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Do Schools That Screen for Body Mass Index Have Recommended Safeguards in Place?

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Abstract

The Centers for Disease Control and Prevention recommends that schools adopt 10 safeguards before launching a body mass index (BMI) screening program; however, little is known about schools' safeguard adoption. Authors identified questions from the 2014 School Health Policies and Practices Study that aligned with 4 of the 10 safeguards to estimate safeguard prevalence among schools that screened students for BMI (40.7%, $N = 223$). Among these schools, 3.1% had all four safeguards and 56.5% had none or one. The most prevalent safeguard was having reliable and accurate equipment (54.1%, 95% confidence interval [CI] = [46.1, 62.1]). Providing staff with appropriate expertise and training was the least prevalent; respondents in 26.4% (95% CI [17.1, 35.6]) of schools received recent training on weight status assessment, weight management, and eating disorder identification. School-based BMI screening is common, but adopting multiple recommended safeguards is not. Absent these safeguards, BMI screening programs may fall short of intended outcomes and potentially incur unintended consequences.

Keywords

BMI; health/wellness; obesity; screening/risk identification; policies/procedures

Schools are strategic settings for obesity prevention efforts (Hoelscher, Kirk, Ritchie, Cunningham-Sabo, & Academy Positions Committee, 2013; Institute of Medicine, 2012; White House Task Force on Childhood Obesity, 2010), and decision makers (e.g., state

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Authors' Note

Data from the School Health Policies and Practices Study are available to the general public for use. More information can be found online: https://www.cdc.gov/healthyyouth/data/shpps/index.htm

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legislators, superintendents, principals) can consider a mix of strategies for schools to adopt to address obesity. One such decision is whether to collect information about student weight status in schools. School-based body mass index (BMI) measurement is part of both surveillance and screening efforts. In BMI surveillance, data are collected and aggregated to identify the percentages of students among the population who are obese, overweight, normal weight, and underweight (Nihiser et al., 2007). In contrast, BMI screening assesses the weight status of individual students to identify those who should be further examined by a medical care provider and communicates to parents personalized health information about their child (Nihiser et al., 2007). Data from both surveillance and screening efforts can be used to monitor progress toward health objectives and to describe local prevalence and trends (Nihiser et al., 2007). In 2014, about 40% of public and private schools in the United States reported screening for student weight status by using BMI (Centers for Disease Control and Prevention [CDC], 2015). Several states require BMI screening (Blondin, Giles, Cradock, Gortmaker, & Long, 2016; National Cancer Institute, 2016; Ruggieri & Bass, 2015), but even without a state mandate, districts and individual schools can adopt, and even require, this practice. The percentage of districts that addressed BMI measurements in local wellness policies increased significantly between school year 2006–2007 and 2013–2014 (Piekarz et al., 2016).

BMI measurement, and especially screening, has been controversial. In the earlier years of school-based BMI screening (e.g., through 2007), various stakeholders, including eating disorder specialists, parents and caregivers, and public health researchers, voiced concern about the potential for harm via decreased self-esteem, increased weight-based stigmatization, and adoption of unhealthy weight reduction practices (Eisenberg, Neumark-Sztainer, & Story, 2003; Ikeda, Crawford, & Woodward-Lopez, 2006; Neumark-Sztainer, Story, & Harris, 1999).

The CDC does not make a recommendation for or against BMI measurement in schools. Instead, CDC states that,

> Schools should not launch a BMI measurement program unless they have established a safe and supportive environment for students of all body sizes; are implementing a comprehensive set of strategies to prevent and reduce obesity; and have put in place a series of safeguards that address the primary concerns raised about such programs. (Nihiser et al., 2007, p. 663)

CDC's position and recommended safeguards have remained unchanged since the 2007 release; however, the layout and graphics on the BMI measurement in schools webpage have since been updated.

The first eight safeguards recommended by CDC aim to minimize concerns associated with any type of school-based BMI measurement (i.e., surveillance or screening). They promote introducing the measurement program to school staff and the broader community, obtaining parental consent, ensuring privacy, training staff to minimize stigmatization and ensure the reliability and accuracy of measurements, having accurate and reliable equipment, entering and analyzing data appropriately, avoiding using BMI data to evaluate teacher or student performance, and evaluating the measurement program (Nihiser et al., 2007). For BMI

screening, two additional safeguards aim to ensure that measurement results are communicated in a clear and respectful way with parents of all students and accompanied by appropriate follow-up actions (Nihiser et al., 2007). These additional safeguards intend to avoid singling out children whose weight falls outside the normal range, while providing their parents with tangible next steps.

CDC's safeguards were developed in the earlier years of school-based BMI measurement programs and respond to the aforementioned concerns. The safeguards incorporate insights drawn from a literature review, an expert panel, and the experiences of early adopters of BMI measurement at the state and school district levels (Nihiser et al., 2007). The safeguards reflect principles from the National Association of School Nurses Code of Ethics (last revised 2016), which asserts that nurses maintain privacy and confidentiality, obtain informed consent, take steps to eliminate bullying and discrimination, pursue training to enhance the quality of practice, and provide referrals to further child well-being. Given that the supporting evidence was largely indirect, the safeguards can be considered good practice statements rather than evidence-based guidelines (Guyatt, Schünemann, Djulbegovic, & Akl, 2015).

Although these safeguards have been disseminated for over a decade, little is known about their prevalence. This study analyzes data from the 2014 School Health Policies and Practices Study (SHPPS) to estimate the extent to which schools that screen for BMI have the recommended safeguards in place and to determine school characteristics associated with screening for BMI.

This article focuses on the four safeguards that aligned with questions on the SHPPS survey: having accurate and reliable equipment, providing training to ensure that staff can obtain accurate results and minimize potential for stigmatization, ensuring resources are available for follow up, and notifying parents of results and providing referrals. These safeguards represent several of the critical steps that schools should take to minimize adverse outcomes (Nihiser et al., 2007).

Method

Study Design and Sample

The SHPPS is a national survey conducted periodically by CDC to assess school health policies and practices at the state, district, school, and classroom levels. The present study used school-level data gathered from February to June 2014. A detailed description of SHPPS methods has been published previously (CDC, 2015). Briefly, a two-stage sample design was used to select a nationally representative sample of elementary, middle, and high schools. All public and private schools in the United States with any of grades kindergarten through 12 were eligible for sampling. Trained interviewers visited each participating school to conduct computer-assisted personal interviews. Seven school-level questionnaires were administered in each school. The principal or other school contact identified the most knowledgeable respondent for each questionnaire. This analysis used data gathered from the health services questionnaire (N = 588, response rate = 71%). SHPPS was reviewed by an

institutional review board at CDC and was determined to be exempt under federal regulation 45 CFR 46.101 (b).

Measures

As part of SHPPS 2014, respondents to the health services questionnaire (primarily school nurses) were asked a series of questions related to student health screenings, which were defined on the questionnaire as “screenings conducted for most students in the school or certain grades in the school.” Specific to BMI screening, respondents were asked, “Are most students from the designated grade or grades screened at your school for weight status using BMI?” Respondents answered yes or no. Other questions assessed whether the school had recommended safeguards for BMI screening in place. The questions used to measure each safeguard are shown in Table 1. Except for the questions that assessed whether the school had a registered nurse (RN) present for at least 30 hr per week, respondents answered yes or no to each question. The questions assessing the presence of a nurse asked, “How many RNs provide standard health services to students at your school?” Then, for each nurse, respondents were asked, “During the past 30 days, how many hours per week on average has the RN spent at your school?” Responses to this question were then summed to calculate a total number of RN hours per week. Schools with 30 RN hours or more were considered to have a full-time school nurse.

Schools that did not have someone to “oversee or coordinate school health services,” or where the respondent did not hold this role, skipped the questions that addressed recent professional development for school health services coordinators (e.g., Safeguard 2, see Table 1). This reduced the sample size for questions in Safeguard 2 from 223 schools with BMI safeguards to 149.

Using SHPPS data, a composite variable for each safeguard was calculated on the basis of the yes responses to the related questions. With the exception of Safeguard 9, this composite variable required a yes response to all of the questions associated with that safeguard. For Safeguard 9, the school had that safeguard in place if it had *either* on-site services *or* arrangements with outside providers for nutrition and dietary behavior counseling and physical activity and fitness counseling. The Safeguard 9 question that addressed identification of and referrals for eating disorders was only asked of middle and high schools and, therefore, was not included in the composite score for elementary schools.

The authors created a count variable to indicate the total number of composite safeguards each school had in place by summing the four composite scores described above, treating missing values as zeroes. Therefore, schools that did not oversee or coordinate school health services were assigned a zero for Safeguard 2. We conducted a sensitivity analysis with a count variable that included only schools that answered all the safeguard questions.

The SHPPS data file includes information about select school characteristics from the National Center for Education Statistics including school type (public, state-administered, private or Catholic), school level (elementary, middle/junior high, and senior high), locale (urban, suburban, township, and rural), and region (Northeast, Midwest, South, and West). Other variables (i.e., school enrollment size, per-pupil expenditure, and percentage of

students eligible for free and reduced-priced lunch) were obtained from extant data collected by Market Data Retrieval and linked to the SHPPS data set. Total student enrollment was categorized as small, medium, or large by using cutoffs appropriate to achieve comparable frequencies across grade levels, accounting for differences in size by school level (for elementary and middle schools, ≤300, 301–500, and >500; for high schools, ≤350, 351–800, and >800). Per-pupil expenditure was categorized into two groups (<US$8,200 and ≥US $8,200) on the basis of the distribution of the categorical responses. The percentage of students eligible for free or reduced-price lunches was categorized into three groups (<40%, 40% to <75%, and >75%). The 40% cutoff was chosen to align with the school-level threshold for the Community Eligibility Provision (U.S. Department of Agriculture, 2015), and the National Center for Education Statistics uses ≥75% eligibility to identify high poverty schools (National Center for Educational Statistics, 2015).

Data Analysis

All analyses were conducted in Stata/SE statistical software (Version 14.0; StataCorp LP, College Station, TX, 2013) and accounted for the complex sampling design and weights, yielding nationally representative estimates. Across key characteristics, we conducted χ^2 analyses with Pearson's design-corrected tests to determine whether schools that conducted BMI screening differed from schools that did not. We estimated the prevalence and 95% confidence intervals for the safeguard components, overall composite safeguard measures, and total number of composite safeguards that schools had in place.

Results

School Characteristics

Overall, 40.7% of schools screened for BMI. With the exception of the region of the country in which they were located, schools that screened students' weight status were demographically similar to schools that did not (Table 2). The proportion of schools with a full-time school nurse was greater among schools that conducted BMI screening ($p = .03$).

Prevalence of Safeguards

Table 3 presents the prevalence of safeguards among schools that screened for BMI. More than one quarter of schools (26.4%) had measures to ensure staff had appropriate expertise and training (Safeguard 2), 54.1% had the recommended equipment (Safeguard 4), 33.4% had resources available for safe and effective follow-up (Safeguard 9), and 44.4% provided parents with notifications and referrals if results indicated "a potential problem" (e.g., student's BMI percentile was above or below the normal range; Safeguard 10). Over half of schools (56.5%) reported having zero or one safeguard in place. In contrast, 3.1% of schools had four safeguards in place (Table 3). Among the subset of schools that answered all the safeguard questions ($n = 141$), 11.4%, 38.4%, 27.1%, 18.4%, and 4.8% had zero, one, two, three, and four composite safeguards in place, respectively.

Looking at the prevalence of the components of the composite measures indicates variability within each safeguard. For example, in Safeguard 4, 74.6% of schools reported having an electronic scale or beam balance, and 65.8% had a stadiometer, but only 54.1% had both.

For Safeguard 10, the majority (86.0%) of schools notified parents when results indicated a potential problem, whereas less than half (47.0%) provided referrals to community health-care providers.

Discussion

Although BMI screening is relatively widespread, our results suggest that the implementation of at least some recommended safeguards is not. Among schools that screened for BMI, roughly 3% had all four safeguards this study assessed. Almost 60% of schools reported having none or one of the safeguards in place.

The most prevalent of the safeguards examined, Safeguard 4: "Use equipment that can accurately and reliably measure height and weight," was in place in more than half of schools. Having the recommended equipment is essential to obtaining reliable data (Himes, 2009; Nihiser et al., 2007; Oza-Frank, Hade, & Conrey, 2012; Stoddard, Kubik, & Skay, 2008). Conducting BMI screenings with less reliable or accurate equipment may increase the risk of communicating inaccurate results to parents. Height values are squared when calculating BMI, which magnifies measurement errors (Malone & Zemel, 2015). Several studies have shown that professionals trained on height and weight measurement, including school nurses and physical education teachers, collected highly reliable data as part of statewide (Conrey, Hade, Norton, & Scarpitti, 2009; Morrow, Martin, & Jackson, 2010; Oza-Frank et al., 2012) and community-wide (Berkson et al., 2013) school-based BMI measurement programs. To measure height accurately, staff must pay attention to multiple factors including clothing (e.g., removing shoes), hairstyles, body positioning, and breathing rhythm (Arkansas Center for Health Improvement, 2010; Malone & Zemel, 2015; Stoddard et al., 2008). Less than 60% of SHPPS respondents reported receiving training on accurately measuring height and weight or assessing student weight status during the past 2 years. One reliability study observed seven nurses taking height and weight measurements on 70 students with high reliability for both younger (80% for height and 97% for weight) and older students (85% for height and 100% for weight). The researchers observed that the majority of nurses modeled practices as described in preimplementation training (e.g., ways to create a private space, proper measurement techniques; Stoddard et al., 2008). The authors concluded that standardized preimplementation training was worthwhile and suggested that refresher trainings may also be valuable; however, the study was not designed to assess measurement reliability and privacy among nurses who did not receive preimplementation training (Stoddard et al., 2008). Limited training and availability of recommended equipment can make it challenging to collect high-quality data (Himes, 2009).

Although these results regarding adoption of Safeguards 2 and 4 indicate potential data quality issues, such concerns have not featured prominently among criticisms of BMI measurement programs. Literature reviews related to school-based BMI measurement indicate that related controversy typically focuses on issues that can directly or indirectly affect student safety and well-being: measurement privacy, weight-based bullying and stigmatization, reduced self-esteem, and the content of communications with parents (Evans & Sonneville, 2009; Ikeda et al., 2006; Nihiser et al., 2007; Ruggieri & Bass, 2015). The measurement process can make students uncomfortable (Kalich et al., 2008); therefore,

training staff to ensure privacy during data collection and how to address students' questions is important. A well-documented concern, voiced by public health practitioners and caregivers alike, is that "BMI letters" or "BMI report cards" could increase weight-based bullying or stigmatization, unhealthy or restrictive weight control behaviors, and adverse mental health outcomes including the development of eating disorders. This concern was raised in earlier reviews about BMI measurement programs (Evans & Sonneville, 2009; Ikeda et al., 2006; Nihiser et al., 2007) as well as in reviews published in the last three years (Ruggieri & Bass, 2015; Thompson & Madsen, 2017). Safeguards 9 and 10 aim to minimize unintended consequences of screening; however, most schools that screened for BMI lacked these safeguards.

Only 47% of schools that screened for BMI provided parents or guardians with referrals to community healthcare providers. Without referrals, parents may be insufficiently prepared to act on the information schools send home. For example, letters may prompt well-intentioned parents to engage in "weight talk," which has been linked with both obesity and eating disorders among youth (Golden, Schneider, & Wood, 2016). In a survey of elementary school nurses in the National Association of School Nurses database, more than half of respondents in this self-selected sample identified "inappropriate or inadequate parent reactions" among their major concerns about BMI screening (Hendershot, Telljohann, Price, Dake, & Mosca, 2008). SHPPS does not address the letters' content, readability, or availability in translated versions, which limits our ability to assess whether the information communicated to parents is "clear and respectful." Further, "respectful" is subjective. The term obesity is normative and useful among clinicians and public health professionals but can offend parents and youth (Crawford, Hinson, Madsen, Neumark-Sztainer, & Nihiser, 2011; Eneli, Kalogiros, McDonald, & Todem, 2007; Meadows & Daníelsdóttir, 2016; Moyer, Carbone, Anliker, & Goff, 2014; Puhl, Peterson, & Luedicke, 2011; Thompson, Linchey, & Madsen, 2015). If letters induce negative emotions, recipients may be less likely to take the intended actions.

A potential benefit of BMI screening is reaching all enrolled students whose parents consent and providing them with timely and actionable information (Institute of Medicine, 2005; Nihiser et al., 2007; Ruggieri & Bass, 2015). Although well-child visit attendance significantly increased between the mid-1990s and 2007–2008, less than 60% of children attended such visits, and substantial disparities were identified across household income levels, race, and ethnicity (Abdus & Selden, 2013). In contrast, about 95% of school-aged children are enrolled in school (National Center for Educational Statistics, 2016). Therefore, school-based screening may be an important way to reach children who do not have access to regular health-care-based screening and who may be at higher risk of obesity, given documented disparities in both access to health care and obesity rates by socioeconomic status, race, and ethnicity (Bethell, Simpson, Stumbo, Carle, & Gombojav, 2010; Ogden et al., 2016; Rossen & Schoendorf, 2012; Wang, 2011). With the exception of regional differences, we found that BMI screening was similarly present in schools regardless of their locale, size, free or reduced-price lunch eligibility, or per-pupil spending. The only school characteristic associated with having a BMI screening program was the presence of a full-time nurse. This suggests that the decision to adopt a BMI screening program may be

independent of geographic or socioeconomic factors. Nevertheless, factors like school funding may influence the extent of safeguard implementation.

Our descriptive analysis estimated the prevalence of the four safeguards that aligned with SHPPS 2014 questions. CDC recommends that schools that screen for BMI implement all 10 safeguards as well as a multicomponent approach to obesity prevention and multiple strategies to reduce weight discrimination and address students' weight-related questions (Nihiser et al., 2007). Encouragingly, data from 2012 to 2013 show that districts that required weight status measurement (i.e., screening or surveillance) had significantly stronger local wellness policies (Centers for Disease Control and Prevention and Bridging the Gap Research, 2014). This finding is consistent with the expectation that a BMI measurement program is part of a comprehensive approach to supporting healthier lifestyle behaviors (Nihiser et al., 2007).

Nevertheless, given how few schools have four safeguards in place, it seems improbable that many have implemented the full set of safeguards and prerequisites. It is also unlikely that low implementation reflects a low need for precautions. Schools may lack adequate approaches to addressing weight-based victimization or sufficient resources to provide follow-up related to BMI screening. Weight-based bullying and stigmatization by peers (Bucchianeri, Eisenberg, & Neumark-Sztainer, 2013; Puhl, Peterson, & Luedicke, 2013; Puhl, Neumark-Sztainer, Bryn Austin, Suh, & Wakefield, 2016) and weight bias among teachers (Kenney, Gortmaker, Davison, & Austin, 2015; Puhl et al., 2013) still appear in school settings. Further, the percentage of schools nationwide where the school nurse provides nutrition and dietary behavior counseling, physical activity and fitness counseling, or weight management services declined significantly between the early to mid-2000s and 2014 (CDC, 2015). During this same time period, more districts introduced language about BMI measurement into their wellness policies (Piekarz et al., 2016). Putting safeguards into practice requires time and money. A recent review found that hiring and training staff to conduct BMI measurements and respond to parents' questions was the largest expense for school-based BMI screening programs (Ruggieri & Bass, 2015). School nurses have identified insufficient school-level resources as a leading barrier to implementing BMI screening programs (Hendershot et al., 2008). Given this context, practitioners cannot assume that the recommended supports are in place.

Strengths and Limitations

This analysis presents the first nationally representative data about school-level safeguard adoption among schools conducting BMI screening. Several limitations warrant discussion. The questions identified in SHPPS do not entirely align with the four safeguards. The SHPPS questions identified for Safeguard 4 focus on the availability of recommended equipment, but they provide no information about calibration procedures necessary to ensure accurate readings (Himes, 2009). Similarly, Safeguard 10 emphasizes the importance of providing *all* parents with information and relevant follow-up actions, whereas the SHPPS question focuses on parent notification when results indicate a potential cause for concern.

Second, this analysis focused on schools where respondents to the health services module, primarily school nurses, confirmed that the school conducted weight status screenings.

Results may not be generalizable to schools that conduct BMI screenings in physical education classes via fitness assessments (e.g., FITNESSGRAM) and communicate results with parents, as is required by law in several states (e.g., Texas, Georgia). Our results may not fully reflect the adoption of safeguards in schools that did not have a health services coordinator or whose respondent did not serve in this role, as these schools did not have the opportunity to answer questions related to Safeguard 2. In a sensitivity analysis, we calculated the count of composite safeguards among only those schools with complete data (n = 141) and obtained similar prevalence estimates. Lastly, all data are self-reported and social desirability bias may exist.

Conclusions

Most schools that screened for student BMI had yet to adopt multiple safeguards related to staff training, accurate and reliable equipment, ensuring resources are available for follow-up, and sharing results and referral information with parents. These four safeguards are just some of the practices recommended for a school to have in place before launching a BMI measurement program. Our findings related to Safeguards 2 and 4 indicate room for improvement in providing necessary equipment and training and are relevant to schools that collect student BMI data for either screening or surveillance purposes.

It is unclear whether the low levels of safeguard adoption are due to low awareness, low perceived need, insufficient resources, or a combination of these factors. Future research should estimate the extent to which the full set of safeguards is being adopted in schools that have surveillance and screening programs in place. Another important research direction is to identify characteristics associated with safeguard adoption—including school demographics, presence of a full-time school nurse, and whether BMI measurement is mandated at the state level. Lastly, the safeguards are grounded in standards of ethical nursing practice, expert opinion, and what was an emerging literature over a decade ago. CDC's position on school-based BMI measurement and recommended safeguards is roughly a decade old. In the interim, states have continued to pass legislation around surveillance and screening systems (Blondin et al., 2016; National Cancer Institute, 2016), and researchers have continued to study these initiatives. Updates to CDC's BMI measurement in schools resources that reflect more current research are warranted and underway.

Nevertheless, schools that measure student weight status may need to assess safeguard implementation, the resources available to increase adoption, and potential opportunity costs. BMI screening and surveillance activities represent just one component of a nurse's workload (Maughan, Bobo, Butler, & Schantz, 2016), which can present a barrier to conducting BMI measurement in schools (Stalter, Chaudry, & Polivka, 2011). When screenings are happening, other tasks may receive less attention (Oza-Frank & Siegal, 2011). BMI measurement programs should complement, yet not compete with evidence-based strategies to promote physical activity and healthy eating among schools (Nihiser et al., 2007).

Implications for School Nurses

Although school nurses are often in charge of height and weight measurements, the implementation of the recommended safeguards is not solely the school nurse's responsibility. Nurses who work in schools that conduct BMI surveillance or screening can make sure they are familiar with the recommended safeguards and assess the extent to which these precautions are in place. Nurses can also communicate the importance of safeguards to administrators and others who have the decision-making latitude to advance adoption (e.g., by funding purchases of scales and stadiometers, supporting time for training). State school nurse consultants may have a role to play in training school nurses on the safeguards or in providing refresher trainings on techniques for measuring height and weight as well as strategies for answering sensitive questions that may come up in the context of these measurements.

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Table 1.

CDC Safeguards for BMI Measurement in Schools and Related Questions From the SHPPS, 2014.

Safeguard	Safeguard Concept	SHPPS Questions and Response Items Used for Variable Construction
Safeguard 1	Introduce the program to parents, guardians, students, and school staff and obtain parental consent	None
Safeguard 2	Ensure that staff members who measure height and weight have the appropriate expertise and training to obtain accurate and reliable results and minimize the potential for stigmatization. Staff also need training to measure height and weight in a sensitive and caring manner. This training should • address procedures to maintain student privacy during measurement • increase awareness of groups at increased risk of stigmatization • provide information about body size acceptance and the dangers of unhealthy weight control practices • help staff identify signs of student problems related to weight or body image (e.g., eating disorders)	During the past 2 years, have you received any professional development on[a] • weight management? • identification of or referral for eating disorders? • accurately measuring student height and weight? • calculating student weight status using body mass index or BMI?
Safeguard 3	Establish safeguards to protect student privacy	None
Safeguard 4	Use equipment that can accurately and reliably measure height and weight	Does your school have • an electronic or beam balance scale? • a stadiometer?
Safeguard 5	Accurately calculate and interpret the data	None
Safeguard 6	Develop efficient data collection procedures	None
Safeguard 7	Avoid using BMI results to evaluate student or teacher performance	None
Safeguard 8	Regularly evaluate the program and its intended outcomes and unintended consequences	None
Safeguard 9[b]	Ensure that resources are available for safe and effective follow-up	As I read the list on this card, please tell me if there are arrangements with any organizations or health-care professionals to provide these services to students or families from your school in one-on-one or small-group sessions Are there arrangements to provide • nutrition and dietary behavior counseling? • physical activity and fitness counseling? Does the school provide the following services to students at the school in one-on-one or small group sessions? • Nutrition and dietary behavior counseling • Physical activity and fitness counseling

Safeguard	Safeguard Concept	SHPPS Questions and Response Items Used for Variable Construction
		• Weight management • Identification of or referral for eating disorders (middle and high schools only)
Safeguard 10[b]	Provide all parents with a clear and respectful explanation of the BMI results and a list of appropriate follow-up actions	Looking at this card, please tell me what your school does when a student's screening for weight status by using BMI indicates a potential problem • notify the student's parents or guardians • provide referrals to community health-care providers

Note. SHPPS = School Health Policies and Practices Study; CDC = Centers for Disease Control and Prevention.

[a] A skip pattern precedes these questions, resulting in a smaller sample size. In Safeguard 2, the questions related to professional development are asked only of schools in which the respondent is the school health services coordinator. In Safeguard 9, elementary schools are not asked the question about eating disorder identification or referral.

[b] Safeguards 9 and 10 are specific for BMI screening; Safeguards 1–8 apply to both surveillance and screening programs. CDC safeguards are from Nihiser et al. (2007).

Table 2.

Characteristics of Schools That Do and Do Not Conduct BMI Screening.

	Cross-Tabulation			
	Sample Size (Unwt.)	Conducts BMI Screening	Does Not Conduct BMI Screening	
School Characteristic	***N* = 567**	***n* = 223**	***n* = 344**	***p* Value[a]**
School type	539	214	325	.12
Public school		82.9%	72.6%	
State-administered school		3.6%	4.3%	
Private school or Catholic school		13.5%	23.04%	
School level	567	223	344	.24
Elementary		55.3%	50.7%	
Middle/junior high		27.7%	26.9%	
High school		17.0%	22.4%	
Region	567	223	344	
Northeast		35.9%	7.0%	.001
Midwest		17.4%	32.0%	
South		30.8%	30.2%	
West		15.9%	30.7%	
Free or reduced-priced lunch eligibility	426	178	248	
<40%		43.2%	37.7%	.26
≥40%–<75%		39.7%	36.4%	
≥ 75%		17.1%	25.9%	
Urbanicity	567	223	344	.99
City		32.5%	31.9%	
Suburb		30.4%	28.8%	
Town		11.5%	12.0%	
Rural		25.6%	27.3%	
School size	539	214	325	.66
Small		38.7%	33.9%	
Medium		28.5%	29.4%	
Large		32.8%	36.7%	
Per pupil expenditure[b]	411	166	245	.43
Less than US$8,200		45.3%	51.2%	
≥ $8200		54.7%	48.8%	
Full-time RN[c]	424	190	234	.03
RNs at school ≥ 30 hr/week		58.8%	43.2%	
RNs at school <30 hr/week		41.2%	56.8%	

Note. N = 567. BMI = body mass index; RN = registered nurse.

[a] *p* values from design-corrected Pearson χ^2 tests.

[b] Per pupil expenditure was developed by using a distribution-based approach and approximates a median split.

[c] Among schools where a registered nurse or nurses provide services to students.

Table 3.

Prevalence of Recommended Safeguards Among Schools That Report Having BMI Screening Programs in Place *n* = 223).

Safeguard Description and Components	Sample Size (Unwt. *N*)	Prevalence (95% CI)
Safeguard 2: Ensure that staff members who measure height and weight have the appropriate expertise and training to obtain accurate and reliable results and minimize the potential for stigmatization (*N* = 149)		
Health services coordinator received training on weight management	148	50.8 [40.8, 60.8]
Health services coordinator received training on identification of or referral for eating disorders	147	44.4 [35.2, 53.6]
Health services coordinator received training on accurately measuring height and weight	147	58.5 [50.0, 67.5]
Health services coordinator received training on calculating student weight status by using body mass index (BMI)	147	64.0 [55.6, 72.5]
Safeguard 2 Composite[a]	147	26.4 [17.1, 35.6]
Safeguard 4: Use equipment that can accurately and reliably measure height and weight		
School has an electronic or beam balance scale	218	74.6 [66.9, 82.3]
School has a stadiometer	216	65.8 [57.8, 73.7]
Safeguard 4 Composite[a]	216	54.1 [46.1, 62.1]
Safeguard 9: Ensure that resources are available for safe and effective follow-up[b]		
School has arrangements to provide counseling services at other sites on nutrition and dietary behavior	216	13.6 [8.6, 18.6]
School has arrangements to provide counseling services at other sites on physical activity and fitness	215	12.9 [7.5, 18.3]
School provides on-site counseling in small groups or one-on-one sessions about nutrition and dietary behavior	220	48.5 [40.8, 56.4]
School provides on-site counseling in small groups or one-on-one sessions about physical activity and fitness	217	39.8 [31.6, 48.1]
School health services or mental health and social services staff provide weight management services	215	55.7 [46.8, 64.5]
School health services or mental health and social services staff provide identification of or referral for eating disorders (middle and high school only; *n* = 135	130	73.0 (64.2–81.8)
Safeguard 9 Composite[a]	214	33.4 [24.9, 41.8]
Safeguard 10: Provide all parents with a clear and respectful explanation of the BMI results and a list of appropriate follow-up actions		
School notifies the student's parents or guardians and when a student's BMI screening indicates a potential problem	218	86.0 [80.5, 91.4]
School provides referrals to community health-care providers when a student's BMI screening indicates a potential problem	218	47.0 [38.6, 55.3]
Safeguard 10 Composite[a]	218	44.4 [36.2, 52.5]
Total Number of Composite Safeguards in Place[c]		
None	223	19.4
One		37.1
Two		25.2
Three		15.2
Four		3.1

Note. CI = confidence interval. Overall, 223 schools had BMI screening programs; however, the sample size further varies because of random missing values, as well as systematic missing values in the case of Safeguard 2, and a specific question in Safeguard 9, which was not asked of elementary schools.

[a]Answered "yes" to all the questions in the safeguard category.

[b]Elementary schools were defined as meeting Safeguard 9 if they had the first four components in place; middle and high schools had to have five components in place. To meet the safeguard, schools had to have either out of school or in school arrangements for physical activity and nutrition counseling.

[c]To calculate the number of safeguards, missing values were assigned zeroes. Accordingly, schools without a health services coordinator were assigned zeroes for Safeguard 2. See Results for sensitivity analyses conducted with a subset of schools (n = 141) that had complete data for all the safeguard questions.