



Original article

## School-Based Body Mass Index Screening and Parental Notification in Late Adolescence: Evidence From Arkansas's Act 1220



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 A B S T R A C T

**Purpose:** In 2003, Arkansas enacted Act 1220, one of the first comprehensive legislative initiatives aimed at addressing childhood obesity. One important provision of Act 1220 mandated that all children attending public schools be screened for their body mass index (BMI) and the information sent home to their parents. Since then, eight other states have adopted similar school-based BMI screening and notification policies. Despite their widespread adoption and implementation, there is a dearth of empirical studies evaluating such policies, particularly for adolescents. The aim of this study was to evaluate whether adolescents, who had been previously screened in early adolescence, experienced changes in their health outcomes if they continued to receive screening and reporting throughout late adolescence (11th and 12th grades).

**Methods:** Secondary data from the Centers for Disease Control's Youth Risk Behavior Survey were analyzed using the method of difference-in-differences. Changes in outcomes between 10th and 12th grade were compared between a group of students who received screenings throughout 11th and 12th grades versus a later comparison group who were exempt from screening and reporting requirements in 11th and 12th grades.

**Results:** BMI screening and parental notification during late adolescence, given prior screening and notification in early adolescence, was not significantly related to BMI-for-age z-scores, the probability of being in a lower weight classification or exercise and dietary intake behaviors.

**Conclusions:** Exposing 11th and 12th graders to BMI screening and reporting, given that they had been exposed in prior grades, was not associated with adolescents' health outcomes.

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**IMPLICATIONS AND CONTRIBUTION**

This study demonstrated that screening adolescents for their body mass index and reporting it to their parents in late adolescence, given prior screening and reporting in early adolescence, was not related to adolescents' health outcomes. These results underscored the importance of understanding the timing of adolescents' exposure to body mass indexing screening and reporting.

Between 1980 and 2010, the adolescent obesity rate in the United States more than tripled [1], reaching an all-time high of 18.4% in 2010 [2]. This increase in adolescent obesity (defined as having a body mass index [BMI] at or above the 95th percentile among children of the same age and sex [2]) has placed a growing number of adolescents at risk for physical and

psychosocial problems ranging from Type 2 diabetes and high blood pressure to depression and social isolation [3–6]. Adolescent obesity also has broader societal consequences, impacting the U.S. economy because of productivity losses brought about by obesity-related diseases [5].

Schools districts across the United States have played an increasingly prominent role in combating adolescent obesity [3,4,7], given their regulatory authority to exert influence over students' eating and exercise behaviors during the school day [3]. One of the first comprehensive legislative initiatives placing public schools front and center in the effort to address obesity and overweight was Arkansas's Act 1220 [8]. As part of Act 1220,

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beginning in 2003, all children attending Arkansas's public schools were required to be screened by a team of trained health professionals for their BMI [9], and then confidential letters—known as Child Health Reports—were sent home to parents and guardians [10]. Letters included information about a child's weight category based on their BMI-for-age (overweight, at risk for overweight, healthy weight or underweight) and the general health consequences of being overweight or at risk for overweight. Also, based on guidelines from the American Academy of Pediatrics, each letter advised parents to ensure their children engaged in frequent exercise, limited their intake of soda, and increased their intake of fruits and vegetables.

In the first year of implementation, different school districts across the state held screenings at different times of the school year although Child Health Reports were mailed in June [11] during which more than 346,000 letters were sent to approximately 450,000 K-12 public school students [12]. The reported direct costs for screening and reporting have been estimated at \$1.5 million in its initial year and \$750,000 annually thereafter (in per student terms, this was \$3.00 per student and \$1.50 per student, respectively [11]). These costs were not definitive as estimates reported in 2009 suggested that the per-school cost of screening and reporting in Arkansas could have been as low as \$60 per school or as high as \$500 per school [13]. Since Arkansas implemented its statewide BMI screening and reporting policy in 2003, eight other states have adopted similar BMI screening and parental reporting policies including Alabama, Massachusetts, and Ohio [14]. However, the justification for such programs and, more broadly, community-based strategies aimed at preventing obesity among adolescents, lacks a comprehensive and rigorous empirical basis [15,16].

Theoretically, both the health belief model [17] and social cognitive theory [18] may help explain why BMI screening and notification may lead to changes in outcomes. The health belief model suggests that notifying parents about their children's BMI—particularly if children classified as overweight or obese—may influence parents' perception of their children's *susceptibility* and *severity* [19] of being overweight and/or obese, which in turn serves as a *cue to action* [15]. This enhanced perception could induce children (and/or their parents) to change their diet and exercise leading to improved outcomes. Social cognitive theory suggests that informing parents of their children's BMI status will induce parents to undertake changes to improve their children's health if they are convinced that (1) their children's weight status poses a *potential* health threat; (2) changes in children's behaviors (i.e., exercise and dietary practices) may mitigate any potential threats; and finally, (3) children (and/or parents themselves) possess the capacity to alter their behaviors to influence their well-being [18]. In both models, parents play a critical role since they decide whether to share BMI information with their child. In one prior study on BMI screening and parental notification policies in Minnesota, although about 79% of parents read notification letters in their entirety, 55% did not discuss the information with their child [20]. Furthermore, according to the only peer-reviewed study of BMI screening and parent notification to date from California, notification has not been associated with changes in BMI [21]. The study, conducted by Madsen [21], found no differences in the BMI of children in Grades five, seven, and nine across time between one group of districts that reported BMI information to parents versus a comparison group of districts that did not report such information.

Adherence to BMI screening and reporting in Arkansas has been high with 98.7% of public schools participating in the 2011–2012 academic year [22]. In 2007, because of mounting concerns about a lack of a parental opt out of screening requirements and the administrative burden of screening, the Arkansas General Assembly implemented Act 201, which allowed parental opt out from screenings and exempted children in odd-numbered grades as well as in Grade 12 [10]. This exemption raised a unique opportunity to compare the health outcomes of adolescents who were subject to screening and reporting in 11th and 12th grades to those who were exempt from screening and reporting to understand the effect of screening and reporting requirements in late adolescence. Accordingly, the aim of this study was to evaluate whether adolescents, who had been previously screened in early adolescence, experienced changes in their health outcomes if they continued to receive screening and reporting throughout late adolescence (11th and 12th grades).

## Methods

### Dataset and measures

**Dataset.** Secondary data were used from the Youth Risk Behavior Survey (YRBS) for Arkansas that included individual-level data on adolescents attending public schools in Arkansas [23]. The following three repeated cross-sections were used: 2005, 2007, and 2009. Since data were collected in the spring of the academic year (AY) which typically spanned from February to May [24], the YRBS dataset year (e.g., 2009) corresponded to the preceding AY (e.g., AY 2008–2009). The YRBS data contained no individually identifiable information and were publicly available; therefore, the institutional review board at the University of California, Davis determined that the study was not considered research involving human subjects and exempt from review.

### Measures

**Weight status.** The study's primary outcome measure was an adolescent's BMI calculated based on self-reported height and weight. Two versions were used—one continuous, based on their BMI-for-age z-score, whereas the other was categorical corresponding to three age and gender adjusted BMI percentiles: healthy weight (fifth percentile to <85th percentile); overweight (85th percentile to <95th percentile); obese ( $\geq$ 95th percentile) [25]. BMI percentiles for age and gender have been shown to be highly correlated (.88) with percentage body fat as measured by dual energy X-ray absorptiometry scans [26].

Prior research demonstrated that among YRBS respondents, discrepancies between self-reported versus measured height and weight were common [27]. On average, students tended to overestimate their height by 2.7 inches and underestimated their weight by 3.5 pounds (p. 284). As a result, the prevalence of adolescents at risk for overweight and obesity was underestimated versus the prevalence using measured height and weight (p. 285). Although the YRBS only included self-reported height and weight, the data were still valuable in understanding adolescents' weight status [28]; however, readers should be aware of this limitation.

**Exercise behaviors.** Measures of adolescents' exercise behaviors included the frequency of participation in vigorous activities for

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