a working vehicle		<i>P</i> =0.0001
No	27.3	
Yes	11.7	
Don't have a way to get to store		<i>P</i> =0.0001
Often/sometimes true	73.9	
Never true	11.6	
Don't have enough money		<i>P</i> =0.0001
Often/sometimes true	67.5	
Never true	0.4	
Cost of healthy food		<i>P</i> =0.0001
Significant/somewhat a barrier	39.3	
Not a barrier	3.1	
Kinds of food wanted are not available		<i>P</i> =0.0001
Often/sometimes true	47.3	
Never true	10.5	
Don't have access to a stove		<i>P</i> =0.0001
Often/sometimes true	76.2	
Never true	13.6	
Potential Behavioral Correlates		
Smoking status		<i>P</i> =0.0001
Daily	30.3	
Occasionally	28.3	
Former	10.9	
Never	7.2	
Computer access		<i>P</i> =0.0116
No	21.0	
Yes	11.6	
Cell phone with texting		<i>P</i> =0.0024
No	10.6	
Yes	16.2	

Table 4. Odds Ratio (OR) of Predictors of Severe Food Insecurity (Multivariate Analysis)

Predictor of Severe Food Insecurity	Odds Ratio	95% CI
Health insurance status		
Medicaid (vs private insurance)	3.50	1.45, 8.45
Medicare (vs private insurance)	1.41	0.24, 8.43
No insurance (vs private insurance)	1.71	0.65, 4.56
Rent (vs own)	5.23	1.36, 20.18
Don't have a way to get to store often/sometimes (vs have transportation)	3.09	1.20, 7.97
Don't have enough money often/sometimes (vs never true)	22.88	2.94, 177.81
Cost of healthy food a significant/somewhat barrier (vs not a barrier)	2.97	1.37, 6.47
Smoking status, current/occasional (vs nonsmoking)	3.60	1.72, 7.54

ing stove were identified as insecure with hunger. Lastly, potential behavioral correlates that were found to be significantly related to severe food insecurity included smoking status, not having a computer, and having a cell phone with texting ability. Over 30% of current daily smokers and 28% of occasional smokers had severe food insecurity. Those with a cell phone were more likely to have food insecurity; however, those with computer access were less likely to have severe food insecurity.

Multivariate analysis revealed that 6 variables predict severe food insecurity: health insurance status, whether the respondent rented or owned his/her home, not having a way to a store, not having enough money, indicating the cost of healthy foods was a significant barrier, and currently smoking (Table 4). The greatest predictor of food insecurity was if a person reported not having enough money as a significant barrier, with an odds ratio of 22.9. A person who rented was 5.2 times more likely to be food insecure than a home owner. Respondents who smoked were 3.6 times more likely to be food insecure than nonsmokers. Those with Medicaid as their health insurance were 3.5 times more likely to have severe food insecurity.

DISCUSSION

Based on survey results, 14.6% of households in the food desert in La Crosse were food insecure with hunger; 33.9% had some level of food insecurity. This was higher than the 5.7% prevalence of severe food insecurity nationally.¹ This was also much higher than the estimated food insecurity rate of 11.3% in Wisconsin.² We believe this to be true because our study was conducted in a food desert, which by definition has a high rate of people with low income and low access to find healthy, affordable food. Confirming this was important to help better identify and define the problem, but also to help determine possible causes and consequently work on solutions.

In multivariate analysis, self-reported “not having enough money to buy healthy food” was found to be the best predictor of severe food insecurity, but income was not related. It was

interesting to find that the low income elderly in our study were at low risk of severe food insecurity. It is possible that the elderly are accessing more community resources such as food banks. Without knowledge of expenses, establishing rationale for this remains difficult, although smoking is one apparent unnecessary expense of more than half of those who were food insecure. This finding is consistent with other studies that focused on smoking among the food insecure.⁵

The neighborhood we studied has a very high rate of rental property. Over two-thirds of respondents reported they currently were renting their home. Similarly, over two-thirds had lived in their current home for less than 5 years. This certainly speaks to the need to further explore the type and condition of housing, as well as the impact of frequent moving on health. Determining reasons for the correlation of renting and increased rates of food insecurity remain difficult. Possible explanations include less stability, lower income, and a greater likelihood of frequent moves.¹³

We did explore spending habits to some extent by examining computer, Internet and cell phone access. Those without computer or Internet access had higher food insecurity, as did those with a cell phone. This may be confounded with age. Many without a cell phone were over age 65, and the rate of food insecurity was low in this age group. To further investigate spending habits on food insecurity, future research should include whether or not respondents subscribe to cable television. Eating behaviors could be further investigated by asking the amount of sweetened beverages consumed, instances of binge eating, whether or not a family eats together, and types of food served during meals since studies have found correlations between these behaviors and food insecurity.¹⁴⁻¹⁵

While findings of this study predicting food insecurity match previous research, results may not be generalizable beyond the specific population demographics studied. Additionally, self-reporting on a questionnaire may lead to inaccuracies. We did not ask about participant's marital status. Marital status is particularly important considering results of another study² that showed single-mother households experienced the highest rates of food insecurity.

Much research has been completed concerning factors contributing to and correlated with food insecurity. Finding solutions for populations to have better access to healthy, nutritious foods will involve multiple community members and organizations, including health care systems. Encouraging placement of grocery and other food outlets (such as convenience stores) in food deserts is one solution, but this may not be economically feasible. Retailers may not be able to offer a sufficient variety of healthy foods at affordable prices in low-income neighborhoods. Examining low-cost municipal transit and ensuring routes connect people living in food deserts to food outlets is another important consideration. Assistance programs remain the most frequent intervention; how-

ever, questions exist regarding any impact such programs have on those struggling to obtain enough food.¹ Greater dissemination of the results of cost-comparison studies such as Carlson and Frazão¹⁶ and Glanz et al¹⁷ could increase the awareness of healthy food options that cost less per serving than unhealthy options.

Health care providers need to be aware of the community and environment in which their patients live. Living in a neighborhood with poor access to healthy food—a food desert—can significantly increase the risk of food insecurity. Severe food insecurity may have a significant negative effect on health. Patients with limited incomes may choose to spend their money in ways other than on food or medication. Inquiring about such things as the presence of a working stove, having access to a vehicle, and assessing where food is purchased may not be questions providers routinely ask of their patients, but may be very significant for the patient's overall health status. Understanding the severity of and predictors of food insecurity is necessary to begin to address this issue in our community as well.

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A Survey of Certification for Cardiopulmonary Resuscitation in High School Athletic Coaches

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ABSTRACT

Background: Cardiopulmonary resuscitation (CPR) can increase survival in instances of sudden cardiac arrest. Nationally, high school coaches are the first responders to sudden cardiac arrest in up to one-third of high school athlete collapses, but little is known about the status of their CPR certification. The primary goal of this study was to assess the proportion of Wisconsin high school coaches that are certified in CPR.

Methods: A prospective web-based survey was developed and distributed to high school athletic directors in Wisconsin.

Results: Seventy-eight percent of respondents reported that coaches are the primary responders to a collapse. The majority of high schools do not require CPR certification and only 50% of coaches are currently CPR certified. Athletic directors with greater than 12 years of experience were the most likely to have an emergency action plan in place ($P=0.004$).

Conclusion: In Wisconsin, the proportion of coaches who act as the primary responder to a collapse is greater than previously reported. Although the majority of coaches in Wisconsin serve as the primary responder to an episode of sudden cardiac arrest, only about 50% are CPR certified. Due to the severe consequences of sudden cardiac arrest, CPR certification among coaches should be required.

INTRODUCTION

Although sudden cardiac arrest (SCA) is a relatively rare event in the pediatric population, with an incidence of 4.4/100,000 in high school student athletes, it has a devastating and long-lasting effect on families, society, and the economy given the number of life years potentially lost.¹ Historically, the survival rate for children following a witnessed SCA was estimated to be about 11%.² However, 1 recent study found that 64% of high school athletes with SCA survived until discharged from the hospital.¹

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One reason for this increased survival rate is the early utilization of automated external defibrillators (AEDs), but timely initiation of cardiopulmonary resuscitation (CPR) also is likely a contributing factor as 94% of the victims in the study received CPR before use of an AED.¹

Outcomes following SCA are highly dependent on time elapsed from collapse to defibrillation, making effective responses from a bystander a critical determinant of survival.³ The likelihood of survival for a victim of SCA without defibrillation decreases by 7%-10% for every minute that defibrillation is delayed.³ However, survival decreases by only 3%-4% per minute when effective bystander CPR is initiated early followed by defibrillation, improving a victim's chance of survival up to 3-fold and improving neurological out-

comes.⁴ Cobb et al demonstrated that 90 seconds of CPR before defibrillation can increase survival when response intervals are longer than 4 minutes.⁵ With the average time from collapse to arrival of emergency medical services (EMS) estimated to be 7 minutes, survival almost certainly is as dependent on CPR as it is on defibrillation.³

The status of CPR certification of coaches in the state of Wisconsin is currently unknown. There is no state requirement for high school coaches to be certified in CPR and the Wisconsin Interscholastic Athletic Association (WIAA) does not require coaches to be CPR certified. The primary goal of this study was to determine the proportion of CPR-certified coaches in Wisconsin. The secondary goals were to determine who the respondents to a collapse would be, the estimated incidence of collapse, the frequency with which emergency action plans had been implemented, and attitudes regarding a possible statewide requirement for CPR certification of high school athletic coaches.

METHODS

Research Design

This study was a prospective, web-based survey of high school athletic directors. The study was approved by the Institutional Review Board of the University of Wisconsin School of Medicine and Public Health.

Subjects

Subjects were recruited using an e-mail database of athletic directors from high schools throughout Wisconsin. The database was obtained from the WIAA and used with its approval. An e-mail invitation to complete the survey was sent to all 504 athletic directors. One e-mail address was invalid. The sample population comprised 503 athletic directors.

Survey Design

An initial draft of the survey questionnaire was created and modified after it was piloted with pediatric academic faculty, researchers, and pediatric sports medicine physicians from the University of Wisconsin. The questionnaire was reviewed by the WIAA medical board and approved for use with the athletic directors. The online survey website Qualtrics (Qualtrics, Provo, Utah) was used to create the layout of the web questionnaire, which consisted of 16 multiple response questions (Box). Several questions used a Likert scale for responses. The survey included questions regarding the presence of an emergency action plan (EAP)—an EAP is a written policy that details the plan for a response to a SCA at a school and is developed by the school, local EMS responders and local physicians.

The survey, including the informed consent, was e-mailed to all 503 athletic directors on May 1, 2012. After 2 weeks, follow-up e-mails were sent weekly to nonresponders for 4 weeks.

Data Analysis

Data were tabulated through the UW Qualtrics online survey website and the chi square statistic was used to compare responses with $P < 0.05$ used as the level of significance.

RESULTS

A total of 243 athletic directors started the questionnaire and 240 were completed, for a 48% response rate. The 3 questionnaires that were not submitted as final but that contained partial responses were included in the data analysis (Table 1).

Athletic directors from large schools had the highest response rate. The remaining athletic directors were from schools with enrollments of less than 400 and a mean student population of 300.

All but 1 conference in the state had at least 1 athletic director respond. Lakeland Conference, located in western Wisconsin, had the highest response rate among conferences; 13 of 21 athletic directors responded. The remaining conferences were from

Box. Survey Questionnaire

1. What is the enrollment of your high school?
2. What conference does your school belong to?
3. What sports does your school offer? (check all that apply)
4. For which sports is there an athletic trainer present at most practices? (check all that apply)
5. For which sports is there an athletic trainer or physician present at most competitions? (check all that apply)
6. Please indicate who is the typical primary responder to an injury or collapse at practices.
7. What is the average response time for EMS to arrive to an athletic event, if needed?
8. Does your school require your coaches to be CPR certified?
9. To your knowledge, what percentage of coaches at your school are CPR certified?
10. Do you feel coaches should be CPR certified?
11. Do you feel coaches should be required by law to be CPR certified?
12. Of the following, please rank these potential obstacles to obtaining CPR certification for coaches at your school. Please rank from 1 to 4 with 1 as the most significant obstacle, to 4 as the least significant obstacle.
13. To your knowledge, has there ever been an on-the-field collapse of one of your players at a practice or game?
14. To your knowledge, has there ever been an on-the-field collapse of an adult (parent, coach, administrator, fan) at a practice or game?
15. How long have you been the athletic director at your school?
16. Does your school have an emergency action plan for a sudden collapse at a sporting event?

Abbreviations: EMS, emergency medical services; CPR, cardiopulmonary resuscitation.

all regions of the state including the urban areas of Milwaukee and Madison as well as the rural northern areas of the state.

The mean athletic director tenure was 4 years. The majority of athletic directors had less than 6 years of experience. Twenty-one percent of athletic directors were in their positions for over 12 years.

Football was identified as the sport with an athletic trainer present at the highest percentage of practices (55%). For competitions, respondents indicated that 88% of football games were attended by a trained responder. However, basketball, wrestling, and volleyball were attended by a trained provider at fewer than 67% of competitions. Nine of 14 sports had a trained responder present at competitions less than 50% of the time.

Primary Responders

A coach was identified as the primary responder to a collapse in 78% of cases (Table 2). Most athletic directors estimated an EMS response time to an emergency call at his or her school to be between 4 and 9 minutes. Twenty-one percent of schools stated that it would take more than 9 minutes for EMS to respond to an emergency call. A small minority of schools have an EMS response time of less than 3 minutes. Twenty-nine percent of athletic directors indicated that there had been a collapse of a high school athlete at his or her school and 25% reported the collapse of an adult at an event.

Table 1. Demographics of Responding Schools

Category	Percentage
Enrollment (Number of Students)	
0-100	11
101-200	15
201-300	16
301-400	13
401-500	6
>500	38
Athletic Director Tenure (Years)	
1-3	37
3-6	22
7-9	12
9-12	8
>12	21
Sports Offered by School	
Baseball	93
Basketball	99
Cross country	88
Football	92
Golf	80
Gymnastics	24
Hockey	40
Soccer	58
Softball	89
Swimming and diving	39
Tennis	45
Track and field	93
Volleyball	98
Wrestling	80
Schools with Trainer at Practice	
Baseball	26
Basketball	47
Cross country	21
Football	56
Golf	3
Gymnastics	9
Hockey	6
Soccer	22
Softball	26
Swimming and diving	11
Tennis	10
Track and field	33
Volleyball	40
Wrestling	35
Schools with Trainer at Competitions	
Baseball	44
Basketball	66
Cross country	36
Football	88
Golf	4
Gymnastics	19
Hockey	30
Soccer	48
Softball	40
Swimming and diving	12
Tennis	6
Track and field	52
Volleyball	55
Wrestling	63

CPR Certification of Coaches

The majority of Wisconsin high schools do not require CPR certification of coaches (Table 3). A small subset of respondents indicated that their school had a requirement for some, but not all, coaches to be certified. When asked to estimate the percentage of current coaches at his or her school who were CPR certified, athletic directors were given ranges of responses in 20% increments. The mean percentile of CPR-certified coaches in Wisconsin was 41% to 60%. Schools in which a collapse had occurred tended to also have requirements of CPR certification for coaches but this did not reach the level of statistical significance ($P=0.12$).⁶

Eighty-six percent of athletic directors either agreed or strongly agreed that coaches should be CPR certified. Only 4% of respondents disagreed that coaches should be CPR certified. However, when asked if coaches should be required by law to be CPR certified, only 55% agreed.

The most frequently identified obstacle to obtaining CPR certification of coaches was time. Financial difficulty was the next highest obstacle identified, followed by the large number of coaches who would need to certify and the lack of availability of CPR training opportunities.

Emergency Action Plans

Overall, 75% of those responding to the survey reported having an EAP at their school currently. Athletic directors with the longest tenure—greater than 12 years—compared to athletic directors with tenures of 1 to 3 years were the most likely to have an EAP in place at their school ($P=0.004$). There was no statistical difference in the implementation of EAPs between schools that had experienced a prior collapse and those who had not.

DISCUSSION

Our study shows that only 32% of Wisconsin schools currently have a requirement for athletic coaches to be certified in CPR. It also shows that 40%-60% of high school coaches possess current CPR certification. Most athletic directors would like to have their coaches certified in CPR, although not necessarily required by law to be certified. The major perceived obstacles to statewide CPR certification of coaches are time and funding.

In 2011-2012 there were over 190,000 high school athletes in Wisconsin.⁷ Assuming an incidence of SCA of 4.4/100,000 in this age group, 8-9 collapses per year would be expected in Wisconsin alone. Our results show that coaches are the primary responders to these collapses 78% of the time, which is significantly higher than the nationally reported coach response rate of 33%.¹ Our findings are similar to those reported by Cross et al, who showed that 89% of high school coaches in South Dakota are the first responders to a collapse, with 46% possessing current CPR certification.⁸

National data regarding requirements for CPR certification in high schools indicate that only 23 of 50 state athletic associations require coaches to be CPR certified.⁹ Given the higher than expected number of coaches who serve as primary responder to a collapse and the lower than expected number of CPR certified coaches, the Wisconsin high school student athlete population is at risk for poor outcomes in the event of a collapse. The Inter-Association Task Force recommends that coaches for each team need to be certified in CPR and trained in the use of AEDs because an athletic trainer, physician, or school nurse cannot be universally present at all practices and games,¹⁰ and we agree with this recommendation.

We found the EMS response rate in Wisconsin of 4 to 9 minutes to be consistent with the nationally reported average of 7 minutes.³ Of particular concern is a substantial proportion of athletic directors who estimated the EMS response time to be greater than 9 minutes. If CPR is not initiated during this 9-minute interval, the athlete will have less than a 10% chance of survival. Given the lack of trainers present at most high school sports practices and competitions, the ideal trained responder is the coach who is always present at games and practices and can initiate CPR immediately.

It is now recommended that every institution that sponsors athletic events have an EAP.¹⁰ Our results show that only three-quarters of schools in Wisconsin have an EAP. Schools that have experienced an athlete collapse previously and those athletic directors who have been at their jobs for the longest period of time are more likely to recognize the importance of having an emergency plan in place. Even if schools are unable to have CPR-certified coaches, at the minimum all high schools in the state of Wisconsin should have an EAP that is developed with EMS responders and reviewed annually with coaches.

Lastly, a majority of athletic directors believe that their coaches should be CPR certified. Surprisingly, however, athletic directors identified time as the greatest obstacle to achieving CPR certification for coaches. Currently there are several CPR courses that take less than 1 hour to complete and only require recertification every other year.¹¹ These courses decrease the time burden and hopefully will facilitate training of coaches. We expected that cost would be the leading limitation, and although it was the second-highest rated obstacle, Wisconsin already has a program to promote funding for high school CPR programs. For the past 10 years, Project ADAM in Wisconsin has been able to place AED/CPR programs in approximately 30% of all state schools.¹² If further funding sources can be identified, or if schools and coaches are willing to sponsor CPR certification, perhaps Wisconsin can increase its CPR certification rate and the safety of its young athletes.

Table 2. Responders and Collapse Data

Category	Percentage
Primary Responder	
Coach	78
Trainer	20
Other	2
Emergency Medical Services Response Rate	
1-3 min	5
4-6 min	44
7-9 min	30
10-12 min	14
>12 min	7
Collapse of Athlete at Event	
Yes	29
No	71
Collapse of Bystander at Event	
Yes	25
No	75

Table 3. Cardiopulmonary Resuscitation (CPR) Data

Category	Percentage
School Requirement of CPR Certification	
Yes, all sports	32
Yes, only a few sports	5
No	63
Percent of Current CPR-Certified Coaches	
0-20	20
21-40	14
41-60	22
61-80	17
81-100	27
Attitude Toward CPR Requirement	
Strongly disagree	3
Disagree	1
Neutral	11
Agree	37
Strongly agree	49
Attitude Toward CPR Law	
Strongly disagree	7
Disagree	16
Neutral	32
Agree	23
Strongly agree	23
Obstacles to CPR Certification	
Financial	20
Lack of CPR training available	7
Time	62
Too many coaches to certify	11

Limitations

The primary limitation of this study was that it focused on athletic directors and not the coaches themselves. The proportion of CPR-certified coaches may be misrepresented if there were coaches who were actually certified without the knowledge of their athletic directors. In addition, because this study was performed only in

Wisconsin, the results may not be representative of CPR training among coaches in other regions of the United States. Finally, the survey itself is a novel tool which lacks validity assessments for reproducibility or sensitivity.

CONCLUSION

In Wisconsin, the proportion of coaches who act as the primary responder to a collapse is greater than others have reported, and the proportion of CPR-certified coaches is lower than the national average. This discrepancy creates a dangerous gap in the emergency care of our adolescent athletes. Pediatricians and other health care providers should advocate for schools to develop EAPs and mandate CPR certification for coaches as 2 important steps to protect the safety of high school athletes.

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Perception and Documentation of Weight Management Practices in Pediatric Primary Care

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ABSTRACT

Background: Pediatric obesity is a significant problem in the United States. The Childhood Obesity Action Network (COAN) published expert recommendations in 2007 for pediatric obesity prevention and assessment at well-child visits. The purpose of this study was to assess pediatric providers' perception and documentation of their adherence to the 2007 COAN guidelines.

Methods: This was a 2-part cross sectional research study. A 36-item questionnaire about screening and management of obesity was sent to 69 providers from 16 pediatric practice sites in Southeastern Wisconsin. A retrospective chart review of well-child visits performed in June 2012 was conducted.

Results: Discrepancies were found between what providers reported and documented for their obesity screening management and anticipatory guidance that they provided. In addition, the majority of providers reported inadequacy and lack of comfort when working with overweight or obese patients. Patient compliance and motivation were reported as barriers to obesity management.

Conclusion: Discrepancies exist between providers' self-report and documentation of obesity screening and management. In addition, providers report discomfort in managing obesity. Tools to improve documentation and continued education to improve provider comfort in managing obesity are imperative steps in optimizing care.

INTRODUCTION

Childhood obesity (defined as body mass index above the 95th percentile for age and gender in youth age 2 to 18 years) is increasing at an alarming rate in the United States and it is affecting children and adolescents of all races, ethnicities, and income lev-

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els.¹ Wisconsin's obesity rate ranked 16th highest in the country in 2006, with 1 in 4 high school students overweight or obese.² Based on current trends, Wisconsin's obesity rate is predicted to grow by more than a third by 2018.³

Significance of Problem

Primary prevention of overweight/obesity is recommended by multiple organizations and initiatives, including the American Heart Association, American Academy of Pediatrics and Healthy People 2020.^{1,4,5} Despite this position, screening for overweight/obesity at well-child checks by primary care providers is not done consistently.⁶ For example, Dilley and colleagues found that overweight children were identified as such by their primary care provider only 28% of the time.⁷ These children tended to be older and fell into the

highest body mass index (BMI) categories, highlighting potential missed early intervention opportunities with children who fell into the at-risk of being overweight category.⁷

The Centers for Disease Control and Prevention recommends that parents partner with their child's health care provider to monitor their child's growth.⁸ However, parents of overweight and obese children are less likely to recognize the weight status of their children compared to parents of normal-weight children.⁹ Such misclassification is important as parental perceptions of their child's weight, eating habits, and physical activity determine parental readiness for action and involvement in the treatment of childhood obesity.^{10,11} This places the responsibility of educating the family on the child's weight status and concerns with overweight or obesity on the health care provider.

While education is important, the accurate documentation of the patient's weight status, the anticipatory guidance provided, and the family's level of motivation are critical to the success of weight management. As other studies have recognized, documen-



CME available. See page 154 for more information.

Table 1. Sample Questions from Provider Survey

Question Number	Question	Response Options
6	Do you routinely take a family medical history at well-child visits?	Yes or No
18	Do you routinely ask the family if they have any concerns about their weight at well-child visits?	Yes or No
21	If there are concerns about the patient's weight, do you assess if the family is ready to make lifestyle changes?	Yes or No
27	What anticipatory guidance do you consistently provide at well child visits?	(Check all that apply – i.e. sugar sweetened beverages, moderate to vigorous physical activity for at least 60 minutes a day, remove television from child's bedroom, eat breakfast every day, limit portion sizes, etc)
29	How effective do you think you are at treating obesity?	Highly ineffective, ineffective, effective, or highly effective
31	A. I feel I am better able to treat obesity than asthma.	True or False
	B. I feel I am better able to treat obesity than Attention Deficit Hyperactivity Disorder (ADHD).	True or False
34	In the last year, did you participate in any CME sessions or trainings regarding childhood and adolescent overweight/obesity?	Yes or No

Table 2. Demographics

Chart Review of Patient Demographics	SD	N (%)
Mean Age of Children Seen	8.72 (+/- 5.0)	
Gender		
Male		158 (50.6)
Female		154 (49.4)
BMI Category		
Underweight (<5th percentile)		10 (3.2)
Normal weight (6-85 percentile)		226 (72.4)
Overweight (86-95 percentile)		48 (15.4)
Obese (> 95 percentile)		0 (0.0)

tation is not always performed consistently in a primary care setting¹²⁻¹⁴ or accurately charted.^{15,16} Inadequate or inaccurate documentation complicates follow-up visits and the ability for the provider to assess adherence to previous recommendations.

The aims of this study were to (1) evaluate the documentation of adherence of pediatric health care providers in a large, urban city in the Midwest to established guidelines for the screening of overweight/obesity in their patients between 2 and 18 years of age; (2) assess providers' perception of their adherence to established screening guidelines; and (3) examine pediatric providers' level of comfort with screening and management of obesity within their primary care clinic.

METHODS

This was a 2-part cross-sectional study conducted in southeastern Wisconsin. A 36-item questionnaire regarding screening and management of overweight/obesity was sent to 69 providers (physicians, physician assistants, and nurse practitioners) from 16 pediatric practices sites. The survey was designed by the investigators based on the Childhood Obesity Action Network (COAN) recommendations for assessment, prevention, and treatment of child and adolescent overweight/obesity¹⁷ (Table 1). The survey was reviewed by 2 content experts. The content validity index

was 0.91. The pediatric practices were diverse and represented affluent, middle class, and low-income areas. The questionnaire was sent electronically through the online Survey Monkey tool (SurveyMonkey, Palo Alto, California) to all providers in July 2012 and took approximately 20 minutes to complete. Providers were given 6 weeks to voluntarily complete the questionnaire with 1 reminder e-mail sent during this timeframe. Responses were anonymous.

The second part of this study was a retrospective chart review. Based on the recommendation of a statistician, the medical record department of each pediatric practice surveyed was asked to provide 5 randomly selected charts per provider who completed well-child visits in June 2012. This chart review was all inclusive and not limited to providers who completed the questionnaire. At the time of the study, the medical group was using paper charting. The selection process for the charts was based on the following inclusion criteria: (a) age 2-18 years old; (b) patient seen between June 1-30, 2012 (the month before the survey was distributed); (c) purpose of visit was for a well-child exam. There were no exclusion criteria. Three charts were excluded at analysis due to not meeting inclusion criteria. A total of 312 charts (158 male, 154 female) were analyzed (Table 2). The data was collected using a scanner tool. Data included patient's age, gender, ethnicity, height, weight, BMI, blood pressure, family history, review of systems, labs ordered, and anticipatory guidance provided. The data was then scanned using the Remark system (Gravic, Inc., Malvern, Pennsylvania) and analyzed. Descriptive analysis was performed.

This proposal was approved by Children's Hospital of Wisconsin Institutional Review Board. This project qualified for an expedited review as it posed no more than minimal risks to the subjects. A HIPAA waiver was required as this was a retrospective chart review.¹⁸

RESULTS

The response rate for this study was 43.5%. When comparing

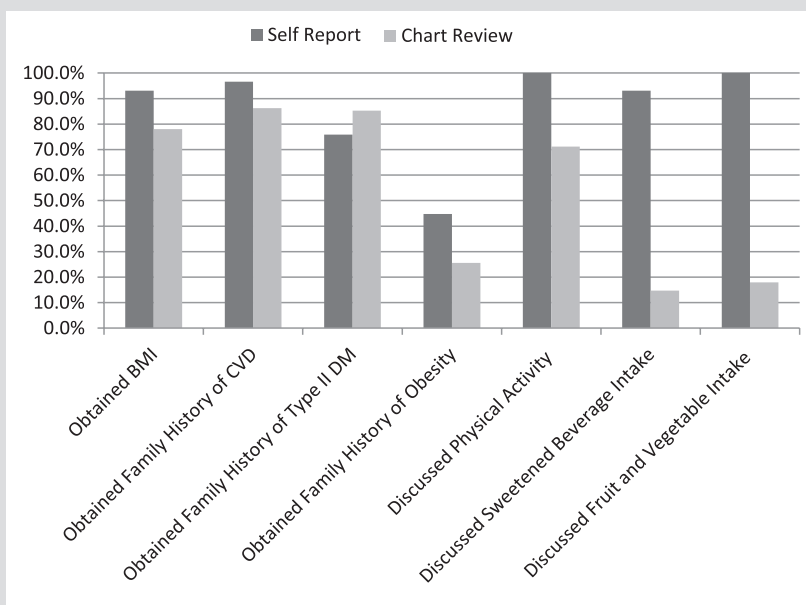
the results from the provider survey to the chart review, there were discrepancies noted between what the provider reported and what was documented in the charts (Figure 1). For example, 100% of the providers reported that they measure height and weight and 93.1% reported calculating BMI. While the chart review results showed that 100% of charts documented height and weight, 79% of charts had a documented BMI. Of the charts reviewed, 15% of patients were overweight and 9% were obese as calculated by BMI. Of the patients that were overweight, 22% were documented as such; of the patients that were obese, 51.6% were documented as such.

Anticipatory guidance and family history are important components of the well-child visit. All providers (100%) reported discussing physical activity with patients, however, the chart review illustrated that 71.2% of providers documented discussing physical activity and 18.3% documented counseling on physical activity. Providers (93.1%) reported discussing sweetened beverage intake. On chart review, 14.7% of providers documented sweetened beverage intake and 11.5% documented counseling on sweetened beverage intake. Providers (96.6%) reported screening for a family history of cardiovascular disease, 75.9% reported screening for type II diabetes mellitus, and 44.8% reported screening for a family history of obesity. A documented review of family history was noted for cardiovascular disease (86.2%), type II diabetes (85.3%), and family history of obesity (25.6%).

When evaluating the providers' self-assessment of their management of overweight/obesity, 100% of providers reported that they need to improve how they assess, prevent, and treat overweight and obese patients; 67.9% of providers reported being ineffective in treating obesity. Providers reported feeling more comfortable with treating asthma (100%) and ADHD (89.7%) than obesity.

Additional assessment included asking providers to determine the age at which they thought it appropriate to discuss eating habits, physical activity, and obesity concerns. They reported that it was appropriate to discuss eating habits (93.1%) and physical activity (79.3%) at well-child checks for patients less than 5 years old, but only 58.6% thought that obesity should be discussed with this age group. When determining what perceived barriers exist, providers reported patient compliance (71.4%) and patient motivation (55.2%) as the most significant barriers to obesity management. When discussing assessment of a child/

Figure 1. Provider Self Report Versus Documentation



Abbreviations: CVD, cardiovascular disease; DM, diabetes mellitus

family's motivation to change when there was a concern about the patient's weight, 86% of providers surveyed perceived that they questioned patients and families about their level of motivation to make changes. However, based on the chart review there was no documentation in any of the charts that the level of motivation to make changes was discussed.

DISCUSSION

This study found incongruences between the pediatric providers' perceptions of the care they provided and the care that was documented for assessment and prevention of childhood overweight/obesity, specifically regarding eating habits and physical activity. These findings are similar to other studies, which have demonstrated that providers generally overestimate how often they assess and counsel patients about health-related behaviors (ie, cardiac risk factors or tobacco cessation), but this has not been found specifically when focusing on behaviors related to childhood weight management.^{15,16} It has been questioned that the moderate intense dietary counseling that is recommended to combat obesity may be beyond the capability of the provider.¹⁹ This is corroborated by Bleich and colleagues, who found that United States primary care physicians identified nutritionists/dieticians as the most qualified providers to care for obese patients.²⁰ However, in our sample, only 3 of 312 patients were referred to a dietician, creating the potential for improved collaboration.

Unlike previous studies in which providers identified reimbursement and competing medical/social issues as barriers to obesity management in the primary care setting,^{21,22} these providers reported patient compliance and patient motivation as their

perceived barriers. This supports the need for providers to assess levels of motivation with the families, but as noted, such was not documented in any of the charts. Without that documentation occurring, it is not possible to determine if there is a true lack of patient motivation or awareness of the problem on behalf of the family. The concern about lack of family awareness is accentuated by the fact that only a small percentage of providers identified documented the child's abnormal weight status based on their BMI. Furthermore, over half of the providers surveyed did not think obesity should be discussed with families of children less than 5 years.

While all of the providers in this study felt that their assessment, prevention, and treatment of overweight/obese patients could be improved, only 21.4% of providers had participated in recent (within previous 1 year) CME sessions or training regarding childhood and adolescent overweight/obesity. Offering targeted CME programs and ensuring more extensive training may assist providers in feeling more confident in treating overweight/obesity.²¹

In addition to education, streamlining documentation through the use of electronic health records (EHR) has been seen as a measure that could enhance a provider's adherence to guidelines for the prevention and treatment of overweight/obesity. An EHR provides a potential opportunity to integrate health care guidelines within a provider's charting through actions such as calculating and labeling a BMI percentile, highlighting specific medical history or health habit questions, or offering recommended options of anticipatory guidance based on the child's clinical diagnosis.⁴ However, further studies are needed to better understand the true impact of EHR use on health care provider behavior.²³ Despite EHR implementation, the provider still needs to be knowledgeable and comfortable in the discussion of overweight/obesity with the family.

Overall, this exploratory study had some similar findings to previous published literature showcasing the lack of comfort of pediatric providers in screening for and managing childhood weight concerns. Novel findings that add to the literature include the lack of consensus of the appropriateness of discussing overweight/obesity status with families who have a child less than age 5 and marked disagreement between what the provider reports discussing and counseling the patient/family on in regard to behaviors related to weight management and anticipatory guidance. When dealing with a chronic health condition such as overweight or obesity that relies on education, behavior change, motivational interviewing, and consistent messaging, it is crucial for the primary care provider to have accurate documentation and consistent strategies started at an earlier age for successful treatment.

Limitations

The sample size was limited to 1 specific medical practice with 16 groups in southeastern Wisconsin. The medical director of

this practice was supportive of providers completing this confidential, online questionnaire, but because their participation was voluntary, there is potential for responder bias. Minimal documentation of care and anticipatory guidance may not be a true representation of the counseling that occurs during a particular well-child visit.

CONCLUSION

Childhood overweight/obesity continues to be a significant problem at both a national and local level. Health care providers play an integral role in the prevention, assessment, and treatment of the problem. Awareness and incorporation of national guidelines is an imperative step in optimizing care, as well as accurate documentation. Supporting providers to overcome their perceived barriers will provide an opportunity for the successful management of overweight/obesity. Future studies that examine interventions that support providers with efficient documentation methods, as well as effective provider education on incorporation and implementation of these guidelines are necessary.

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Quiz: Perception and Documentation of Weight Management Practices in Pediatric Primary Care

EDUCATIONAL OBJECTIVES

Upon completion of this activity, participants will be able to:

1. Describe the importance of screening for overweight/obesity in pediatric primary care.
2. Recognize the importance of accurate documentation of patient's weight status, the anticipatory guidance provided and the family's level of motivation for the success of weight management.
3. Identify barriers and strategies to overweight/obesity management.

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QUESTIONS

1. According to the article, which of the following is FALSE regarding childhood obesity?
 - ☐ It is defined by youth aged 2 to 18 years old.
 - ☐ It is defined as a body mass index above the ninetieth percentile.
 - ☐ Parents of obese and overweight children, in comparison to parents of normal-weight children, have more difficulty in recognizing their child's weight status.
 - ☐ Problems to prevention include missed early intervention opportunities as well as lack of identification of at risk and overweight youth.
2. Information reported by providers in the study was reasonably consistent with the information documented in patient charts.
 - ☐ True
 - ☐ False
3. According to this particular study, which of the following is NOT an immediate hindrance to providers in treating childhood obesity?
 - ☐ Competing medical and social issues.
 - ☐ Patient compliance and motivation.
 - ☐ A need for more provider training on assessment, prevention, and treatment.
 - ☐ Appropriateness of discussion of obesity with younger patients.
4. Suggested improvements to treating childhood obesity could include which of the following:
 - ☐ Increase collaboration with nutritionists and dietitians.
 - ☐ Improve documentation, particularly on obese/overweight identification, motivation, and discussion of eating habits and physical activity.
 - ☐ Provide and pursue CME sessions or training to increase provider effectiveness in treatment.
 - ☐ All of the above.

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You may earn CME credit by reading the designated article in this issue and successfully completing the quiz (75% correct). Return completed quiz to WMJ CME, 330 E. Lakeside St, Madison, WI 53715 or fax to 608.442.3802. You must include your name, address, telephone number and e-mail address. You will receive an e-mail from wmj@wismed.org with instructions to complete an online evaluation. Your certificate will be delivered electronically.

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Assessing the Readiness of a School System to Adopt Food Allergy Management Guidelines

Christina Eldredge, MD, MS; Leslie Patterson, PhD; Brenda White, EdS; Kenneth Schellhase, MD, MPH

ABSTRACT

Importance: The prevalence of potentially fatal food allergies in school-aged children is rising. It is important for schools to have a food allergy management policy and an emergency action plan for each affected student.

Objective: To examine the current status of food allergy guideline and/or policy implementation and adoption in a large school system in southeastern Wisconsin.

Design: A 24-item anonymous electronic survey was developed and completed by school principals and administrators in the Archdiocese of Milwaukee School System (approximately 125 schools) in southeastern Wisconsin.

Results: One in 4 responding schools reported no guidelines or policy. Schools that reported having students with special needs due to food allergy were more likely to have a local food allergy policy compared to schools that did not report having students with food allergy special needs (OR 6.3, 1.5-26, $P=0.01$). Schools with food allergy guidelines/policies were 3.5 times more likely to require student individual action plans than schools with no guidelines or policies (OR 3.5, 1.00-12.2, $P=0.05$).

Conclusions: Gaps in evidence-based food allergy policy implementation were found in this school system. Schools with food-allergic children with special needs were more likely to have guidelines/policy, however, they were not more likely to require emergency action plans. The majority of schools (66, 90%) reported interest in receiving further information or training on food allergy management.

INTRODUCTION

Food allergies are becoming an increasingly common student health challenge for schools in the United States. A recent national food allergy epidemiologic study reports a food allergy prevalence of 8% and furthermore notes that 38.7% of food-allergic children have a history of a severe reaction.¹ The Centers for Disease

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Control and Prevention (CDC) estimates that 1 in 25 school-aged children have food allergies.^{2,3} For some students with chronic food allergies, exposure to their specific food allergens can result in life-threatening anaphylactic reactions. There is no cure for food allergies and the only known treatment is strict avoidance of the allergen. In the school setting, food-allergic students face multiple challenges, including fear of exposure, inadvertent ingestion, and bullying.⁴⁻⁶

If inadvertent exposure occurs, immediate recognition and treatment with epinephrine (adrenaline) is critical for survival.^{4,7} According to emergency department estimates, there is approximately 1 emergency department visit for an acute food allergy-related reaction in the United States every 3 minutes and an estimated 30,000 food-induced anaphylactic reactions in the United States per year.^{8,9} It is difficult to predict if a food-allergic child will develop anaphylaxis after exposure to

the food allergen; further, a child with a previously mild reaction to a food may have a severe reaction in the future.^{10,11} In a study of an anaphylactic registry performed in the United Kingdom, fewer than one-fourth (22%) of food-allergic fatal reactions were preceded by a previous severe food-allergic reaction.⁷

Incidents associated with fatal and near-fatal anaphylaxis due to food allergies are more likely to occur away from home—eg, in a school or restaurant setting—and they often are associated with delays in epinephrine administration.^{4,5,12} This is likely related to the increased risk of accidental exposure and delay in symptom recognition.¹² Students with food allergies can develop severe symptoms quickly and, therefore, the use of food allergy emergency action plans is recommended to aid school staff in recognizing and promptly treating a reaction in an emergency situation.^{13,14}

Table 1. Descriptive Statistics of Responding Schools

Type of School	Number of Schools Responding (%)
Total responding schools	78
Total schools completed survey	71 (91)
School grade levels	
PK-5th/6th grade	5 (7)
PK/K-8th grade	56 (76)
PK-12th grade	1 (1)
5th/6th-8th grade	2 (3)
9th-12th grade	3 (4)
Schools with a school nurse	6 (8)
Responder Occupation	
Administrator	8 (10)
Principal	70 (90)

Abbreviation: PK, prekindergarten

The unpredictable nature of food allergy reactions, coupled with the need for prompt recognition and treatment with epinephrine, has led to the development of school management guidelines and recommendations for students with food allergies by nationally respected professional organizations such as the American Academy of Allergy, Asthma & Immunology (AAAAI), Food Allergy Research and Education (FARE), and the National Association of School Nurses (NASN).¹⁵⁻¹⁸ Several states also have published school food allergy management guidelines.^{19,20} Additionally, the Food Allergy and Anaphylaxis Management Act (FAAMA), signed into federal law in January 2011, required the CDC to collaborate with stakeholders in the development of national guidelines.²¹ Despite the above-mentioned national food allergy guidelines, school food allergy policies are insufficiently implemented.^{5,11,22-24}

Given these gaps, we set out to examine the current status of food allergy guideline implementation and adoption in a large school system in southeastern Wisconsin. The primary outcomes of interest studied included whether the school had a guideline or policy to address the management of food allergies in students and whether or not the school required that all students with food allergies have individual food allergy action plans. Furthermore, we examined the degree of school nursing support and the school's interest in further food allergy education and training.

METHODS

Subjects

Jointly the Archdiocese of Milwaukee Office for Schools and the Medical College of Wisconsin asked the principals and school administrators of the Archdiocese of Milwaukee System of Schools to participate in our study. This school system is the second-largest system of schools in the state of Wisconsin and relies mostly on nonmedically trained staff and volunteers to staff school health rooms. Located in southeastern Wisconsin, the school system is a parochial system of 125 3-year-old kinder-

garten (K3) through 12th-grade schools with 2,699 school staff serving approximately 32,000 students at the time of the study. The system spans 10 counties, including the inner city and urban area of Milwaukee County, rural counties (eg, Dodge, Walworth, Ozaukee) and suburban communities. The school system is ethnically and economically diverse with 20% of students coming from underrepresented minority groups and 30% of students receiving free/reduced lunch services. In this decentralized system, each school is independently run by its sponsoring parish or a governing board, and each school determines its own local guidelines or policies addressing the management of student food allergies. The school health rooms are usually run by administrative staff or volunteers.

The study was approved by the Institutional Review Board at the Medical College of Wisconsin.

Instrument

Our community-academic partnership developed a 24-item questionnaire (Appendix). The questions were based on current guidelines from the literature and recommendations for school management of student food allergies from nationally known organizations such as FAAN (now FARE) and AAAAI.^{5,15,16} Prior to administration, a school principal and the associate superintendent pretested the questionnaire for clarity.

Procedure

We sent the questionnaire to all school principals and school administrators in their weekly electronic Office for Schools information packet (InfoPak). The questionnaire was anonymous, voluntary, and administered electronically from December 2010 through February 2011. It took approximately 10 minutes to complete. To ensure anonymity, we did not record respondent Internet Protocol (IP) addresses or administer paper copies of the questionnaire.

Statistical Analysis

The primary outcomes of interest analyzed were whether the school had a guideline or policy to address the management of food allergies in students and whether or not the school required that all students with food allergies have individual food allergy action plans. The potential factors for predicting these outcomes of interest included school enrollment, the presence or absence of a school nurse, the demographic setting of the school (rural, inner city, or suburban), and the presence or absence of food-allergic students at the school. Additionally, we tested whether or not a school had a food allergy policy or guidelines as a possible predictor of whether the school required individual food allergy action plans. Three schools responded "not sure" as to whether they had food allergy guidelines or policies and 3 did not respond. Additionally, 4 schools responded "not sure" as to whether they required food allergy action plans and 5 schools did not respond. Since these were the primary outcomes of interest,

these responses were removed from the bivariate and multivariate analysis. Fisher's exact test was used to analyze the differences in the predictors between schools with student food allergy management guidelines or policies and schools that did not have them. We also used Fisher's exact test to analyze these predictors and the presence of food allergy guidelines/policies between schools that require food allergy emergency action plans and schools that did not require food allergy action plans. We used multivariate logistic regression analyses to model dependence of the 2 primary outcomes of interest, schools having food allergy policies/guidelines and schools requiring student food allergy action plans, on the above-described factors. A backward elimination model selection procedure was used to identify statistically significant covariates to be added into the final model. A statistical significance (alpha) level of 0.05 was used throughout the analysis. SAS OnDemand Enterprise Guide 4.2 (SAS Institute, Cary, North Carolina) was used to perform all statistical analysis.

RESULTS

One hundred twenty-five schools were surveyed and 78 responded for a response rate of 62%. Seventy-one (91%) of the responding schools completed the questionnaire. The majority of the questionnaires were completed by the school's principal and the remainder were completed by another school administrator (Table 1). The mean school enrollment was 251 students (standard deviation 189) with a range of 55 to 1,365 students. The majority of participating schools served students in prekindergarten through 8th grade. Table 1 displays the breakdown of schools by grade levels. Seventy-two (92%) schools indicated that they had no school nurse. For those schools that indicated they had a school nurse, 80% reported the nurse being present at the school for less than 10 hours per week.

Overall, 53 (71%) schools had some type of guideline or policy to address food allergies in students. However, 1 in 4 schools indicated they had no local policy or guidelines and 3 (4%) schools responded they were unsure. Food allergy emergency action plans (EAP) were required in 41 (56 %) schools. The setting of the study schools are described in Table 2a. Using Fisher's exact test, no association was found between a school's reported geographic area and the adoption of food allergy guidelines/policies or requirement of action plans in this system of schools (Tables 2a and 2b).

Fifty-six (76%) schools reported having students that needed special arrangements due to food allergies. Of these schools, the most frequent accommodation was establishing a peanut-free classroom (44; 79%). Fifteen (27%) schools had specific allergen-free areas and 25 (45%) had special lunchroom tables. Other methods to accommodate students with food allergies included (1) having allergic students move themselves away from the allergen; (2) providing special snacks for affected students or having the parents provide their lunch; (3) increased monitoring of

Table 2a. Selected Characteristics of Responding Schools With Food Allergy Policies in Comparison to Those Without Food Allergy Policies

n (%) Schools			
	With Food Allergy Policies or Guidelines	Without Policies or Guidelines	
Variables	(n = 47)	(n = 14)	P-value
Student Enrollment			
Mean	254	209	0.06
Variables	(n = 53)	(n = 19)	P-value
School Has Students With Food-allergic Special Needs			
Yes	45 (85)	8 (15)	< 0.0001
No	5 (36)	9 (64)	
Missing/other	1 (100)	0 (0)	
School Has a Nurse			
Yes	4 (80)	1 (20)	1.00
No	47 (75)	16 (25)	
School Setting			0.23
Inner City	6 (75)	2 (25)	
Rural	13 (65)	7 (35)	
Suburban	30 (83)	6 (17)	
Missing/other	2 (50)	2 (50)	

Table 2b. Selected Characteristics of Responding Schools That Require Food Allergy Action Plans in Comparison to Those Who do Not Require Food Allergy Action Plans

n (%) Schools			
	Require Food Allergy Action Plans	Do Not Require Food Allergy Action Plans	
Variables	(n = 36)	(n = 25)	P-value
Student Enrollment			
Mean	251	234	0.18
Variables	n = (41)	(n = 28)	P-value
School Has Students With Food-allergic Special Needs			0.74
Yes	32 (60)	21 (40)	
No	7 (50)	7 (50)	
Not sure	1 (100)	0 (0)	
School Has a Nurse			0.63
Yes	3 (60)	2 (40)	
No	37 (59)	26 (41)	
School Setting			0.22
Inner City	2 (25)	6 (75)	
Rural	12 (60)	8 (40)	
Suburban	23 (64)	13 (36)	
Missing/Other	3 (75)	1 (25)	
School Has Food-allergic Policy/Guidelines			<0.0001
Yes	34 (67)	17 (33)	
No	6 (35)	11 (65)	

snacks; and (4) 1 school indicated it was moving toward a peanut-free school environment.

However, the study schools used recommended food allergy reaction prevention guidelines inconsistently. Table 3 displays simple prevention guidelines and the number of responding

Table 3. Simple School Prevention Guidelines

Prevention Guideline	Number of Schools With Guideline or Policy	Percentage
Hand washing guidelines or policies	42	56.8 %
No food or eating utensil sharing	22	29.7%
Food substitution guidelines for classroom projects	43	58.1%
Cleaning surfaces in contact with food allergens	33	44.6%

Table 4a. Bivariate Analysis of Factors Associated With a School Having Local Food Allergy Guidelines or Policies

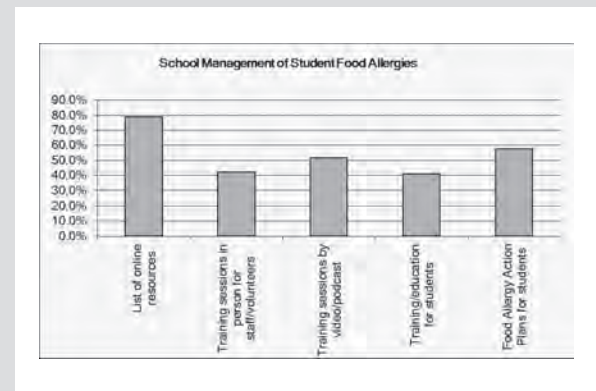
Proportion of Schools With Food Allergy Policies or Guidelines			
Crude Odds Ratio			
Variable	n (%)	(95% Confidence Interval)	P-value
Schools Has Students With Food Allergy Accommodation Needs			
No	5 (11)	Referent	
Yes	42 (89)	6.3 (1.5, 26)	0.01
School Nurse Present			
No	43 (91)	Referent	
Yes	4 (9)	1.2 (0.12, 11.8)	1.00
School Setting			
Suburban	29 (62)	Referent	
Inner City	6 (13)	0.52 (0.08, 3.32)	0.60
Rural	12 (25)	0.30 (0.08, 1.12)	0.09
Student Enrollment			
Continuous		1.003 (1.00, 1.01)	0.28

Table 4b. Bivariate Analysis of Factors Associated With a School Requiring Food Allergy Action Plans for Students With Food Allergy

Proportion of Schools That Require Food Allergy Action Plans			
Crude odds ratio			
Variable	n (%)	(95% Confidence Interval)	P-value
Schools With Students with Food Allergy Accommodations Needs			
No	6 (17)	Referent	
Yes	30 (83)	1.25 (0.4, 4.7)	0.75
School Nurse Present			
No	33 (92)	Referent	
Yes	3 (8)	1.05 (0.2, 6.8)	1.00
School Setting			
Suburban	22 (61)	Referent	
Inner City	2 (6)	0.18 (0.03, 1.0)	0.06
Rural	12 (33)	0.94 (0.3, 3.0)	1.00
School Has Food Allergy Guideline/Policy			
No	5 (14)	Referent	
Yes	31 (86)	3.487 (1.00, 12.16)	0.05
Student Enrollment			
Continuous		1.001 (1.00, 1.01)	0.63

schools that had adopted the guideline.

Study schools with students who had food allergy special needs differed significantly from schools that did not have students with these needs as to whether or not they had local

Figure 1. Preferred Instructional Formats for Educational Information and Training

food allergy policies or guidelines (85% vs 15%, $P < 0.0001$). Additionally, schools with food allergy policies were more likely to require individual student food allergy action plans (67% vs 35%, $P \leq 0.0001$). Further breakdown of these characteristics (variables) in relation to the primary outcomes of interest are shown in Tables 2a and 2b.

Anaphylaxis and epinephrine training of some kind were provided by 49 (66%) schools. Of these 49 schools, all provided training to school staff; however, only 9 (18%) provided training for school volunteers and 1 (2%) provided parent training. Sixty-six schools (90%) reported interest in receiving further information or training on school management of food allergies. Figure 1 displays the preferred format of information and training.

Bivariate Analyses

Results of the bivariate analysis are summarized in Tables 4a and 4b. Schools that reported having students with special needs due to food allergy were 6 times more likely to have a local food allergy policy compared to schools that did not report having students with food allergy special needs (OR 6.3, 1.5-26). However, there was no significant difference between the 2 groups in regard to whether the school required individual food allergy action plans for students with food allergies.

When analyzing whether having a local school food allergy policy is associated with the school requiring individual student action plans, we found marginal significance with a P -value of 0.05. Schools with food allergy guidelines/policies were 3.5 times more likely to require student individual action plans than schools with no guidelines or policies (OR 3.5, 1.00-12.2).

Multivariate Analyses

Multivariate analyses of the potential predictors for the 2 outcomes above did not yield any other significant variables.

DISCUSSION

The results of our study show that adoption of school food

allergy management guidelines remains inconsistent in this large school system. Additionally, many did not employ simple prevention strategies or provide education and training, and did not require student emergency action plans. Our results support current studies in the literature with similar findings in other geographic areas of the United States.^{5,11,22-24}

We had a high response rate for the survey and believe that our community-academic partnership approach and the use of the electronic survey mechanism promoted the completion of the questionnaires. Our high response rate also may be related to the school principals' and administrators' recognition of the importance of implementing better practices for caring for students with food allergies.

Additionally, we found significantly limited school staff access to school nurses. The lack of schools with access to nurses limited our power to test associations between the presence of school nurses and the adoption of food allergy guidelines. Therefore, it is possible that with a high number of schools with access to a school nurse in our sample we may have found this to be a significant predictor of the school adopting food allergy guidelines. The literature posits that implementing food allergy guidelines and policies without access to qualified health professionals (such as a school nurse) to help with the interpretation, implementation, and adherence to food allergy guidelines may be difficult.²⁵ Without the aid of a school nurse, school leaders and staff are tasked to provide health services for students—this includes compliance with state statutes regarding school health services. Anecdotally, we discovered that schools often rely on teachers, administrators, and volunteers to provide school health services and to implement appropriate local health safety measures to ensure student well-being. The additional responsibilities of providing health care to students often extends beyond the comfort level of school personnel.²⁵ Furthermore, the presence of a school nurse alone is not sufficient to care for students with food allergies. Indeed, the US Peanut and Tree Nut Allergy Registry found that the school nurse responded to food allergy reactions in only 10% of food allergy incidents. Teachers were noted to be the first responder in 59% of cases; therefore, teacher training and communication with health care providers are particularly important.²⁶

In addition, it is likely that to some extent schools learn from or are motivated by the parents of affected students to implement policy, as our results show that having a student who has a food allergy was significantly associated with having adopted school guidelines or policies. Unfortunately, relying on concerned parents to drive food allergy policy and practices in schools is not enough, as many first reactions occur in the school setting.²⁶ Schools need to be prepared for the unexpected and adopt evidence-based policies to prevent poor outcomes.

Our study also indicates that staff, volunteer, and parent training on epinephrine use was inconsistent in the schools. This

is concerning given the unpredictable nature of food allergies in which prompt recognition and epinephrine administration are the primary methods of treatment. Given that health rooms, field trips, sports, and after-school activities often are staffed, or run, by parents and volunteers, training and education targeted at these groups would be beneficial. However, as we previously noted, few schools have the access to skilled health professionals to help provide training.

Our results also indicate that recommended preventive management strategies for students with food allergies were not consistently used such as simple hand washing, cleaning guidelines, and no-sharing policies. Once again, this finding underscores the need for education and training of staff and volunteers on simple food allergy management strategies. Furthermore, many of the schools that had children with food allergy special needs did not mandate that all students have a food allergy emergency action plan. Without individualized physician-prescribed emergency care plans for each affected student, the school administrative staff, teachers, and volunteers do not have the vital information (ie, a written plan to manage a student with a food allergy) needed in the event of an emergency when swift appropriate action is needed and an experienced school nurse may not be available.¹⁷

On a positive note, many respondents noted a desire to improve their knowledge and skills by requesting further information or training on food allergy management. Most schools preferred online resources or video podcasts to learn more about school management of food allergies. These formats may provide an efficient strategy to address food allergy management training, as they can be merged easily into the current school workflow (ie, reduced need for attendance and participation at workshops and seminars). In addition, the school system's administration is supportive of continued health education and training and our partnership currently is working to develop online and mobile health food allergy education and training resources for school staff and volunteers in addition to regional educational workshops. Further study will be required to identify the most effective and efficient strategies to provide food allergy education and training to schools with minimal to no nursing support.

LIMITATIONS

We acknowledge limitations in applying these results to other settings. First, all survey responses were drawn from a single geographic area in Southeastern Wisconsin; it is not clear the results would be similar outside this region. Similarly, while our focus on private (parochial) schools avoids confounding by different types of school systems, allowing us to examine specific characteristics, it does limit the generalizability to other types of school systems. Also, the nature of our survey design may have created recall bias. To minimize the effect of this, the questions were kept simple and most allowed for a "not sure" response. Finally, we

1. What is the role of the person filling out this survey?

- a. Principal
- b. Teacher
- c. School nurse
- d. Administrator

2. Does your school have a school nurse?

- a. Yes
- b. No

3. If yes, how many hours is the nurse in your school per week?

- a. Less than 10 hours
- b. 11-20 hours
- c. 21-30 hours
- d. 40 or more hours

4. Does your school have any policy or guidelines specifically addressing food allergies in students?

- a. Yes
- b. No
- c. Not sure

5. Does your school require that all students with food allergies have a Food Allergy Action Plan or similar form filled out by the student's doctor or primary care provider?

- a. Yes
- b. No
- c. Not sure

6. Does your school have any children who currently need special arrangements due to food allergies?

- a. Yes
- b. No
- c. Not sure

7. If yes, please check all that apply

- a. Allergen free areas
- b. Special lunchroom table
- c. Special classroom accommodations (eg, peanut-free)
- d. Other (please specify)

8. Does your school have guidelines or a policy regarding hand washing after food handling by staff, students, or volunteers?

- a. Yes
- b. No
- c. Not sure

9. If yes, which group do these handwashing guidelines or policy apply (may select one or more groups)?

- a. Staff
- b. Students
- c. Volunteers

10. Does your school have a "no food or eating-utensil trading" guideline or policy?

- a. Yes
- b. No
- c. No sure

11. Some classroom projects involve food (such as math, science projects, art projects, cooking demonstrations etc.) Does your school use food substitution guidelines for classrooms with food allergic students who may have an allergy to the food used (eg, peanut butter)?

- a. Yes
- b. No
- c. Not sure

12. Does your school have guidelines or a policy for cleaning surfaces (eg, tables, desks) which have been in contact with common food allergens (such as peanut, peanut butter, egg, tree nuts etc)?

- a. Yes
- b. No
- c. Not sure

13. Does your school provide any training on anaphylaxis* and epinephrine (adrenaline) treatment? *According to the Food Allergy and Anaphylaxis Network (FAAN), anaphylaxis is a "serious allergic reaction that is rapid in onset and may cause death." Symptoms can include difficulty breathing, hives, facial swelling, vomiting, diarrhea, cramping, shock and loss of consciousness. ²⁷

- a. Yes
- b. No
- c. Not sure

14. If yes, please select which group receives training in your school on anaphylaxis and epinephrine (adrenaline) use. (May select more than one).

- a. Staff training
- b. Volunteer training
- c. Parent training

15. When a classroom has a student with a food allergy, does the school provide information to the parents of the classmates?

- a. Yes
- b. No
- c. Not sure

16. If yes, please select the type of information provided (May select more than one).

- a. Letter from the teacher
- b. Letter from the student's parents
- c. Safe snack list
- d. Educational information on food allergies
- e. Other (please specify)

17. Is educational information on food allergies provided or available to staff, parents, and volunteers? (May select more than one)

- a. Yes, staff
- b. Yes, parents
- c. Yes, volunteers
- d. No
- e. Not sure

18. If yes, please check the type of information:

- a. Websites
- b. Pamphlets
- c. Training sessions
- d. Video
- e. Other (please specify)

19. Would your school like training and/or information on school management of food allergies? Please select all that apply:

- a. List of online resources
- b. Training sessions in person for staff/volunteers
- c. Training sessions by video/podcast
- d. Training/education for students
- e. Food Allergy Action Plans for students
- f. Other (please describe)

20. Please share any other comments you have:

21. Please select which applies to you:

- a. Public school
- b. Private school

22. How would you describe the setting your school is in?

- a. Rural
- b. Suburban
- c. Inner City
- d. Other (please specify)

23. What was your school's enrollment last year? ____

24. Please enter your school's lowest grade and your school's highest grade:

- a. Lowest grade ____
- b. Highest grade ____

did not achieve a 100% response rate and the study's results may not fully represent the entire school system. However, we feel that the geographical diversity of the schools that did participate can serve as a strong representation of the school system, as many neighboring schools likely will adopt similar policies.

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Pop and Drop

Michael Witcik, MD, FACC; Joshua Meskin, MD, FACC

ABSTRACT

A 70-year-old man presented to cardiology clinic with recurrent syncope associated with consumption of carbonated beverages. Ambulatory monitoring revealed multiple symptomatic ventricular pauses. A barium esophagram was unremarkable, and the patient underwent placement of a dual chamber pacemaker for deglutition syncope with resolution of symptoms. A challenge of carbonated beverage was given, resulting in bradycardia that initiated an appropriate pacing response. This case illustrates the need for a thorough history when defining the etiology of syncope.

INTRODUCTION

Despite advancing medical technology, a thorough history continues to be integral to optimal patient care. This is illustrated by a case of a 70-year-old man who presented an unusual form of recurrent syncope.

CASE PRESENTATION

A 70-year-old man presented to cardiology clinic with recurrent syncope after consumption of cold carbonated beverages. The episodes typically resulted in weakness and flushing; however, one episode was associated with head trauma. The patient reported regaining full consciousness after several seconds without residual symptoms. There was no history of dysphagia or odynophagia. He denied any history of neurological disease. There was no associated chest pain, dyspnea, or palpitations. Past medical history was significant for coronary artery bypass surgery and rate-controlled atrial fibrillation. Family history was unremarkable for any arrhythmias, and social history was noncontributory.

On examination, the patient appeared well. He was afebrile and normotensive with normal heart and respiratory rates. Cardiac

auscultation revealed an irregular rhythm without a significant murmur or gallop. No jugular vein distension was present. Pulmonary examination revealed clear lung fields. The rest of the examination, including abdominal and neurological exam, was normal. Laboratory evaluation was unremarkable. The chest radiograph did not reveal any cardiopulmonary abnormality. The 12-lead electrocardiogram demonstrated atrial fibrillation with a ventricular

rate in the 60s. Transthoracic echocardiogram revealed normal left ventricular size and function, mild aortic valve regurgitation, and otherwise no significant abnormalities. The patient underwent ambulatory event monitoring that revealed atrial fibrillation with multiple ventricular pauses, up to 4 seconds, associated with swallowing and symptoms of significant pre-syncope (Figure 1). Barium esophagram did not demonstrate underlying esophageal pathology.

The patient underwent placement of a dual chamber permanent pacemaker with resolution of symptoms and ventricular pauses. After pacemaker placement, a challenge of carbonated beverage was given, resulting in bradycardia that initiated an appropriate pacing response (Figure 2). Subsequently, the patient has been free of recurrent syncope.

DISCUSSION

Deglutition syncope, or swallow syncope, was described as early as 1906.¹ It is a relatively rare type of situational syncope that is related to the ingestion of solid foods or liquids and can be independent of underlying esophageal or cardiac disease.^{2,3} Through 2011, 80 cases have been reported in the English literature.⁴ Deglutition syncope can, however, be associated with various esophageal abnormalities such as spasm, carcinoma, and stricture.⁵⁻⁷ Additionally, there are cases that report association with achalasia, esophageal diverticulum, and hiatal hernia.⁷

The typical presentation includes lightheadedness or syncope during or immediately after swallowing food or liquids. The episodes can be intermittent and unpredictable. The ingestion can be of any size, consistency, or temperature; however, carbonated

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beverages have been the implicated agent in many cases.⁹ The physical examination and resting electrocardiogram are usually normal. Ambulatory electrocardiographic monitoring often reveals the causative bradyarrhythmia. Atrioventricular block is the most common cause of syncope and cases of sinus arrest, sinoatrial block, sinus bradycardia, and ventricular asystole have also been reported.⁹

The pathophysiology of this disorder is not completely understood; however, it appears that it is due to a hypersensitive vagal reflex triggered by mechanoreceptors in the esophagus in response to swallowing. Mechanoreceptors in the esophageal wall sense distension and send signals to the cardioinhibitory center in the medulla. The efferent limb of reflex pathway is postulated to be the vagus nerve, which innervates the sinoatrial and atrioventricular nodes. Vagal stimulation leads to nodal suppression that can result in slowing or cessation of conduction and transient inappropriate bradyarrhythmias. If prolonged, this can lead to a reduction of cardiac output, hypotension, diminished cerebral perfusion, and syncope.^{4,10} Additionally, there are reports that suggest the efferent pathway results in vasodilation.¹¹ During continuous hemodynamic monitoring, a vasodepressor response has been noted followed by bradycardia. The decrease in systemic blood pressure preceding bradycardia may be due to withdrawal of sympathetic neural activity, activation of cholinergic vasodilation, or effects of local humoral substances such as nitric oxide. This vasodepressor mechanism is important to recognize as permanent pacemaker placement may not alleviate symptoms.

CONCLUSION

The diagnosis of deglutition syncope requires careful acquisition of the temporal relationship between swallowing solid food or liquids and lightheadedness or syncope. It can cause significant impairment of quality of life and can result in significant injury, especially if it occurs while driving. A thorough history is imperative to the diagnosis of this disorder.

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Figure 1. Ventricular Pause Associated With Swallowing



Figure 2. Carbonated Beverage Challenge Resulting in Appropriate Pacing Response

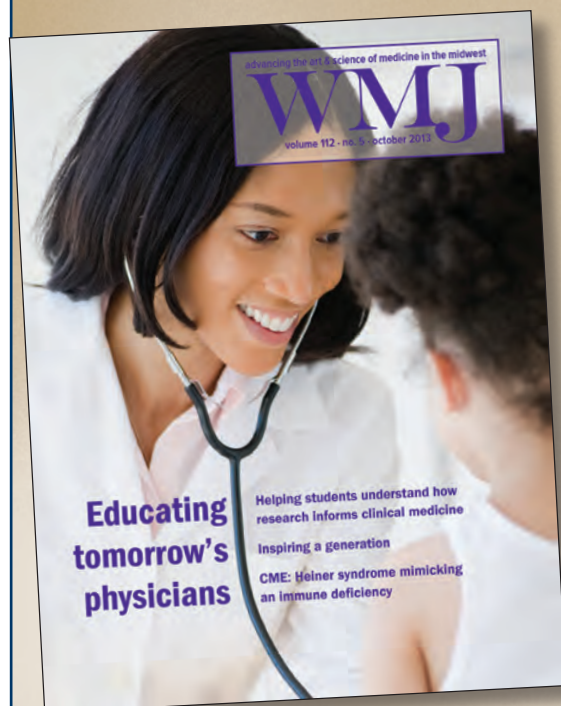


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Assuring Conditions for Population Health

Patrick Remington, MD, MPH, Robert N. Golden, MD

This is the first of two articles that describe the activities of the University of Wisconsin School of Medicine and Public Health's (SMPH) Wisconsin Partnership Program. The program represents a far-reaching commitment by the school to greatly improve the health of people in Wisconsin for years to come. The Partnership Program—which is celebrating its 10th anniversary and recently released a plan for its next 5 years—includes two main, complementary committees: the Oversight and Advisory Committee (OAC) and the Partnership Education and Research Committee (PERC). SMPH faculty members chair the committees. Dr Remington serves as OAC chair; Richard Moss, PhD, chairs the PERC. A future WMJ, will focus on plans for research and physician education over the next 5 years.

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Simply stated, the goal of public health is to assure conditions in which all people can live long and healthy lives.¹ A recent analysis of the trends in Wisconsin's health shows decidedly mixed results toward reaching this goal. Although people in the state are living longer, this increase in longevity may

ity and affordability, but also for public health approaches that create healthy communities and assure conditions for population health. These policy, systems, and environmental approaches complement health care interventions and are needed when confronting complex, multifactorial health problems.^{5,6} The

Together with our partners, we are committed to supporting new and innovative policy, systems, and environmental approaches, so that all people can live long and healthy lives.

have come at the cost of higher morbidity and a lower quality of life.² Troubling increases in rates of obesity, infant deaths,³ and children living in poverty will make future progress more challenging. Even more vexing are the significant and persistent health disparities across the state, as shown by the County Health Rankings.⁴

Although these are not insurmountable problems, progress will be made only if we go beyond the traditional medical model of providing services solely to those in need—whether through private health care systems or in governmental public health settings. Health care systems and physician leaders must advocate not only for improvements in health care qual-

University of Wisconsin School of Medicine and Public Health has embraced this public health approach, as we work to seamlessly integrate public health into our education, research, and service missions.^{7,8} In this brief commentary, we describe one important element of this effort—the grants to communities directed by the Wisconsin Partnership Program's Oversight and Advisory Committee.

Through this 9-member committee, the Wisconsin Partnership Program has provided more than \$53 million in grants to support community-based public health initiatives throughout the state. The committee is responsible for developing the infrastructure for reviewing public health-related grant applications, moni-

toring the progress and assessing outcomes of funded applications, establishing priorities for the portfolio, and setting the strategic direction for its activities. Grant programs in 3 broad areas have been established, as described below.

Community-Academic Partnership Grant Program

The Community-Academic Partnership Grant Program has been a cornerstone of the Wisconsin Partnership Program since its inception in 2004.⁹ The program supports community-academic partnerships with direct funding for projects proposed by community organizations. The projects are selected through a competitive, peer-reviewed process. Each community organization provides overall leadership and direction for its project, which must be designed to address an identified local, regional, or statewide need. Each project has an academic partner who supports the work by providing advice on evidence-based approaches and/or on program evaluation. This community-driven approach responds to local needs and brings together the expertise of community members and UW faculty and staff.

A new component of the Community-Academic Partnership Grant Program—the Opportunity Grants Program—will begin this year. This new grant mechanism will support selected short-term projects designed to enhance communities' capacity to collaborate with their local health care systems on community-identified priorities. The Opportunity Grants Program will capitalize on community-driven efforts such as facilitating the establishment of local Accountable Care Organizations or community health improvement plans. Through a rolling application process, these grants will be strategic, flexible, responsive, and timely.

Public Health Service and Workforce Development

The Oversight and Advisory Committee also supports several public health service and workforce development programs. For example, the Wisconsin Population Health Service Fellowship supports early-career public health professionals in government or community

organizations. Fellows focus on issues such as preventing injuries, reducing exposure to occupational and environmental risks, and promoting healthy communities.¹⁰ Another example is the Healthy Wisconsin Leadership Institute, a public health leadership and training program that provides yearlong training to community teams. This program responds to local needs by using a shared-learning model. More than 40 Wisconsin communities have applied policy, systems, and environmental approaches to their health initiatives through this program, thus strengthening partnerships.¹¹

Targeted Public Health Initiatives

In 2009, the Wisconsin Partnership Program began to focus on the enormous public health challenge of improving birth outcomes among African-Americans in Wisconsin—committing up to \$10 million to the Lifecourse Initiative for Healthy Families. The initiative focuses on the cities of Beloit, Kenosha, Milwaukee, and Racine, which account for nearly 90% of African-American infant deaths in Wisconsin. The “lifecourse” perspective holds that the stresses an individual encounters through environmental factors, economic conditions, societal problems, and personal circumstances have lasting implications and impact on health. Through the Lifecourse Initiative, community collaboratives in each of the cities seek to improve African-American birth outcomes by improving health care, strengthening families and communities, and addressing social and economic inequities.

The Wisconsin Partnership Program is developing a new, targeted initiative to address obesity prevention. The program's goal is to reduce the obesity rate in Wisconsin by funding evidence-based strategies—particularly those that take sustainable policy, systems, and environmental approaches. Grants provided to community organizations through the Oversight and Advisory Committee will focus on preventing obesity and serve as a “population health laboratory” for expanding the evidence-base for obesity prevention in Wisconsin and beyond, while providing resources and interventions to communities.

In summary, the grants provided through the UW School of Medicine and Public Health's

Oversight and Advisory Committee not only support “good work” but also are aimed at beneficial, sustainable changes in health policies, systems, and the environment. The partnerships developed through these programs bring the university's resources into communities and enrich the university with community perspectives that help guide our teaching and research efforts. Together with our partners, we are committed to supporting new and innovative policy, systems, and environmental approaches, so that all people can live long and healthy lives. The Wisconsin Partnership Program's new 5-year plan sets the stage to build upon the successful efforts of its initial decade.

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