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Physical activity and healthy eating environmental audit tools in youth care settings: A systematic review

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Abstract

Background—There is a growing interest in evaluating the physical activity (PA) and healthy eating (HE) policy and practice environment characteristics in settings frequented by youth (18 years).

Objective—This review evaluates the measurement properties of audit tools designed to assess PA and HE policy and practice environmental characteristics in settings that care for youth (e.g., childcare, school, afterschool, summer camp).

Method—Three electronic databases, reference lists, educational department and national health organizations' web pages were searched between January 1980 and February 2014 to identify tools assessing PA and/or HE policy and practice environments in settings that care for youth (18 years).

Results—Sixty-five audit tools were identified of which 53 individual tools met the inclusion criteria. Thirty-three tools assessed both the PA and HE domains, 6 assessed PA domain and 14 assessed HE domain solely. The majority of the tools were self-assessment tools (n=40), and were developed to assess the PA and/or HE environment in school settings (n=33), childcare (n=12), and afterschool programs (n=4). Four tools assessed the community at-large and had sections for assessing preschool, school and/or afterschool settings within the tool. The majority of audit tools lacked validity and/or reliability data (n=42). Inter-rater reliability and construct validity were the most frequently reported reliability (n= 7) and validity types (n=5).

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Conclusions—Limited attention has been given to establishing the reliability and validity of audit tools for settings that care for youth. Future efforts should be directed towards establishing a strong measurement foundation for these important environmental audit tools.

Context

From childhood to adolescence, children (age 3-18 years) are exposed to a variety of settings such as preschool, school, afterschool and summer camp. Nearly 60% of children age 3-5 years attend some type of childcare center and over 95% of youth age 5-17 years are enrolled in public/private school.¹ Additionally, over 10 million school-age children are enrolled in afterschool programs² and over 14 million youth (18 years) attend summer day camps annually.³ Given the extended contact youth have with these settings, whether these environments support or hinder physical activity and healthy eating habits is of critical importance.

In recent decades there has been an increased recognition of the role the physical environment characteristics and the policy and practice environmental characteristics plays in shaping the physical activity levels and eating habits of youth.^{4,5} In the context of this review, physical environment characteristics refers to factors such as size and quality of structures of fixed and portable playgrounds, green fields, facility designs, esthetic etc.⁶⁻⁸ Whereas, policy and practice environmental characteristics includes characteristics such as, having supportive physical activity and/or healthy eating written policy, provision of professional training on physical activity and/or healthy eating promotion to staff, scheduling of physical activity, quality of physical activity and food served, and monitoring and evaluation processes.⁹⁻¹¹ More recently, there has been a visible increase in the prevalence of policies and standards designed to influence settings that care for youth to be more supportive of physical activity and healthy eating habits.^{1, 10, 11} Examples of these include “wellness” policies in school settings that dictate the amount and quality of daily physical education students must receive per week during the school year and/or the type of foods and beverages sold or served at schools.

In response, a wide array of audit tools designed to assess policy and practice environmental characteristics have been developed. Audit tools come in a variety of forms, such as questionnaires, checklists, observation scales, and surveys. These tools are designed to capture information pertaining to the alignment or presence of physical activity and healthy eating environmental characteristics of a given setting with existing state or national policies, standards, or scientific position statements.^{7, 12-14} The extent to which audit tools designed to assess policy and practice environmental characteristics provide an accurate reflection of such settings, however, remains unknown.

If audit tools are to provide credible information aimed at informing current and future policy decisions regarding the adoption or implementation of supportive policy and practice physical activity and healthy eating interventions,¹⁵⁻¹⁸ it is of critical importance that such tools demonstrate: (1) an acceptable level of reliability (defined as the ability of the tools to consistently capture the same information with repeated use and/or when used by two or more users) and (2) validity (referred to as the ability of the tools to accurately measure what

they were designed or intended to measure)¹⁹. To the authors' knowledge, no reviews have examined audit tools designed to assess policy and practice environmental characteristics in the wide range of settings that care for youth. Therefore, the aim of this review is to identify and examine the quality of policy and practice environmental audit tools currently in use at various settings caring for youth.

Evidence acquisition

Literature Search

A systematic literature search was conducted to identify tools assessing policy and practice environmental characteristics related to physical activity and healthy eating in settings that care for youth (3-18 years). Three electronic databases: PubMed, Web of Science, and CINAHL were searched for all relevant articles published between January 1980 and February 2014. Search strategies for the databases included the following key words: population (child, youth, adolescent); settings [(preschool, childcare, homecare (residential children homes)], school, afterschool, summer camp); apparatus (tool, kit, instrument, index, survey, questionnaire, checklist, audit); quality (assessment, development, validity, reliability); and area (environmental, policy, standards, benchmarking, physical activity and nutrition). In addition to database searches, reference lists of identified articles were screened in order to identify additional tools to include in the review.^{12-14, 20-27}

Tools were also sourced from the following national education departments and health organizations' web pages: National Cancer Institute, Active Living Research, Robert Wood Johnson Foundation, Center for Diseases Control and Prevention (CDC), Yale Rudd Center for Food Policy and Obesity, National Association of School Nurses, USDA's "Changing the Scene" and National Association of State Boards of Education (NASBE). The following keyword combinations were used when conducting an electronic search of national education departments and health organization web pages: wellness, policies, tool (kit), audit, assessment, resources, measurements, school (pre-, after-), summer camp, and homecare (i.e., residential children homes).

Eligibility Criteria

Tools were included in the review if they met the following inclusion criteria: (1) the tool as a whole or sections of the tool assessed physical activity and/or healthy eating policy and practice environmental characteristics (e.g., written policies, provision of professional training on physical activity and/or healthy eating promotion and the credentials of staff delivering the training, scheduling of physical activity and/or snack/meals, quality of physical activity and food served, monitoring and evaluation processes), (2) the setting assessed included one or more of the following: preschool, school, afterschool, summer camp, residential children homes, (3) the tool could be used by researchers and/or non-research affiliated staff in the field, (4) it was an English language publication, and (5) the tool was available electronically or through communication with the authors. Two independent reviewers (RA and JC) screened and selected the audit tools included in the review based on the above inclusion criteria. Tools were excluded from this review if they (1) only assessed the physical environment (e.g., facilities, room space, playground features,

green field, etc.), (2) were designed to evaluate strategies for meeting national/state policy recommendations, or (3) were a non-English publication. For the purpose of this review, we only included articles reporting psychometric properties as part of the tool development/testing procedure.

Selection of Tools

The electronic search strategies were executed by two independent researchers (RA and JC). Disagreements were discussed and resolved, and, if required, a third reviewer (MWB) was consulted. A copy of the latest version of the tools included in the review was retrieved, and when available, the full text papers reporting on tool measurement properties that fulfilled the inclusion criteria were also retrieved.

Description of Tools

The following information was extracted from the tools included in this review: (i) name of the tool, (ii) developer; (iii) the purpose of the tool development; (iv) setting; (v) intended users; (vi) data collection method; (vii); time frame needed to complete the tool; (viii) number of items in the tool; and (ix) domains (e.g. written policy, child feedback, time allocated for physical activity, type of activity, staff professional training, screen time, time allocated for snack/meals, meal quality, evaluation, etc.) assessed by the tool. In addition, when psychometric (i.e., reliability and/or validity) information of the tool was available, the following information was extracted: (i) type of validity and or/reliability evaluated; (ii) time frame for reliability testing (test-retest); (iii) type of analysis used; (iv) validity comparison, and (v) reliability and validity findings.

Evidence synthesis

Description of Tools

A total of 123 tools were identified from the initial search of the three databases, review of references from these articles, and from a search of national health organizations/agencies' web pages. After excluding duplicates, 65 tools were retained, of which 53 tools were included in this review based on the inclusion/exclusion criteria (Figure 1).

Table 1 presents summaries of the audit tools included in this review. Policy and practice environmental characteristics were evaluated solely in 34 tools²⁸⁻⁶² compared to 19 tools^{27, 63-80} which assessed both policy and practice environmental characteristics and the physical characteristics. Physical activity and healthy eating domains were assessed in 33 tools^{27-29, 34-36, 39-44, 46-52, 54, 61, 63-69, 72, 75, 78-80} compared to six tools^{33, 38, 70, 74, 76, 77} that assessed only physical activity domain and 14 tools^{30-32, 37, 45, 53, 55-59, 62, 71, 73} that assessed only healthy eating domain.

School was the setting with the most tools assessing physical activity and/or healthy eating environments (n= 33)^{27, 36-41, 45-47, 54-56, 58, 59, 61-64, 69-78, 81} followed by childcare settings (n= 12).^{28-35, 65-68} There were 4 tools⁴⁸⁻⁵¹ evaluating afterschool settings and 4 tools^{52, 53, 79, 80} evaluating community settings with sections dedicated to evaluating childcare, school, and/or the afterschool setting. Forty out of the 53 tools^{30-35, 42-47,}

49-56, 58, 61, 63-66, 68-70, 72-74, 76-80 were categorized as self-assessment tools designed to be used by staff/community members, 12 tools^{27-29, 36-41, 59, 67, 71} were designed to be completed by researchers/public health practitioners for research purposes or for assessments within specific projects, and a single tool⁴⁸ was intended to be used by both researchers and staff members.

The majority of the tools assessing physical activity focused on items such as written policies (n=31) and time allocation (n=31). A considerable number of tools included items such as activity types (n=26), staff training (n=20), curriculum (n=19), staff behavior (n=16), staff credentials (n=16), and screen time (n=14). Fewer tools included items such as evaluation and monitoring process (n=10), parent workshop (n=8), child involvement (n=5), and barriers and support (n=4). When healthy eating was evaluated, the majority of tools focused on written policies (n=40) and menu quality (n=30). The majority of tools included staff training (n=26), behavior (n=19), access to water (n=21), access to vending machines (n=18), curriculum (n=18), food safety (n=12) and child involvement (n=12). Fewer tools included meals/snack schedules (n=10), parent workshops (n=10), evaluation (n=10), staff credentials (n=9), and barriers and support (n=2).

Reliability

Inter-rater reliability (Table 2) was the most commonly tested type of reliability (n=7)^{13, 21, 23-26} followed by test-retest (n=3),^{21, 82, 83} and internal consistency (n=1).²⁵ For reliability assessment, studies reported Pearson correlation, Cronbach's α , kappa coefficient, percent agreement and/or interclass correlation coefficient (ICC) scores. The following tools had the highest reliability coefficients: the Wellness Child Care Assessment Tool (WellCCAT)²⁵ with an ICC ranging from 0.84-0.99; the Food and Beverage Environment Analysis and Monitoring System (FoodBEAM),²⁶ with an ICC ranging from 0.97-0.99; the Community Healthy Living Index (CHLI),²³ with percent agreement ranging from 84%-93%; and the Healthy Afterschool Activity and Nutrition Documentation (HAAND)¹³ with percent agreement ranging from 85%-100% and kappa coefficients ranging from 0.73-1.00.

Validity

Construct validity (table 2) was the most reported type of validity (n=5),^{13, 21, 24, 25, 82} followed by face and/or content validity (n=3),^{13, 21, 83} criterion validity (n=2)^{21, 84} and convergent validity (n=1).²⁶ Construct validity comparisons were made: against national expert review,²¹ comparison to environmental characteristic scores among sites using groups expected to differ due to known characteristics,^{24, 25} and objective measures of child-level physical activity such as pedometers¹³ and direct observation.²⁷ For validity assessment, studies reported Pearson correlation coefficient (r), weighted kappa coefficient, percent agreement, means and standard deviation, multi-level modeling and one-way ANOVA. The following tools reported the highest validity coefficients: the WellCCAT,²⁵ with centers known to have supportive environmental characteristics scoring significantly higher than centers with less supportive environments; the Child Care Nutrition and Physical Activity Assessment Survey,⁸⁴ with 62% of the items reporting 80% agreement between item scores and criterion measures such as in-person interviews, direct observations, and a

newly-developed tool to assess menu items; and the HAAND tool,¹³ with physical activity items having significant positive associations with pedometer step counts.

Discussion

The purpose of this review was to examine the measurement properties of audit tools currently used to evaluate environmental characteristics at various settings caring for youth (18 years). Fifty-three tools evaluating the physical activity and healthy eating environmental characteristics in a variety of youth care settings were included in this review. The findings from this review indicate that although a considerable number of tools have been developed over the past decade, relatively little work has been devoted to establishing their reliability and/or validity, with only 11 out of 53 tools having measurement properties information reported.

This review highlights several key issues regarding the utility and the quality of the data collected by the audit tools identified. Several tools (n=7) were developed to assess a specific project or environmental interventions^{35-37, 87, 93} or to evaluate the validity of another pre-existing audit tool.⁸⁵ For example, the Policy Assessment Tool, the 2-minute Program Assessment, and the Program Assessment Tools were all developed to assess the Out of School Nutrition and Physical Activity (OSNAP) intervention in the afterschool setting.⁸⁶ Another example is the Principal's Survey Tool⁸⁵ which was developed as part of evaluating the Teens Eating for Energy and Nutrition at School (TEENS) intervention. As a result, the generalizability of such tools is limited to the projects/interventions they were developed to evaluate and may therefore not provide accurate reflection of practice when used to assess alignment with national and state level physical activity and healthy eating environmental characteristic recommendations.

Psychometric properties

Reliability—Inter-rater reliability was the most reported type of reliability. Assessing tool test-retest and internal consistency reliability is an essential step in establishing measurement properties in the early stages of audit tool development. It is especially important to establish this characteristic in self-assessment tools as it provides critical information about the stability of the item scores on multiple administrations (test-retest reliability) and the extent to which items in the tools all measure the same underlying construct (internal consistency reliability).⁸⁷ However, for observational audit tools, inter-rater reliability is most critical as it will confirm that individuals using the tools observe the same items. For instance, do multiple evaluators assign similar scores to items with respect to the presence or absence of environmental characteristics? An example might be “does the school have a written policy banning cafeteria from serving sugar-sweetened beverages?”.

For continuous data, the intraclass correlation coefficient (ICC) is recognized as the most preferred analysis, whereas for ordinal/categorical data, the recommended analysis is kappa statistics.^{88, 89} An ICC and kappa coefficient of 0.7 is considered an acceptable reliability coefficient^{90,91} while use of Pearson correlation coefficient (*r*) is not recommended to assess test-retest reliability as correlations are considered a measure of association and not a measure of agreement.⁹² In this review, only a single study reported using a Pearson

correlation coefficient (r) to evaluate test-retest reliability¹⁴. Overall, there are large variations in the reported reliability coefficients, with reliability coefficient values ranging from poor agreement (i.e., 0.2) to almost perfect (0.8 to 1.00) for kappa while many of the items across the tools reviewed failed to reach the acceptable level for reported reliability (i.e., Kappa > 0.70).

This review found that although the majority of the tools assessing the physical activity and/or healthy eating environmental characteristics were designed to be used by staff/community members (i.e., self-assessment tools), only two studies^{23, 93} evaluated the inter-rater reliability of the tool when used by different groups (i.e., among non-research affiliated staff/community members and/or when compared to research staff). The first study was conducted by Kim et al²³ to evaluate the reliability of the CHLI tool. They reported that the items in the audit tool showed substantial to almost perfect agreement between staff/community members. The second study was done by Bullock et al,²⁶ to evaluate researcher-to-researcher and researcher-to-non-researcher inter-reliability of the FoodBEAMS tool. In this study, they reported perfect agreement between researchers as well as between researchers and non-researcher staff. The ability of the staff/community members to rate the environmental characteristics as accurately as researchers is an essential step in tool development for several reasons. Audit tools designed to evaluate the policy and practice environmental characteristics are often definition-dense, with terminology that does not easily lend itself to use by community members. In addition, one cannot assume that establishing inter-rater reliability across researchers will necessary translate to inter-rater reliability when used by staff/community members. Therefore, adequate training to intended users of these tools is required if such tools are to yield accurate data. Future research should focus on establishing accuracy of newly developed tools when used by intended audiences (i.e., staff/community members).

Validity—Establishing all types of validity (e.g., content, face, criterion, and construct) is an essential step in new tool development.⁹⁴ Construct validity is particularly important as it provides important details as to whether or not a tool actually measures the construct it intends to measure. An important question is “do the items in the tool consistently follow a predicted pattern or theory?”^{97,98}. An example of this type of validity would be settings which score higher in physical activity-promoting policies having a higher participant physical activity levels when an objective measurement is used, such as accelerometers/pedometer.

The use of Pearson correlation coefficient (r), ICC, percent agreement, scatter plots of interest differences versus means (i.e., visual inspection), and one-way ANOVA are considered acceptable analyses for reporting on the validity of continuous measures.⁹⁵ For ordinal continuous data, the use of Spearman rank correlation coefficient (r_s) is recommended and for categorical (ordered) data, weighted kappa statistics are often recommended.⁹⁶ When a tool's validity coefficients were reported, there were wide variations in the reported values across tool items within each tool, with many of the studies reporting that tools demonstrate good to acceptable validity coefficients, despite the fact that multiple items within those tools fail to reach acceptable coefficient values. Overall this review found that the majority of the studies evaluating measurement properties used

appropriate terminology when reporting on the type of validity evaluated. However, only a single study¹² reported criterion validity by using a follow-up interview with the site director who completed the original assessment as a criterion comparison to evaluate policy and practice items of the tool. Accurate use of terminology is of critical importance as misclassification of the type of measurement evaluated will impact the quality of the data collected.

In this review, apart from the study by Lounsbery et al.,⁸³ which only reported on content validity for the S-PAPA tool, all the other studies examined additional validity types such as construct or criterion validity to establish stronger measurement properties of the newly developed tools. When validity was tested, construct validity was the most often reported validity type, which is an essential measurement property to establish if audit tools are expected to be used to evaluate the environmental characteristics in relation to health outcomes.⁹⁷

These elements, reliability and validity, are fundamental measurement properties necessary for the collection of accurate information on policy and practice environmental characteristics of settings that serve youth. This review shows the lack of consistency when reporting on measurement properties of such tools, with 7 studies out of 11 reporting both validity and reliability properties of environmental characteristics audit tools, and 4 studies reporting on either validity or reliability properties of such tools. For example, Kim et al.,²³ and Schwartz et al.,²² reported only the reliability of the CHLI and the WellSAT tools, respectively. Henderson et al.,¹² reported on only the validity of their newly developed tool. Validity testing of newly developed tools is an important first step in establishing the measurement quality of newly developed tools prior to establishing tool reliability. However, this review indicates that, when measurement properties were tested, the focus was more on reliability testing than validity testing, with reliability reported more often than validity when assessing newly developed instruments, which is in line with current literature findings⁹⁸. Future studies, should address the cause for this apparent lack of validity reporting in the field.

Limitation—Despite our efforts to identify current environmental audit tools used in youth care setting, the authors understand that some tools could have been overlooked. In addition, as indicated in our review, many of the tools were developed for specific projects and were not intended for publication making their identification more difficult.

Recommendations regarding future audit tool development

Audit tools designed to evaluate the environmental characteristics of settings that care for children must demonstrate minimal acceptable levels of reliability and validity evidence. This is critical as information gathered from such tools is being used to inform policy makers' decisions regarding the impact or effectiveness of environmental characteristics interventions and to, in turn, formulate future strategies regarding the promotion of physical activity and healthy eating habits among youth. Saelens et al.,¹⁹ put forward a set of guidelines for reporting on newly developed instruments. These guidelines include: (1) the rationale and justification for developing the tool and how it differs from existing tools, (2)

the construct measured by the tool, (3) reliability and validity of the tool, (4) detailed protocols on how to use the tool, (5) scoring and scaling of the tool, (6) modifications made to the tool, (7) the setting, geographical area, and population or environments where the tool was used, and (8) ways to access the tool.

In the future, when developing new audit tools to assess the environmental characteristics, we recommend that the guidelines put forward by Saelens et al.,¹⁹ be followed when evaluating new audit tools designed to measure environmental characteristics. In addition, we propose that when developing such audit tools, (1) greater efforts must be put towards evaluating inter-rater reliability between researchers and intended users of the tool (e.g., staff/community members, researchers); (2) establishment of construct validity should be given a high priority; and (3) reliability and validity coefficient scores across items of newly developed tools should be reported.

Conclusion

Little attention has been given to establishing reliability and validity evidence of newly developed tools designed to assess physical activity and/or healthy eating environmental characteristics in settings caring for youth. Future efforts should be directed towards establishing a strong measurement foundation for these important environmental audit tools in order to maximize understanding of the health-promoting potential of these critical developmental settings.

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Highlights

- Considerable number of policy and practice environment audit tools have been developed
- Majority of the tools were developed to assess school settings and were based on self-report
- Little attention has been given to establishing measurement properties of newly developed tools
- Majority of the currently available tools lack validity and/or reliability information

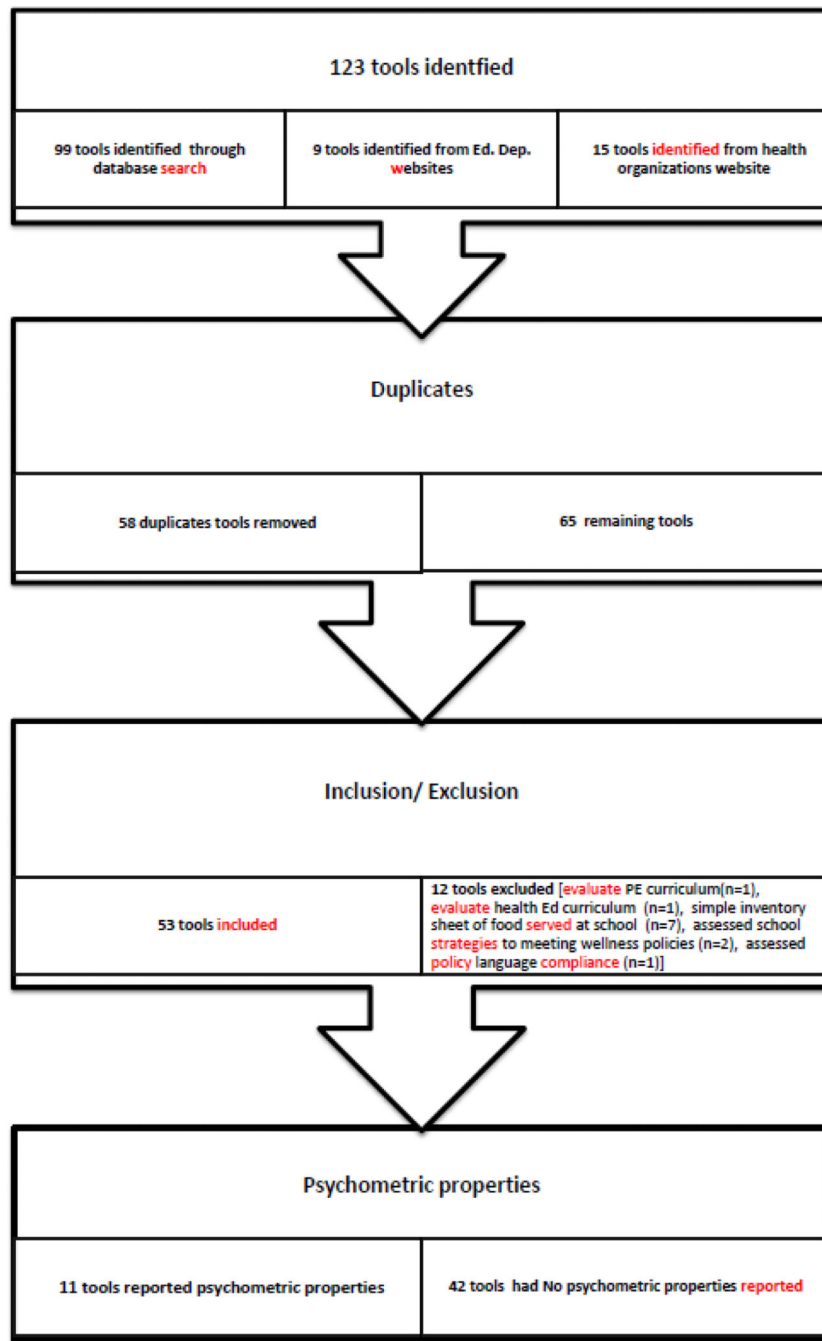


Figure 1.
Tool selection process.

Table 1
Description of Environmental Audit Tools assessing Healthy Eating and Physical Activity

Tool Name	Setting	Developer	Purpose	User	Staff/community member (Self-assessment)	Researcher
Child Care Nutrition and Physical Activity Assessment Survey	Childcare	Rudd Center for Food Policy and Obesity, Yale University.	To evaluate nutrition and physical activity environment of child care centers.			
Child Care Nutrition and Physical Activity Policies- Communication & Promotion	Childcare	Connecticut State Department of Education.	To assess communication level and health promotion strategies of childcare centers in the state of Connecticut.			
Child Care Nutrition and Physical Activity Policies- Eating Environment	Childcare	Connecticut State Department of Education.	To assess nutrition standards of childcare centers in the state of Connecticut.			
Child Care Nutrition and Physical Activity Policies- Evaluation	Childcare	Connecticut State Department of Education.	To assess evaluation policies of childcare centers in the state of Connecticut.			
Child Care Nutrition and Physical Activity Policies- Nutrition Education	Childcare	Connecticut State Department of Education.	To assess nutrition education of childcare centers in the state of Connecticut.			
Child Care Nutrition and Physical Activity Policies- Nutrition Standard	Childcare	Connecticut State Department of Education.	To assess nutrition standards of childcare centers in the state of Connecticut.			
Child Care Nutrition and Physical Activity Policies- Physical Activity	Childcare	Connecticut State Department of Education.	To assess nutrition standards of childcare centers in the state of Connecticut.			
Childcare director interview	Childcare	Rudd Center for Food Policy and Obesity, Yale University.	To assess nutrition and physical activity environment at childcare settings.			
Environment and Policy Assessment and Observation (EPAO)	Childcare	Ward et al., Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill.	To evaluate the Nutrition and Physical Activity Self-Assessment for Child Care Program (NAP SACC).			
Nutrition and Physical Activity Self-Assessment for Child Care Program (NAP SACC)	Childcare	Ward, et al., Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC), Center for Health Promotion and Disease Prevention and Department of Nutrition, University of North Carolina at Chapel Hill.	Developed for the Nutrition and Physical Activity Self-Assessment for Child Care Program (NAP SACC) intervention.			
Study of Healthy Activity and Eating Practices and Environments in Head Start (SHAPES) Self-assessment Survey	Childcare	Whitaker, et al, Department of Public Health and Pediatrics, Center for Obesity Research and Education, Temple University.	To evaluate nutrition and physical activity environments in childcare setting.			

Tool Name	Setting	Developer	Purpose	User
Wellness Child Care Assessment Tool (WellCCAT)	Childcare	Falbe et al., Rudd Center for Food Policy and Obesity, Yale University.	To assess written health-related policies (i.e., nutrition and physical activity and wellness policies).	Staff/community member (Self-assessment) Researcher
Abbreviated Wellness School Assessment Tool (WellSAT)	School	Robert Wood Johnson Foundation Healthy Eating Research Program, Working Group 1.	To evaluate the quality of existing schools' district wellness policies.	•
Competitive Foods and Beverages Toolkit	School	Alliance for Healthier Generation.	To help schools evaluate the presence of competitive food and beverages at their schools.	•
Food and Beverage Environment Analysis and Monitoring System (FoodBEAM)	School	Samuels & Associates.	Developed to capture the following: <ul style="list-style-type: none"> • Venues where competitive foods and beverages are sold. • Types of foods and beverages sold. Compliance of foods and beverages with the California school nutrition standards for competitive foods.	•
Food and Fitness School Health Policies and Practices Questionnaire	School	Turner, Bridging the Gap Research Program.	Developed as part of a study to assess school s' health policy and programs.	•
Gold Medal Rating Scale – Elementary School	School	Massachusetts Action for Healthy Kids supported by the MetroWest Community Health Care Foundation.	Developed as part of Action for Healthy Kids initiative for schools to assess their local wellness policies.	•
Gold Medal Rating Scale – Middle & High School	School	Massachusetts Action for Healthy Kids supported by the MetroWest Community Health Care Foundation.	Developed as part of Action for Healthy Kids initiative for schools to assess their local wellness policies.	•
Illinois Needs Assessment & Evaluation Tool	School	Illinois State Board of Education.	Developed to evaluate the local schools wellness policies and practice in Illinois.	•
Local Wellness Policy	School	National Team Nutrition Office for the Colorado Healthy Schools Summit.	Developed to assess local schools wellness programs.	•
Michigan's Healthy School Action Tools (HSAT)- Nutrition service	School		Developed for Michigan schools to create healthier environments initiative.	•
Michigan's Healthy School Action Tools (HSAT)- Physical education and other physical activity opportunities	School		Developed for Michigan schools to create healthier environments initiative.	•

Tool Name	Setting	Developer	Purpose	User
Michigan's Healthy School Action Tools (HSAT)- School Health & Safety Policies	School		Developed for Michigan schools to create healthier environments initiative.	Staff/community member (Self-assessment) • Researcher
Mississippi School Nutrition and Physical Activity Environment Assessment	School	Mississippi Department of Education.	Developed for Mississippi schools to evaluate their health and wellness environment.	•
Neumark-Sztainer Food Policies and Practices questionnaire	School	Developed by the Minnesota Association of Secondary School Principals and the University of Minnesota, Division of Epidemiology.	To evaluate high school food policy and practice environment.	•
New Hampshire School Wellness Policy Assessment Form	School	New Hampshire Department of Education Local.	Developed to evaluate the New Hampshire schools wellness policies and practice complete school environment.	•
Policy and Systems Toolkit	School	Alliance for Healthier Generation.	Developed to be used by schools enrolled in the Healthy Schools Program	•
Principals Survey	School	Lytle et al, Division of Epidemiology, University of Minnesota.	Developed as part of the TEENS intervention project.	•
Rhode Island Nutrition & PA survey	School	Rhode Island Healthy Schools Coalition.	Developed for Rhode Island schools to assess their school environment with respect to nutrition and physical activity.	•
Rhode Island Needs Assessment Tool (RINAT)	School	Pearlman, Rhode Island Department of Health..	Developed as part of needs assessment and intervention project in Rhode Island schools.	•
School Environment Assessment Tool (SEAT)	School	Nathan et al, Hunter New England Population Health and School of Medicine and Public Health, The University of Newcastle, Australia.	Developed to assess quality of school food and physical activity environment.	•
School food policies and practices: a state-wide survey of secondary school principals	School	French 2002. University of Minnesota, Division of Epidemiology.	To evaluate food related policies and practices in secondary schools in Minnesota.	•
School Health Index (SHI) (2012) - Elementary School	School	Centers for Disease Control and Prevention.	Developed for schools to assess health and safety policy and for planning.	•
School Health Index (SHI) (2012) - Middle/High school	School	Centers for Disease Control and Prevention.	Developed for schools to assess health and safety policy and for planning.	•
School Health Policies and Practices Study (SHPPS 2006) questionnaire- Nutrition	School	Centers for Disease Control and Prevention.	Developed for the School Health Policies and Practices study.	•

Tool Name	Setting	Developer	Purpose	User
School Health Policies and Practices Study (SHPPS 2006) questionnaires-Physical Education and Activity	School	Centers for Disease Control and Prevention.	Developed for the School Health Policies and Practices study.	Researcher
School Health Policies and Practices Study (SHPPS 2006) questionnaires-School Policy & Environment	School	Centers for Disease Control and Prevention.	Developed for the School Health Policies and Practices study.	
School Meals Program Toolkit	School	Alliance for Healthier Generation.	Developed to be used by schools to evaluate the quality of the school meals provided as part of assessing school wellness policies and practice programs.	
School Nutrition by Design	School	California Department of Education Nutrition Services Division.	Developed as part of the recommendation of State Superintendent Advisory Committee on Nutrition Implementation Strategies.	
School Physical Activity Policy Assessment (S-PAPA)	School	Lounsbury et al., University of Nevada, Las Vegas	Developed to assesses physical activity policy at the district & school level.	
Student Wellness Toolkit – Elementary school	School	Alliance for Healthier Generation.	Developed to be used by elementary schools to evaluate overall school wellness policies and practice	
Student Wellness Toolkit – High School	School	Alliance for Healthier Generation.	Developed to be used by high schools to evaluate overall school wellness policies and practice	
Student Wellness Toolkit – Middle School	School	Alliance for Healthier Generation.	Developed to be used by middle schools to evaluate overall school wellness policies and practice	
Survey of school vending machines	School	Johanson and Wootan. Center for Science in the Public Interest (CSPI).	Developed as part of the CSPI nutrition policy project to evaluate the nutrition quality of food in school vending machines.	
Wellness School Assessment Tool (WellSAT-96)	School	Robert Wood Johnson Foundation Healthy Eating Research Program, Working Group 1.	To provide a standard method for assessing school district wellness policies.	
Community Healthy Living Index (CHLI)	Community	Y-USA collaborated with Stanford, Harvard, and St. Louis Universities.	To examine environmental and social supports for healthy eating and active living.	
Healthy Community Checklist	community	Michigan Healthy Communities Collaborative.	To assess community's health environment with regard to promoting and supporting: •Physical Activity.	

Setting	Developer	Purpose	Staff/community member (Self-assessment)	User	Researcher
Assessment 3 (school)	Community Michigan Healthy Community Collaboration.	<ul style="list-style-type: none"> •Healthy Eating & Healthy Weight. •Healthy Eating & Healthy Weight. •Smoke-Free Environments & Tobacco-Free Lifestyles. 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
Intervention and Community Tool	Community Strategic Alliance (California).	Developed to help communities assess how supportive their environment is to healthy eating.	Developed to help community assess current policy status and develop an action plan.	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
Assessment	After-school Harvard School of Public Health Prevention Research Center as part of the Out of School Nutrition and Physical Activity (OSNAP) Initiative.	To assess how closely program adheres to the OSNAP nutrition and physical activity environmental standards.	To assess the extent to which the afterschool environment meets current physical activity and nutrition policies.	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
Intervention and Instrument	After-school Aija et al., Arnold School of Public Health, University of South Carolina, Columbia.	To assess the extent to which the afterschool environment meets current physical activity and nutrition policies.	To identify existing nutrition, physical activity and screen time policies.	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
Intervention and Instrument	After-school Harvard School of Public Health Prevention Research Center as part of the Out of School Nutrition and Physical Activity (OSNAP) Initiative.	To assess the nutrition and physical activity of program during the OSNAP intervention.	To assess the nutrition and physical activity of program during the OSNAP intervention.	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
Intervention and Instrument	After-school Harvard School of Public Health Prevention Research Center as part of the Out of School Nutrition and Physical Activity (OSNAP) Initiative.	To assess the nutrition and physical activity of program during the OSNAP intervention.	To assess the nutrition and physical activity of program during the OSNAP intervention.	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
Intervention method	Time frame	No. of items	Domain of physical activity environment covered	Domain of nutrition environment covered	Note
Interview	1 day site visit	43	Environmental (Policy/practice) characteristics Policy, activity types , screen time, staff behavior, training barriers and support	Environmental (Policy/practice) characteristics Policy, menu quality, meal schedule, food safety, staff behavior, training, curriculum, access (water)	Close-ended questions with appropriate responses as follows: - Choose one response category from several possible answers.
Self-report	Not reported	12	Policy, staff behavior	Policy, staff behavior, advertising	Close-ended questions with appropriate responses as follows: - Full/Partial/ None/NA
Interview	Not reported	31	Policy, meal schedule, food safety, staff behavior, training	Policy, meal schedule, food safety, staff behavior, training	Close-ended questions with appropriate responses as follows: - Full/Partial/ None/NA

Data collection method		Time frame	No. of items	Domain of physical activity environment covered	Domain of nutrition environment covered
Observation	Document review	Interview	Self-report	Environmental (Policy/practice) characteristics	Environmental (Policy/practice) characteristics
					Ajja et al.
•		Not reported	6	Policy, evaluation	Policy, evaluation
•		Not reported	17		Policy, staff behavior, curriculum, advertising
•		Not reported	51		Policy, menu quality, meal schedule, food safety, access (water, vending machines), fundraising
•		Not reported	45	Policy, amount of time allocated, activity types, screen time, staff behavior, curriculum	Equipment, space, safety
•		Not reported	73	Policy, amount of time allocated, screen time, staff behavior, training barriers and support	Policy, staff behavior/modeling and training, nutrition curriculum, barriers and support, fundraising
•		1 full day visit	192	Policy, amount of time allocated, activity types, screen time, staff behavior and training, curriculum	Policy, menu quality, meal schedule, staff behavior/modeling, training, nutrition curriculum, access (water, vending machines), fundraising
•		1 full day visit	56	Policy, amount of time allocated, activity types, screen time, staff behavior, training	Policy, menu quality, meal schedule, staff behavior, training, access (water/vending machines), fundraising
•		30 min	90	Policy, amount of time allocated, screen time, curriculum	Policy, menu quality, staff behavior/modeling, curriculum, fundraising

Data collection method		Time frame	No. of items	Domain of physical activity environment covered	Domain of nutrition environment covered	Physical characteristics	Physical characteristics	Physical characteristics
Observation	Document review	Interview	Self-report	Environmental (Policy/practice) characteristics	Environmental (Policy/practice) characteristics	Physical characteristics	Physical characteristics	Physical characteristics
•	•	N/A	64	Policy, amount of time allocated, activity types, screen time, staff behavior, training, curriculum, evaluation	Policy, menu quality, meal schedule, staff behavior, training, access (water), curriculum, evaluation, fundraising	Safety, space		Ajja et al.
•	•	45 min	50	Policy, amount of time allocated, activity types, staff behavior, training and credentials, curriculum, evaluation,	Policy, child involvement, menu quality, meal schedule, staff behavior, training and credentials, food safety, access (water, vending machines), curriculum, advertising, fundraising,	Equipment		
•	•	Not reported	8	Not reported	Policy, access (vending machines).			
•	•	Varies based on school size and number, location where food is sold	N/A		Policy, menu quality, access (vending machines), advertising, fundraising,			
•	•	Not reported	100	Policy, amount of time allocated, activity types, staff credentials, curriculum, barriers and support.	Policy, menu quality, meal schedule, access (vending machines), curriculum, fundraising,	Equipment		
•	•	Not reported	29	Policy, amount of time allocated, activity types, staff behavior, training,		Safety		

Data collection method		Time frame	No. of items	Domain of physical activity environment covered	Domain of nutrition environment covered	Physical characteristics	Environmental (Policy/practice) characteristics	Physical characteristics
Observation	Document review	Interview	Self-report	Environmental (Policy/practice) characteristics	Physical characteristics	Environmental (Policy/practice) characteristics	Physical characteristics	Physical characteristics
				Policy, amount of time allocated, staff behavior, training, curriculum.	Safety			Ajja et al.
				Policy, amount of time allocated, staff behavior training.	Safety		Policy, child involvement, menu quality, meal schedule, food safety, staff behavior, training, advertising.	Food facility
				Amount of time allocated, staff behavior and credentials, curriculum.	Space		Menu quality, meal schedule, food facility, staff behavior, training, access (water), fundraising.	Food facility
							Policy, menu quality, meal schedule, staff behavior, training and credentials, fundraising.	
				Policy, amount of time allocated, activity types, staff behavior, training and credentials, curriculum.	Equipment			
				Child involvement, amount of time allocated, activity types, staff behavior, training, evaluation.	Equipment, space, safety		Policy, child involvement, menu quality, meal schedule, food safety, staff behavior, training, access (water, vending machine), evaluation, food safety, advertising, fundraising.	Food facility
				Amount of time allocated, screen time, curriculum.	Equipment		Policy, child involvement, menu quality, meal schedule, food safety, food facility, staff training, access (water, vending machines), curriculum, advertising	

Data collection method		Time frame	No. of items	Domain of physical activity environment covered	Domain of nutrition environment covered
Observation	Document review	Interview	Self-report	Environmental (Policy/practice) characteristics	Physical characteristics
					Ajja et al.
			36		Policy, access (vending machines).
			50	Policy, type, staff behavior, training, credentials, evaluation	Policy, nutrition curriculum, staff behavior, training, meal schedule, evaluation, fundraising.
			8	Policy, child involvement.	Policy, menu quality, food facility, staff behavior, training.
			22		Policy, menu quality, staff training, advertising
			49	Amount of time allocated, staff behavior, staff credentials.	Policy, menu quality, meal schedule, staff behavior, training, access (vending machine), curriculum
			40	Policy, child involvement, amount of time allocated, barriers and support.	Policy, child involvement, barriers, advertising, access (vending machines).
		20 min	65	Amount of time allocated, screen time.	Menu quality, access (water, vending machines), fundraising.

Data collection method		Time frame	No. of items	Domain of physical activity environment covered	Domain of nutrition environment covered
Observation	Document review	Interview	Self-report	Environmental (Policy/practice) characteristics	Physical characteristics
					Ajja, et al.
			36		Policy, menu quality, access (vending machines), attitudes, advertising, fundraising.
		6 hr	105	Policy, amount of time allocated, activity types, staff behavior, training and credentials	Space, safety Policy, menu quality, meal schedule, food safety, staff behavior, training and credentials, access (water), curriculum, evaluation, advertising, fundraising
		6 hr	122	Policy, amount of time allocated, activity types, staff training and credentials, curriculum	Policy, menu quality, meal schedule, food safety, staff behavior, training and credential, access (water), curriculum, evaluation, advertising, fundraising
		40 min	88		Child involvement, menu quality, meal schedule, food safety, staff training, staff credentials, access (water), evaluation
		60 min	114	Amount of time allocated, activity types, staff training and credential, evaluation	
		60 min	201	Policy, amount of time allocated	Policy, menu quality, meal schedule, access (water) evaluation, fundraising
		Not reported	29		Policy, menu quality, food facility, staff behavior, training.
		Not reported	36		Policy, child involvement, staff behavior, training, access (vending machine), curriculum, evaluation, fundraising.

Data collection method		Time frame	No. of items	Domain of physical activity environment covered	Domain of nutrition environment covered
Observation	Document review	Interview	Self-report	Environmental (Policy/practice) characteristics	Physical characteristics
					Ajja et al.
		30 min	96	Policy, amount of time allocated, activity types, staff behavior, training and credential, curriculum, evaluation.	Space
		Not reported	11	Policy, amount of time allocated, activity types, staff training, curriculum	Policy, staff training, curriculum.
		Not reported	10	Policy, amount of time allocated, activity types, staff training, curriculum.	Policy, menu quality, curriculum.
		Not reported	8	Policy, amount of time allocated, activity types, curriculum.	
		Not reported	18		Snack/beverages quality.
		Not reported	96	Policy, amount of time allocated, activity types, staff behavior, training and credentials, curriculum, evaluation	Equipment, safety, space Policy, child involvement, menu quality, meal schedule, staff behavior, training and credentials, food safety, access (water, vending machines) curriculum, advertising, fundraising
		Not reported	160 (childcare) 123 (school) 110 (afterschool)	Policy, child/parent involvement, amount of time allocated, activity types, screen time, staff behavior, training and	Equipment, safety, space Policy, menu quality, meal schedule, staff training, access (water), fundraising.

Data collection method		Time frame	No. of items	Domain of physical activity environment covered	Domain of nutrition environment covered
Observation	Document review	Interview	Self-report	Environmental (Policy/practice) characteristics	Environmental (Policy/practice) characteristics
				Physical characteristics training, credentials, curriculum, evaluation. training, credentials, curriculum, evaluation.	Physical characteristics
	•	Not reported	10	Policy, amount of time allocated, activity types, screen time.	Policy, menu quality, access (water)
•		Program length	27	Amount of time allocated, activity types, screen time.	Menu quality, access (water)

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Table 2

Summary of Tools Reporting Psychometric Properties

Author (year)/Tool name	Reliability		Validity	
	Type	Analysis	Findings	Type
Ward (2008) Bower (2008) EPAO	Interobserver (Concurrent)	For all Items: Percent agreement For Subscale: ICC ² (one-way ANOVA)	Mean percent agreement was 87.26% for observation section and 79.29% for document review section ICC values ranged from 0.45 to 0.97	Construct comparing EPAO subscales with mean activity level and % MVPA using OSRAP ⁸ Pearson correlation
Benjamin (2007) NAP SACC	Test-retest (2 time over 3 wk. period)	kappa coefficients & percent agreement	Test-retest: Kappa ranged from 0.07 to 1.00; interquartile ranged from 0.27 to 0.45 percent agreement ranged from 34.3% to 100%	Face and content Conducting a comprehensive literature and resource review
	Inter-rater (concurrently using 50 triad and 9 dyads) ³	kappa coefficients & percent agreement	Inter-rater: Kappa ranged from 0.20 to 1.00; Interquartile ranged from 0.45 to 0.63 and percent agreement ranged from 52.6% to 100%	validity was reported to be established through National expert review
Henderson (2011) Child Care Nutrition and Physical Activity Assessment Survey				Criterion comparing each question from the NAP SACC to the EPAO data from 69 childcare centers) Weighted Kappa coefficients & percent agreement Kappa ranged from -0.01 to 0.79 & percent agreement ranged from 0 to 93.65%
				Criterion For policy & practice items survey answers were compared with in-person interview with mirroring items For Practice & environment items survey answers to direct observation data For nutrition quality items survey answers were compared to a measurement tool created for this project. Percent agreement Percent agreement 39% - 97% (62% item achieved 80%)

Validity		Reliability	
Author (year)/Tool name	Type	Analysis	Findings
Falbe (2011) WellCCAT	Inter-rater (18 random documents coded by 2 raters independently)	ICC	For total comprehensiveness and strength score ICC was 0.98 and 0.94 respectively. For Subscale ICC ranged from 0.84-0.99 respectively.
			Comprehensiveness and strength scores were higher for head start centers than non-head start centers across most domains and higher for national association for education of young children accredited centers than non-accredited centers across some domain
			Construct compared policy quality scores for Head Start centers to those of non-Head Start centers and centers accredited by the National Association For Education of Young Children
			simple <i>t</i> test
			Comparison between the questionnaire data and interview data
			Interviews with the state and district level respondents indicated that overall the questionnaire produced valid data
Brener (2003) SHPP 2000	Internal Consistency Test-retest (2 interviews) 1 st interview was computer assisted 2 nd interview field staff led Interview conducted 10 to 20 days apart	Cronbach's α coefficients kappa coefficients & Pearson correlation	Cronbach's α ranged from = 0.53 to 0.83 School level PE Kappa ranged from 51.4% to 80.7% Classroom PE kappa ranged from 51% to 74.4% Person correlations for both school and classroom level PE questions ranged from 0.39% to 0.67% Food service, Kappa ranged from 36.6% to 88.5% and Pearson correlation coefficient ranged from 0.45 to 0.75
			Construct only for the state and district level questionnaires (through a follow up a telephone interview with a subsample of the original state and district level respondent)
			Instrument review by content expert and PE teachers
Lounsbery (2012) S-PAPA	Test-retest (measured 14 days apart)	kappa, percent agreement, Phi and Chi Square tests	PE module Kappa ranged from 0.14 to 0.99 and first and second administration responds had significant χ^2 association <i>p</i> values ranging from 0.001 to 0.04 with percent agreement ranging from 67% to 87% Recess module Kappa ranged from 0.33 to 0.81 and first and second administration responds had significant χ^2 association <i>p</i> values ranging from <0.001 to 0.034 with percent agreement ranging from 71% to 97% For before, during and after school program kappa ranged from 0.31 to 0.84 and first and second administration responds
			Draft instrument was reviewed by content expert, revision was made then the revised instrument was resent to the content expert and a third draft was prepared. This draft was sent to 4 PE teachers and based on their feedback a final fourth instrument was prepared resent to PE teachers and based on their feedback final instrument was completed.

Validity		Reliability	
Author (year)/Tool name	Type	Analysis	Findings
			had mostly significant χ^2 association p values ranging from <0.001 to 0.065 with percent agreement ranging from 61% to 87%
Bullock (2010) FoodBEAM	Inter-rater (for researcher to researcher (4 dyads) and researcher non-researcher (5 dyads)	ICC	For both food and beverages researcher versus researcher and researcher versus non-researcher ICC ranged from 0.972 to 0.987
Schwartz (2209) WellSAT	Inter-rater (by pairs of researcher 1 in-state and 1 out-of-state)	ICC Cronbach's alpha	For total comprehensiveness and strength ICC = 0.82 For subscale scores was 0.70 For Individual items ICC was 0.72. Cronbach's alpha ranged from 0.90 to 0.93
Kim (2010) CHLI	Inter-rater (4 sites with two interviews)	Percent agreement	93.0% school items & 84.9% afterschool items showed substantial to almost prefect agreement
Ajja (2012) HAAAND	Inter-rater (concurrently)	Percent agreement kappa statistic	Percent agreement ranged from 85% to 100% across all items. Kappa statistics ranged from 0.73 to 1.00 for HAPI-PA(Healthy Afterschool Program Index-Physical activity) and 0.76 to 1.00 for HAPI-N (Healthy Afterschool Program Index-Nutrition)
			Items of HAAAND tool were developed based on extensive literature review of the existing PA& nutrition environment quality rating, standards and policies from state and national organization and input from expertise in childcare and afterschool field
			Good content validity
			Construct Pedometer step counts were compared to the HAPI-PA scores Menu from observation day was compared to number of time FV Whole
			HAPI-PA. → pedometer steps were significantly associated with presence of PA. amount/quality of staff training use of PA curriculum and offering activity that appeal to both genders
			Means and standard deviation calculated and one-way ANOVA test used

