

Research and Professional Briefs

A Comprehensive Coding System to Measure the Quality of School Wellness Policies

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ABSTRACT

In 2006, all local education agencies in the United States participating in the National School Lunch Program were required to establish school wellness policies that covered nutrition education, nutrition standards for school foods, and physical activity. The purpose of this psychometric study was to develop and evaluate the properties of a comprehensive and quantitative coding system to evaluate the quality of these policies. A 96-item coding tool was developed to evaluate seven goal areas: nutrition education, standards for US Department of Agriculture child nutrition programs and school meals, nutrition standards for competitive and other foods and beverages, physical education, physical activity, communication and promotion, and evaluation. Each goal area subscale and the total scale were scored on two dimensions: comprehensiveness and strength. Reliability was assessed by having pairs of researchers from four different states code a sample of 60 policies between July 2007 and July 2008. Goal area subscales were internally reliable (Cronbach's $\alpha = .60$ to $.93$). Adequate interrater reliability scores were obtained at each level of scoring: total comprehensiveness and strength scores (intraclass correlation coefficient 0.82), subscale scores (intraclass correlation coefficient 0.70), and individual items (intraclass correlation coefficient 0.72). This coding system provided a reliable method for analyzing

and comparing school district wellness policies in single or multistate studies.

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The Child Nutrition and Women, Infants, and Children Reauthorization Act of 2004 (Public Law 108-265) required all local education agencies (public, private, and parochial) participating in the National School Lunch Program to create a school wellness policy by the 2006-2007 school year. The federal legislation required policies to include goals for nutrition education and physical activity to promote student wellness; nutrition guidelines for all foods available on each school campus during the school day; an assurance that reimbursable school meals follow federal law; a plan for measuring implementation of the policy; and the involvement of parents, students, the food authority, school board, school administrators, and the public in the development of the policy. In addition, local wellness policies are subject to relevant state-level statutes; for example, nutrition standards, physical education standards, or body mass index reporting (1).

Early descriptive assessments found that districts adopted policies ranging from strong and specific to weak and vague; however, no quantitative method existed to score policies (2,3). Our study describes development of a coding system to evaluate local school wellness policies for comprehensiveness (ie, breadth of areas covered) and strength (ie, degree to which policies included specific and firm language) and to score policies for comparative analyses.

METHODS

This study was designed to test some of the psychometric properties (eg, range, internal reliability, and interrater reliability) of a coding system to abstract school wellness policies. The policies studied were drawn from a convenience sample of available policies (ie, all the policies from the four states being studied by the investigators: Connecticut, Minnesota, Pennsylvania, and Washington). All Institutional Review Boards deemed the study exempt from review. The coders included the authors and three senior-level research assistants. All coders were experienced researchers with a master's degree or doctorate in nutrition, public health, or psychology.

Developing the Code Book

A group of researchers, each independently completing projects funded by the Robert Wood Johnson Foundation

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Healthy Eating Research program, developed a standard system for abstracting and coding school wellness policies with the purpose of promoting comparability across studies. In fall 2006, an Internet search for school wellness policy evaluation tools identified model policies from the National Alliance for Nutrition and Activity (4) and Action for Healthy Kids (5), evaluation tools from the Clinton Foundation (6) and the School Nutrition Association (7), state policy evaluation tools by the National Cancer Institute (8,9), and state-specific measures already in use by the researchers (10-12). All policy tools were extracted and organized into categories to create the coding system, which was refined through an iterative process of coding policies, reviewing score discrepancies, and revising decision rules. The coding system was peer-reviewed by experts at the Centers for Disease Control and Prevention, the Pennsylvania and Connecticut State Departments of Education, and the Washington Department of Health.

Figure 1 presents the final 96 content items divided among seven goal area subscales: nutrition education, meal standards (for US Department of Agriculture school meals), competitive foods, physical education, physical activity, communication and promotion, and evaluation.

The Coding Scheme

To score a policy, each of the 96 content items is coded with a zero, one, or two based on the following guidelines: zero for no mention of the item topic, one if the topic is mentioned within a recommendation or with vague language, and two if the topic is addressed in a specific and directive manner. To distinguish between a score of one and two, coders used the scenario of a parent approaching a school board about a school wellness-related concern. If the policy language did not clarify the school's position on that issue, it was coded as a one; if the parent and school board could easily determine whether or not the school is compliant, the item was coded as a two. Figure 2 provides examples from the coding manual to illustrate this distinction.

Comprehensiveness and strength scores are calculated for each subscale based on individual item codes. The comprehensiveness score reflects the proportion of items within that scale coded as a one or two, indicating that the policy addressed the topic. The strength score reflects the proportion of items coded as a two, indicating that the policy addressed the topic with clear and specific language. These scores are calculated for each of the seven subscales. Total comprehensiveness and total strength scores for the entire policy are the average of the seven subscale scores.

Scores for some items are determined by state, rather than local, policies. For each state in the sample, relevant state legislation and regulations were used to create "state-level default codes." For example, Connecticut passed a law in 2006 eliminating the sale of all beverages in kindergarten through 12th-grade schools other than milk, water, and 100% juice. Therefore, all Connecticut policies were coded as having strong beverage guidelines whether or not the language appeared in the local policy because local districts may not have deemed it necessary to address an issue that already had state mandates.

Psychometric Analyses

Several tests of the tool's psychometric properties were completed. A sample of policies was obtained by dividing each of the four states' participating districts into tertiles by enrollment and randomly choosing five policies from each tertile. The resulting sample had 15 policies per state (a total of 60 policies).

Interrater reliability analyses assess how consistently different coders obtain the same scores. Each district policy was coded by one in-state researcher and one out-of-state researcher. Intraclass correlation coefficient (ICC) statistics were computed to evaluate coding consistency between two independent coders. For each policy, three sets of ICC values were calculated to examine interrater reliability for each item, the comprehensiveness and strength subscale scores, and the total comprehensiveness and total strength scores. The mean scores across all policies were calculated for the final interrater reliability coefficients.

Internal consistency reliability is a measure of how well a measurement tool (or a subset of that tool) appears to be assessing a single conceptual construct (13); in this case, the quality of school wellness policies across seven domains. Cronbach's α was calculated for each subscale. Because the interrater reliability analysis included two sets of codes per policy (resulting in 120 sets of scores), one set from each pair of coders (alternating between the in-state and out-of-state coder) was selected for use in these analyses.

Construct validity refers to an assessment tool's ability to create factors in a conceptual model that relate to other factors in the expected direction (13). A coding system assessing the comprehensiveness and strength of school policies should provide a score that can be used to rank the policies along a continuum that reflects the overall quality of the policy. To assess the construct validity of our tool, the range and variability of the subscale domain scores and the total scores for each state were examined. Ultimately, if a measure of the quality of a school policy has criterion validity, the policy score should predict some other health outcome of interest, such as eating behaviors or student weight status (13).

RESULTS AND DISCUSSION

The results of the psychometric analyses of the coding system indicate that this is a reliable and valid measure of the quality of school wellness policies. A comparison of the ICC statistics associated with individual raters and each pair of raters revealed no outliers, indicating that no single coder or pair of coders deviated from the rest of the group in their reliability. The mean interrater reliability for the total comprehensiveness and total strength scores was ICC 0.82. The mean interrater reliability was ICC 0.70 when including each individual item in the analyses, and ICC 0.72 when the total subscale scores were included. These values indicate a good level of interrater reliability and support the ability of the tool to produce replicable results (14). The amount of training necessary to use the measure and a defined process for establishing rater reliability will need to be developed as the measure is used, but based on experience, a careful review of the

Nutrition Education

1. Includes goals for nutrition education that are designed to promote student wellness in a manner that the local education agency determines is appropriate (Federal Requirement)
2. Nutrition curriculum provided for each grade level
3. Coordinates nutrition education with the larger school community
4. Nutrition education extends beyond the school environment
5. District provides nutrition education training for all teachers
6. Nutrition education is integrated into other subjects beyond health education
7. Nutrition education teaches skills that are behavior focused and/or interactive and/or participatory
8. Specifies number of nutrition education courses or contact hours
9. Nutrition education quality is addressed

Standards for United States Department of Agriculture (USDA) Child Nutrition Programs and School Meals

10. Assures that guidelines for reimbursable school meals shall not be less restrictive than USDA school meal regulations (Federal Requirement)
11. Addresses access to and/or promotion of the USDA School Breakfast Program
12. Addresses access to and/or promotion of the Summer Food Service Program
13. Addresses nutrition standards for school meals beyond USDA (National School Lunch Program/School Breakfast Program) minimum standards
14. Specifies use of low-fat versions of foods and/or low-fat methods for preparing foods
15. Specifies strategies to increase participation in school meal programs
16. Optimizes scheduling of meals to improve student nutrition
17. Ensures adequate time to eat
18. Addresses access to hand-washing before meals
19. Requires nutrition qualifications of school food service staff
20. Ensures training or professional development for food service staff
21. Addresses school meal environment
22. Nutrition information for school meals (eg, calories, saturated fat, sugar) is available

Nutrition Standards for Competitive and Other Foods and Beverages

23. Includes nutrition guidelines for ALL foods available on school campus during the school day with the objective of promoting student health and reducing childhood obesity (Federal Requirement)
24. Regulates vending machines
25. Regulates school stores
26. Regulates food service à la carte
27. Regulates food served at class parties and other school celebrations
28. Regulates food from home for the whole class
29. Regulates food sold before school
30. Regulates food sold after school that is not part of a district-run after school program
31. Regulates food sold at evening and community events on school grounds
32. Regulates food sold for fundraising
33. Addresses limiting sugar content of foods
34. Addresses limiting fat content of foods
35. Addresses limiting sodium content of foods
36. Addresses limiting calorie content per serving size of foods
37. Addresses limiting serving size of foods
38. Addresses increasing "whole foods," eg, whole grains, unprocessed foods, or fresh produce
39. Addresses limiting the use of ingredients with questionable health effects in food or beverages (eg, artificial sweeteners, processed or artificial foods, *trans* fats, high fructose corn syrup)
40. Addresses food not being used as a reward and/or withheld as a punishment
41. Nutrition information (eg, calories, saturated fat, sugar) available for foods other than school meals
42. Addresses limiting sugar content of beverages
43. Addresses limiting fat content of drinks (other than milk)
44. Addresses limiting calorie content per serving size of beverages
45. Addresses limiting regular (sugar-sweetened) soda
46. Addresses limiting beverages other than soda containing added caloric sweeteners such as sweetened teas, juice drinks, energy drinks, and sports drinks
47. Addresses limiting sugar/calorie content of flavored milk
48. Addresses limiting fat content of milk
49. Addresses serving size limits for beverages
50. Addresses limiting caffeine content of beverages (with the exception of trace amounts of naturally occurring caffeine substances)
51. Addresses access to free drinking water

Figure 1. Brief descriptions of all school wellness policy coding items.

Physical Education

52. Addresses physical education curriculum for each grade level
53. Addresses time per week of physical education for elementary school students
54. Addresses time per week of physical education for middle school students
55. Addresses time per week of physical education for high school students
56. Physical education promotes a physically active lifestyle
57. Specifies competency assessment (ie, knowledge, skills, practice)
58. Addresses physical education quality
59. Physical education promotes inclusive play
60. Addresses physical education classes or credits
61. Addresses frequency of required physical education (daily)
62. Addresses teacher–student ratio for physical education
63. Addresses safe and adequate equipment and facilities for physical education
64. Addresses amount of time devoted to moderate to vigorous activity in physical education
65. Addresses qualifications for physical education instructors
66. District provides physical education training provided for teachers
67. Addresses physical education waiver requirements (eg, substituting physical education requirement with other activities)
68. Requires students to participate in an annual health assessment (eg, fitness or body mass index)

Physical Activity

69. Includes goals for physical activity that are designed to promote student wellness in a manner that the local education agency determines is appropriate (Federal Requirement)
70. Physical activity provided for every grade level
71. Includes physical activity opportunities for school staff
72. Regular physical activity opportunities are provided throughout the school day (not including recess)
73. Addresses physical activity through intramurals or interscholastic activities
74. Addresses community use of school facilities for physical activity outside of the school day
75. Addresses safe active routes to school
76. Addresses not using physical activity (extra or restricted) as punishment
77. Addresses recess frequency or amount in elementary school
78. Addresses recess quality to promote physical activity

Communication and Promotion

79. Involves parents, students, and representatives of the school food authority, the school board, school administrators, and the public in the development of the school wellness policy (Federal Requirement)
80. Includes staff wellness programs specifically addressing the health of staff
81. Addresses consistency of nutrition messages
82. Encourages staff to role model healthy behaviors
83. Specifies who in the district is responsible for wellness/health communication beyond required policy implementation reporting
84. Specifies district use of Centers for Disease Control and Prevention's Coordinated School Health model or other coordinated/comprehensive method
85. Addresses methods to solicit or encourage input from stakeholder groups (eg, two-way sharing)
86. Specifies how district will engage parents or community to meet district wellness goals
87. Specifies what content/information district communicates to parents
88. Specifies marketing to promote healthful choices
89. Specifies restricting marketing of unhealthful choices
90. Establishes a health advisory committee or school health council that is ongoing beyond policy development

Evaluation

91. Establish a plan for measuring implementation of the local wellness policy, including designation of one or more persons within the local educational agency or at each school, as appropriate, charged with operational responsibility for ensuring that the school meets the local wellness policy (Federal Requirement)
92. Addresses a plan for policy implementation, including a person or group responsible (initial or ongoing)
93. Addresses a plan for policy evaluation, including a person/group responsible for tracking outcomes
94. Addresses the audience and frequency of a report on compliance and/or evaluation
95. Identifies funding support for wellness activities or policy evaluation
96. Identifies a plan for revising the policy

Figure 1. Continued

code book followed by coding three practice policies should provide adequate training.

The majority of the a priori developed subscales were

internally valid at acceptable to excellent levels (14). The Cronbach's α values were as follows: nutrition education .60, meal standards .79, competitive foods .93, physical

Coordinates nutrition education with the <u>larger school community</u>	0	Not mentioned
	1	Vague and/or suggested Example: <i>“The entire school environment, not just the classroom, shall be <u>aligned</u> with healthy school goals to positively influence a student’s understanding, beliefs, and habits as they relate to good nutrition and regular physical activity.”</i>
	2	Requires specific strategies Example: <i>“The nutrition education program shall work with the school meal program through school gardens and by having the cafeteria serve as a learning lab.”</i>
Specifies <u>strategies to increase participation</u> in school meal programs	0	Not mentioned (Notifying parents of eligibility requirements for free and reduced price meals is a federal requirement and does not qualify for “1” or “2.”)
	1	Vague and/or suggested Example: <i>“School meals shall be <u>made attractive</u> to students by appealing to their taste preferences.”</i>
	2	Requires specific strategies, such as promotional mailings or events, alternative breakfast systems, altered bus schedules, closed campus, student input on the menu, or “Grab and Go” or “Fun on the Run” promotions Examples: <ul style="list-style-type: none"> ● <i>“Students will have the opportunity to provide input on local, cultural, and ethnic favorites.”</i> ● <i>“... shall provide periodic food promotions to encourage taste testing of healthy new foods being introduced on the menu.”</i>
Addresses limiting <u>regular (sugar-sweetened) soda</u>	0	Not mentioned
	1	Either of the following: <ul style="list-style-type: none"> ● Regular soda is limited but not prohibited ● Prohibition of regular soda is suggested, time- or location-specific, or subject to principal’s discretion
	2	Either of the following: <ul style="list-style-type: none"> ● Regular soda is prohibited ● Foods of Minimal Nutritional Value (FMNV) are prohibited at all times on school grounds. Prohibiting FMNV qualifies for a “2” because the definition of FMNV includes soda. Examples: <ul style="list-style-type: none"> ● <i>“Soda will not be available on school grounds.”</i> ● <i>“Only water, 100% juice, and milk will be available at school.”</i>
Physical education promotes a <u>physically active lifestyle</u>	0	Not mentioned
	1	Any of the following: <ul style="list-style-type: none"> ● Suggests that physical education classes promote a physically active lifestyle ● Suggests National Association for Sport and Physical Education (NASPE) standards ● Suggests that physical education programs focus on self-assessment Example: <i>“Physical education programs should promote an active lifestyle.”</i>
	2	Any of the following: <ul style="list-style-type: none"> ● Requires physical education to teach lifetime activities ● Requires schools to follow NASPE standards ● Focuses on self-assessment through a “Fitnessgram” or “Activitygram” Examples: <ul style="list-style-type: none"> ● <i>“Physical education shall focus on personal fitness.”</i> ● <i>“... shall provide all students physical education that teaches them the skills needed for lifelong physical fitness.”</i>
Regular physical activity opportunities are <u>provided throughout the day</u> (not including recess)	0	Either of the following: <ul style="list-style-type: none"> ● Not mentioned ● Only addresses physical activity before or after school
	1	Vague and/or suggested Example: <i>“Classrooms shall incorporate, where possible, appropriate, short breaks that include physical movement.”</i>
	2	Either of the following: <ul style="list-style-type: none"> ● Regular physical activity throughout the day is required ● Policy requires training for teachers on activities that incorporate physical activity throughout the day Examples: <ul style="list-style-type: none"> ● <i>“Physical activity opportunities shall be offered daily during the school day.”</i> ● <i>“Shall provide Take 10! training to all teachers.”</i>
Addresses consistency of <u>nutrition communication</u>	0	Not mentioned
	1	Vague and/or suggested Examples: <ul style="list-style-type: none"> ● <i>“The entire school environment shall be <u>aligned</u> with healthy school goals”</i> (although “shall” is required, “aligned” is vague). ● <i>“... will <u>encourage</u> menu choices linked with the nutrition education curriculum.”</i>
	2	Specific and required Example: <i>“The school environment, including cafeteria and classroom, shall provide <u>clear and consistent messages</u> that reinforce healthy eating.”</i>

Figure 2. Sample school wellness policy topic items and coding guidance.

education .74, physical activity .75, communication and promotion .71, and evaluation .71. Because a reliability of .70 or greater is considered adequate, the nutrition education subscale was re-examined. Many items on this subscale address how nutrition information is communicated throughout the school environment, which is similar in concept to items on the communication and promotion subscale, which addresses how wellness information is disseminated throughout the entire school community. When the nutrition education items were included in the communication and promotion subscale, α increased to .81. In another study of 150 policies from one state, the nutrition education subscale's Cronbach's α was .72 (Schwartz MB, Henderson KE, unpublished data, 2008) suggesting that within one state, item scores within subscales may be more consistent. Future research using this tool with single state samples may desire to keep the nutrition education subscale separate; however, for studies comparing specific subscales across states, the combined scale may be most appropriate.

The total comprehensiveness and total strength scores demonstrated good range and variability: comprehensiveness scores ranged from 0.19 to 0.81 (mean 0.53 ± 0.15), and strength scores from 0.05 to 0.64 (mean 0.36 ± 0.15). The minimum and maximum scores suggest that the tool is not vulnerable to ceiling or floor effects and will be able to distinguish among very high and low scoring policies within a sample. Policies consistently scored higher on comprehensiveness than strength, supporting the theory that these are two levels of policy quality, with strength the more difficult bar to reach.

Across the four states, the total comprehensiveness scores were not statistically different from each other; however, total strength scores were ($F [3, 56] = 9.12, P < 0.001$). This finding suggests that the tool is sensitive enough to detect systematic differences between groups of policies. Pennsylvania policies were significantly stronger than the three other states in most domains. This finding might be attributable to the strength of the wellness policy template developed by the Pennsylvania Department of Education and the state school board association (15). Connecticut policies were stronger in the domain of competitive foods, which is likely due to state beverage legislation and a program for districts to receive state funding when adopting state nutrition standards for à la carte foodservice.

This coding system builds upon other research evaluating school wellness policies. The School Nutrition Association evaluated the content and implementation of wellness policies in districts across the country (3,7,16). They assessed the frequency of policies that "mandated" vs "encouraged" different components, a distinction further elaborated and quantified in our coding system. Via survey, they found high levels of policy implementation for nutrition standards for US Department of Agriculture meal programs (92%) and à la carte items (72%), but only 33% for other food such as fundraising, class parties, and school stores. Our coding system could be used to examine whether policy strength on these components explains differences in implementation. Metos and Nanney (2) assessed the strength of language in policies in one state as either a "recommendation" or "mandate" for 32 content items. Both of these studies found that districts

with the most mandatory policy components were those with the highest levels of free and reduced price meal participation. Our tool provides a reliable method for further studying this finding using a larger number of content items and a specific and detailed process for quantitatively assessing policy strength.

CONCLUSIONS

This study has limitations. First, the findings may not be generalizable nationally because policies from only four states were included. Second, this study only began to establish construct validity and did not establish criterion validity. It is not known if scores on this measure will predict the actual school environment or relevant student behaviors and health outcomes. Future research is needed in this area.

The strength of this coding system is that it was developed by an interdisciplinary national working group and provides a quantitative method to code school wellness policies on seven key domains: nutrition education, standards for US Department of Agriculture child nutrition programs and school meals, nutrition standards for competitive and other foods and beverages, physical education, physical activity, communication and promotion, and evaluation. This measure has good internal consistency and interrater reliability, exhibits initial signs of construct validity, and provides a practical tool for researchers, school administrators, and community members who desire to systematically evaluate wellness policies.

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