

# Prevalence of and Differences in Salad Bar Implementation in Rural Versus Urban Arizona Schools

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## ARTICLE INFORMATION

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## ABSTRACT

**Background** Rural children consume more calories per day on average than urban children, and they are less likely to consume fruit. Self-service salad bars have been proposed as an effective approach to better meet the National School Lunch Program's fruit and vegetable recommendations. No studies have examined how rural and urban schools differ in the implementation of school salad bars.

**Objective** To compare the prevalence of school-lunch salad bars and differences in implementation between urban and rural Arizona schools.

**Design** Secondary analysis of a cross-sectional web-based survey.

**Participants/setting** School nutrition managers (N=596) in the state of Arizona.

**Main outcomes measured** National Center for Education Statistics locale codes defined rural and urban classifications. Barriers to salad bar implementation were examined among schools that have never had, once had, and currently have a school salad bar. Promotional practices were examined among schools that once had and currently have a school salad bar.

**Statistical analyses performed** Generalized estimating equation models were used to compare urban and rural differences in presence and implementation of salad bars, adjusting for school-level demographics and the clustering of schools within districts.

**Results** After adjustment, the prevalence of salad bars did not differ between urban and rural schools (46.9%±4.3% vs 46.8%±8.5%, respectively). Rural schools without salad bars more often reported perceived food waste and cost of produce as barriers to implementing salad bars, and funding was a necessary resource for offering a salad bar in the future, as compared with urban schools ( $P<0.05$ ). No other geographic differences were observed in reported salad bar promotion, challenges, or resources among schools that currently have or once had a salad bar.

**Conclusions** After adjustment, salad bar prevalence, implementation practices, and concerns are similar across geographic settings. Future research is needed to investigate methods to address cost and food waste concerns in rural areas.

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**F**RUIT AND VEGETABLE (F/V) CONSUMPTION IS PROTECTIVE against chronic diseases such as diabetes, heart disease, and some cancers.<sup>1-3</sup> Most youth do not meet the recommendations for F/V consumption,<sup>4</sup> and F/V consumption decreases throughout adolescence.<sup>5</sup> Eating patterns established in childhood often play a role in nutrition habits in adulthood.<sup>6</sup>

Concomitantly, individuals living in rural settings are increasingly at risk for health disparities.<sup>7</sup> Rural populations in the United States experience a disproportionate burden of chronic conditions and public health challenges, including obesity,<sup>8-11</sup> diabetes, and tobacco use.<sup>12</sup> Rural children also consume more calories per day on average than urban children, and these additional calories typically come from sugar-sweetened beverages and low-fiber foods.<sup>13</sup>

Few studies have described school nutrition environments in rural areas; however, several state-specific studies have

provided analogous data. For example, in Minnesota, urban schools supported healthier food environments for students compared with rural schools, often as a result of more resources and fewer challenges with staffing.<sup>9</sup> A study of school nutrition and F/V availability in schools across 28 states showed significantly higher likelihood of F/V availability at suburban schools than at town/rural schools.<sup>10</sup>

Schools can be useful venues for serving F/Vs and encouraging intake so that students develop healthy habits for a lifetime. The National School Lunch Program (NSLP) serves 31 million students daily and provides opportunities to improve F/V intake.<sup>1</sup> In accordance with the Healthy, Hunger-Free Kids Act, starting in 2012, NSLP-participating schools were required to help students meet new dietary recommendations through increased F/V variety in cafeterias, stipulating a weekly minimum of five different nutrient-rich F/Vs.<sup>4</sup> Schools are required to compose meals of a greater proportion of F/Vs

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(minimum of half cup fruit or half cup vegetable daily) to receive federal reimbursement for qualifying students. Serving additional F/Vs is costly.<sup>14</sup> Given the limited amount of federal contributions, schools are eager to identify methods to efficiently and effectively increase F/V intake.

Providing F/Vs that meet NSLP standards and appeal to students is an ongoing challenge. Self-service salad bars have been proposed as an effective approach to better meet the NSLP F/V recommendations.<sup>15</sup> In 2015, the Centers for Disease Control and Prevention reported that an average of 30% of schools have salad bars, including 29% of elementary schools, 31% of middle schools, and 35% of high schools.<sup>16</sup> Few peer-reviewed studies that have examined the dietary impact of school salad bars exist, and these studies provide limited evidence that salad bars increase F/V intake,<sup>17,18</sup> suggesting that contextual factors such as number of items offered may influence intake<sup>15,19,20</sup> and creating room to explore potential promotion methods and barriers that might enhance and/or constrain implementation. In a recent study, investigators examined differences in salad bars across metro vs nonmetro areas in the United States and found no differences in students' reported access.<sup>21</sup> To date, no studies have examined differences in prevalence or implementation of salad bars in urban vs rural schools as reported by school nutrition managers. Research is needed to elucidate potential differences in salad bar implementation in urban vs rural locales and to identify challenges and sources of support involved in implementation of school salad bars. The purposes of this study were to compare the prevalence of school-lunch salad bars across urban and rural Arizona schools and to assess the differences in implementation practices, including distinct challenges and sources of support for these populations. It was hypothesized that prevalence of salad bars would differ between urban and rural settings, with urban schools having a greater prevalence of salad bars and fewer challenges in salad bar implementation.

## METHODS

This secondary analysis used data from a Web-administered survey<sup>22</sup> distributed during the 2013-2014 academic year to school nutrition managers via e-mail in Arizona. The Arizona Department of Education provided school-level contact information (names and e-mail addresses) of school nutrition managers participating in the NSLP (1,799 schools). If the nutrition manager's information was not listed or the information was outdated (eg, e-mail undeliverable), district nutrition directors and schools were contacted for the e-mail addresses of school nutrition managers. Researchers obtained valid contact information for 863 school nutrition managers who were then invited to take the survey. Managers were e-mailed reminders up to seven times with various prompts. Of these managers, 648 completed the survey (75.1%), meeting the power required to assess the prevalence of having a salad bar (primary aim of original study).<sup>22</sup> For the purposes of this study, the existing survey data were merged with data on locale of participating schools from the National Center for Education Statistics (NCES).<sup>23</sup> Of those 648 surveys, 52 were from schools not included in the NCES urban-centric locale categories and were excluded from the study. A total of 596 schools from 207 districts were included in the analytical sample. Participants provided informed consent by means of

an online check box and received a \$5 gift card and entry into a raffle for a \$50 or \$100 gift card for completing the survey. The Arizona State University Institutional Review Board approved the study protocol.

## Urban and Rural Classification

More than two dozen federal definitions of rural exist, and the various classifications of rural areas in the United States include a range of 17% to 49% of the population.<sup>20</sup> The NCES is the primary federal entity that collects and analyzes data on schools. The NCES locale codes are a measure of geographic status on an urban continuum. With data from the Census Bureau, the NCES revised its definitions of school locale types in 2006 to create the current classification system. Their definitions rely less on population size and county boundaries and more on proximity of an address to an urbanized area.<sup>24</sup> The system has four major locale categories: city, suburb, town, and rural; each of these is further subdivided into three subcategories. City and suburb are divided into large, midsize, and small; and town and rural are divided into fringe, distant, and remote. Fringe is defined as a territory inside an urban cluster, less than or equal to 10 miles from an urban area; distant is more than 10 miles but less than or equal to 35 miles from an urban area; and remote is more than 35 miles from an urban area.<sup>25</sup> Locales in the present study were combined into one of two groups: urban or rural. Urban comprised city, suburb, and town (fringe, distant). Rural comprised town (remote) and rural. These designations were based on both the number of schools listed in each locale subcode and the geographical characteristics of Arizona. Arizona public school distribution is 83% urban and 16% rural.<sup>26</sup>

## Instrumentation

The 68-item survey was developed by reviewing existing items in the gray literature (not peer-reviewed) and consulting with state and national content experts on salad bars. The previous literature included the Food and Farming Foundation Salad Bar survey,<sup>27</sup> a previous survey conducted by the Arizona Departments of Education and Health Services,<sup>28</sup> and the Food and Fitness survey from Bridging the Gap.<sup>29</sup> Nutrition and public health content experts judged the face validity of developed items and refined existing items as necessary. More information about the instrumentation has been published elsewhere.<sup>22</sup>

**Having a Salad Bar.** Participants were asked to respond "yes" or "no" to the following question developed for this survey: "Does your school currently offer a self-service salad bar (also known as produce bars, fresh fruit and vegetable bars, fruit and vegetable bars, condiment bars, etc) to students in your cafeteria/multipurpose room?" If "no" was chosen as the answer to this question, participants were asked to respond "yes" or "no" to the following question: "Have you ever had a self-service salad bar (also known as produce bars, fresh fruit and vegetable bars, fruit and vegetable bars, condiment bars, etc) for students in your school?" Use of these questions resulted in a coding of "currently have a salad bar", "once had a salad bar", and "never had a salad bar".

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