Smart Snacks in School Legislation Does Not Change Self-Reported Snack Food and Beverage Intake of Middle School Students in Rural Appalachian Region

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ABSTRACT

Objective: To assess the effects of the national *Smart Snacks in School* standards, which include nutrient and ingredient limitations for school competitive foods and beverages effective July, 2014, on student intake in low-income rural Appalachian middle schools.

Methods: Food-frequency questionnaires were administered to students before and after implementation. Multiple ordinal logistic regression models were conducted to examine effects from year of data collection, grade, and free or reduced price lunch participation rates.

Results: No significant changes were observed after implementation except a decrease in consumption of 1% or nonfat flavored milk at school.

Conclusions and Implications: *Smart Snacks in School* standards did not result in significant dietary changes in this study. Longitudinal studies could evaluate long-term impacts of nutrition standards.

Key Words: Smart Snacks, schools, competitive foods, *à la carte*, vending machines, adolescent (*J Nutr Educ Behav*. 2017;49:599-604.)

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INTRODUCTION

Children and adolescents aged 5–17 years spend the majority of their waking hours in school settings and consume 35% to 40% of their daily calories in schools.[1] Schools are important avenues to promote healthy eating among transitioning adolescents to become independent purchasers, when long-term risk of obesity may persist.[2]

School competitive foods are foods and beverages sold in vending machines, school stores, a *à la carte*, and as fundraisers. More than 60% of middle schools offer competitive foods, which are generally energy dense and often high in solid fats and added sugars.[3] In July, 2014, the *Smart Snacks in School* (Smart Snacks) regulation took effect and amended the Healthy, Hunger-Free Kids Act of 2010 to create nutrition standards for all foods and beverages sold in schools, based on the Institute of Medicine recommendations and Dietary Guidelines for Americans (Table).[4,5]

The Healthy, Hunger-Free Kids Act of 2010[5] is based on the socioecological model. Smart Snacks specifically targets the school food environment of schools, which not only can influence availability and access to healthy foods but can alter social and cultural norms.[6]

The goal of this study was to examine the effect of this policy on adolescents' snack food and beverage intake within rural Appalachia, especially considering that low socioeconomic status and rural lifestyle are tied to lower dietary quality and higher obesity rates.[7,8] A secondary goal of the study was to examine the relationship between school poverty rates, determined by free or reduced price lunch rate (F/R) and intake of snack foods and beverages. Despite the multiple increased risk factors for obesity prevalent in this region, few studies focused specifically on this problem, likely because of the geographical barriers to accessing many

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Table. Summary of Middle School *Smart Snacks in School* Competitive Food and Beverage Standards[5]

Foods

General standard: foods must meet 1 general standard
- A grain product (>50% whole grains by weight or whole grain as first ingredient[a])
- A fruit (can be dried), vegetable, dairy or protein (meat, bean, poultry, seafood, eggs, nuts, etc) or have these as first ingredient[a]
- A combination food with 0.25 cup fruit/vegetable
- Contain 10% of Daily Value of a nutrient of public health concern (Ca, K, vitamin D, dietary fiber) until July 1, 2016 (after this it will not qualify)
- Fat exemptions: reduced-fat cheese, nuts and seeds, nut/seed butters, dried fruits with nuts/seeds and no added sweetener/fat, seafood with no added fat, part-skim mozzarella cheese
- Sugar exemptions: dried/dehydrated fruits or vegetables with no added nutritive sweeteners, dried fruits with nutritive sweeteners for processing/palatability, dried fruits with nuts/seeds and no added sweetener/fat

Nutrient standard: foods must meet all nutrient standards
- ≤200 cal/portion as served
- ≤35% total calories from fat as served
- <10% of total calories from saturated fat as served
- 0 g trans fat (<0.5 g)/portion as served
- <230 mg sodium/portion as served (until July 1, 2016), <200 mg/portion as served (after July 1, 2016)
- ≤35% of weight from total sugars as served

- Overall exemptions: fruits (frozen/fresh/canned in juice/light syrup), vegetables (fresh/canned with minimal sugar)
- Entrée items as part of the *National School Lunch Program/School Breakfast Program* if it is sold as a competitive food on the day of service or the day after service in the *National School Lunch Program/School Breakfast Program* (must have ≤480 mg/sodium and ≤350 cal)

Beverages

≤12 oz as served	Unflavored low-fat, unflavored fat-free, or flavored fat-free milk; milk alternatives
≤12 oz as served	100% fruit or vegetable juice with or without carbonation
No limit	Plain water, with or without carbonation

[a]Can be the second ingredient if the first is water.

Appalachian communities.[9,10] It is possible that much of these children's diets consist of foods provided through the school system because of the high poverty rates. The hypothesis was that national implementation of Smart Snacks would improve snack food and beverage intake of middle school students in rural Appalachian middle schools.

METHODS

Sample

The researchers recruited only middle schools, defined as schools housing sixth- through eighth-grade students in southwest Appalachian Virginia with ≥50% of students eligible for F/R *National School Lunch Program* (NSLP) meals, to participate in this study in spring, 2014 (before implementation) and spring, 2015 (after implementation). Schools were contacted using a randomized list of 23 qualifying middle schools in Appalachian Virginia. Of the 11 schools that were contacted, 3 declined to participate, which left a total sample of 8 schools (72.7% response rate).[11,12] Audits were also completed to assess compliance in the same 8 schools before and after implementation of standards in a parallel study.[13]

Participants

Trained graduate students guided participating middle school students through the questionnaire before allowing them to complete the remainder of the questionnaire on their own, assisting when necessary. Approximately 45 sixth-grade students completed questionnaires in each school before implementation. After implementation, questionnaires were administered to approximately 45 seventh-grade and 45 sixth-grade children per school. Principals in participating schools were instructed to identify classes from their respective schools to participate in the study and acquire consent from the respective teachers to minimize possible interference in the academic schedule. Often the required number of students was fulfilled by gym classes or individual classes of students. Sample size was determined based on a desired 80% probability that the study would successfully detect differences in student diets before and after implementation, determined by a minimal detectable difference of 0.22 times consumed per day (SD 1.50 times per day) of a food or beverage item on the survey instrument.

Only sixth-graders were selected before implementation because these students would be exposed first to more competitive foods compared with seventh-grade students. Sixth-graders were targeted because they are transitioning into more independent decision making regarding foods, because elementary schools tend to be more restrictive, offering few vending or *á la carte* items compared with middle schools.[14] Both sixth- and seventh-graders were included in the after-implementation analysis to ensure there were no confounding effects by grade. It is possible that students surveyed before implementation also