

School-Based Measurement of Children's Body Mass Index

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Overweight and obesity have risen rapidly among US children and adolescents, reaching epidemic proportions in recent years. The standard measure for monitoring children's weight status is Body Mass Index (BMI), which is calculated based on weight and height.

Schools can play an important role in addressing childhood obesity, and school-based BMI screening may be a useful strategy in these efforts. However, BMI screening is not without controversy. Despite initial concerns about potential adverse effects of widespread school-based BMI measurement (e.g., burden on schools, confidentiality issues and potential stigmatization of children) evaluation of the first four years of Arkansas' statewide BMI screening efforts in public schools has shown several beneficial outcomes but few adverse effects.

The Institute of Medicine recommends that schools annually measure each student's weight and height, calculate BMI percentile, and provide this information to parents and students. Furthermore, during the past few years an increasing number of states have addressed the issue of school-based BMI screening with legislation requiring or suggesting such practices.

With this study, we sought to examine state, district, and school-level BMI screening and reporting activities, and to evaluate the implementation of state and district policies in US elementary schools.

Methods

State Laws

Statutory (legislative) and administrative (regulatory) laws governing school-level requirements for BMI effective as of the beginning of the 2007-08 school year were obtained for each of the 50 states and the District of Columbia via primary legal research through searches of the Lexis-Nexis state legal databases. All state data were confirmed against secondary sources available from Trust for America's Health, NASBE, NCSL, and others.

School District Policies

We used a mixed-methods approach to obtain district policies, including Internet searches with telephone, email, and mail follow-up. Policies were coded using a three-level ordinal scheme as follows: 0) no policy, 1) weak policy that suggests but does not require BMI measurement, or requires only for certain grades, and 2) strong policy that requires BMI measurement, either with or without parental reporting. Only those policies in place by the first day of the 2007-08 school year were used in these analyses. Data were weighted to provide inference to all public school districts in the U.S., and to adjust for nonresponse. Our sample of districts included 602 districts serving elementary-level students.

Elementary School Survey

Survey data were obtained from a nationally-representative sample of public and private elementary school districts in the U.S. We distributed a mail-back survey to school principals in the spring of 2008, to gather information on school policies and practices during the 2007-08 school year. A \$100 incentive was offered for completing the survey. After follow-up efforts (emails and phone calls), we received completed surveys from 1084 elementary schools (final response rate of 74.4%). We asked principals to indicate whether/how often their school measured student BMI, and, if measured, whether results were reported to parents. Data were weighted to provide inference to US elementary schools, and to adjust for school-level nonresponse on the survey.

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States

We found that 37 states did not have any laws pertaining to school BMI measurement or reporting. Thirteen states had laws that either suggested that schools measure student BMI, or required BMI measurement only for some grades. One state had laws requiring BMI measurement.

Districts

The majority of public school districts (83.4%) did not have a policy regarding student BMI measurement. An additional 16.2% had a weak policy that suggested measurement, or required measurement for selected grades only. Less than one percent of districts required BMI measurement, either with or without reporting to parents.

Schools

School BMI measurement activities were as follows:

	Public	Private	Total
BMI measurement			
Never measured	47.5	73.1	51.0
Measured for selected grades only	23.0	6.7	20.8
Measured annually for all students	18.7	8.6	17.3
BMI reporting			
Does not measure BMI	47.5	73.1	51.0
Measures BMI, but does not report to parents	12.1	4.0	10.9
Measures BMI and reports to parents	25.3	11.6	23.4

Public schools were significantly more likely to measure and to report student BMI than were private schools.

Among schools that measure student BMI, approximately two-thirds report this information to parents, whereas one-third do not (23.4% vs. 10.9% in table above).

In addition we asked whether schools measured student weight, and whether schools measured student height. Approximately a third (33.9%) of respondents indicated that their school measured both student weight and height annually. However, as only 17% of schools calculate student BMI annually, there are a substantial number of schools that have the information necessary to compute BMI but are not doing so.

Overall, approximately half of the elementary schools in the US reported participating in some sort of student BMI-related screening activities. These practices were less common among private schools than public schools. Among schools that measure BMI, only two-thirds report the information to parents. Among public schools, district policies were not significantly associated with school practices, but state laws were associated with school practices indicative that state laws do matter in this area. School-level BMI activities are more common in schools with higher proportions of Latino students, in the Northeast and Southern US, and in states with laws regarding school-based BMI activities.

Results

Public school practices as a function of state laws and district policies

We examined the correspondence of school-level BMI activities with state-level laws and district-level policies. These analyses were conducted for *public schools* only.

School practices varied considerably and significantly ($p < .0001$) depending on state-level laws. As shown below, among 25 public schools within states with laws requiring student BMI measurement, nearly all measured student BMI. Among 213 public schools in states that suggest BMI measurement, the majority measured student BMI. Among 440 schools in states with no laws regarding BMI measurement, the majority (64.8%) did not measure student BMI.

School Practice	State Laws		
	None	Suggested	Required
BMI not measured	64.8	34.4	2.8
BMI measured, with or without reporting	35.2	65.6	97.2

As noted below, in districts with a strong policy requiring BMI measurement, all schools reported that they do so. Where the district policy was weak or there was no policy, approximately half of schools reported that they measure student BMI. These differences were not statistically significant.

School Practice	District Policy		
	None	Suggested	Required
BMI not measured	52.9	49.3	0
BMI measured, with or without reporting	47.2	50.7	100

Multivariate predictors of school practices

We examined whether district policies and state laws were significant predictors of whether schools engaged in any student BMI-related activities (measurement of all or some students, either with or without reporting). Covariates included in the model included school size, student racial/ethnic characteristics, free/reduced lunch participation, and region of the country. District policy was not a significant predictor of school practices. However, state law was a significant predictor. In our final model, several variables significantly predicted school practices (only significant variables are shown here):

Significant predictors of school-level BMI measurement practices	OR	95% CI	p
	Percent Latino students	3.63	(1.43, 9.22)
Northeast region (compared to West)	1.99	(1.03, 3.84)	.041
South region (compared to West)	3.33	(1.99, 5.58)	.000
Any state law regarding BMI measurement	3.49	(2.13, 5.71)	.000

Discussion and Conclusions