A Systematic Review of School Health Policy Measurement Tools: Implementation Determinants and Outcomes

Gabriella M McLoughlin (✉ Gmcloughlin@wustl.edu)

Iowa State University <https://orcid.org/0000-0002-7731-2382>

Peg Allen

Washington University In St Louis: Washington University in St Louis

Callie Walsh-Bailey

Washington University In St Louis: Washington University in St Louis

Ross C. Brownson

Washington University In St Louis: Washington University in St Louis

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Abstract

Background: Governments in some countries or states/provinces mandate school-based policies intended to improve the health and well-being of primary and secondary students, and in some cases the health of school staff. Examples include mandating a minimum time spent per week in programmed physical activity, mandating provision of healthy foods and limiting fat content of school meals, and banning tobacco products or use on school campuses. Although school health researchers have studied whether schools, districts, or states/provinces are meeting requirements, it is unclear to what extent implementation processes and determinants are assessed. The purposes of the present systematic review of quantitative measures of school policy implementation are to identify quantitative measures of implementation determinants and Proctor model implementation outcomes and assess pragmatic and psychometric properties of such measures.

Methods: Peer-reviewed journal articles published 1995-2020 were included if they: 1) had multiple-item quantitative measures of school policy implementation; and 2) addressed overall wellness, tobacco, physical activity, nutrition, obesity prevention, and mental health/bullying/social-emotional learning. The final sample comprised 86 measurement tools from 67 peer-review articles. We extracted study characteristics, such as psychometric and pragmatic measure properties, from included articles based on three frameworks: Implementation Outcomes Framework, 2) Consolidated Framework for Implementation Research, and 3) Policy Implementation Determinants Framework.

Results: Most implementation tools were developed to measure overall wellness policies which combined multiple policy topics (n=35, 40%) and were in survey form (n=75, 87%). Fidelity was the most frequently prevalent implementation outcome (n=70, 81%), followed by adoption (n=32, 81%). The implementation determinants most assessed were readiness for implementation, including resources (n=43, 50%), leadership (n=42, 49%), and policy communication (n=41, 48%). Overall, measures were low-cost and had easy readability. However, lengthy tools and lack of reported validity/reliability data indicate low transferability.

Conclusions: Implementation science can contribute to more complete and rigorous assessment of school health policy implementation processes, which can improve implementation strategies and ultimately the intended health benefits. Several high-quality measures of implementation determinants and implementation outcomes can be applied to school health policy implementation assessment. D&I researchers can also benefit from measurement experiences of school health researchers.

Contributions To The Literature

- This systematic review provides an innovative summary compilation of identified quantitative measures of school health policy implementation determinants and outcomes.
- Dissemination and implementation (D&I) and school health researchers can benefit from sharing expertise to build an integrated understanding of policy implementation. School health researchers are more familiar with these contexts and can guide contextual assessment; whereas D&I researchers can help guide selection of pre-existing measures and pilot testing of adapted assessment tools.
- Several high-quality measurement tools tested and used in D&I research can be applied in the school setting to inform policy implementation strategies to improve implementation outcomes and ultimately the intended health benefits.
- This review also highlights the need for a focus on health equity as an implementation process and outcome for future study as a means to bridge the gap between policy and practice.

Introduction

Health policies enacted across multiple levels (e.g., schools, districts, states, countries) are necessary to influence children's health behaviors (1–6). Although evidence supports the impact of successful school-based policy implementation on student health outcomes (1, 6–10), the disconnect between evidence-based policy and school-based enactment poses challenges for school administrators and teachers (11). Therefore, researchers and practitioners have called for enhanced policy implementation research which specifically targets the implementation determinants, processes, and outcomes, in order to enhance the rate at which policies are adopted and infused in to organizational culture (11–14).

One prominent example of school policy is the Child Nutrition and WIC Reauthorization Act (15), which mandated that all schools participating in the National School Lunch Program (NSLP) within the United States develop a comprehensive wellness policy and a plan for implementation. Another example is the Australian New South Wales (NSW) Sport and Physical Activity Policy, which mandates that all children attending primary and secondary schools should participate in a minimum of 150 minutes of planned moderate activity across the school week (16). Through dissemination and implementation science (D&I) principles, several factors influence the adoption and implementation - herein termed *implementation determinants* - of school health/physical activity policies and interventions. Such determinants stem from within (e.g., organizational culture, leadership) and outside (e.g., outside collaborations) the school setting, in addition to policy characteristics (e.g., complexity, cost), facilitating or limiting the adoption and diffusion of policy and innovation into practice (17–20). Factors

from prior policy/school health promotion implementation research such as lack of funding, training/professional development, and administration support are highlighted as key barriers/negative determinants to implementing health-promotion policies and programs (21–24), whereas provision of such supports are found to be enabling determinants (21). However, the measurement tools used to assess implementation outcomes and determinants remain poorly understood (25), thus contributing to the sustained research-practice gap. The overuse and over-dependence of “barriers” and “facilitators” to explain implementation of school health promotion and policy research can contribute to misinformation and to the circulation of highly-cited factors (i.e., time, funding, support) (17, 22, 26, 27). As such, minimal solutions are provided for stakeholders to better implement policies and programs. Furthermore, much of the earlier research has been conducted through qualitative evaluation (1, 7, 28–31), which offers rich information about implementation processes but limits our ability for generalizability and replication.

Within the field of D&I, a clear distinction exists between implementation outcomes and determinants. Implementation outcomes refer to detectable changes in processes and practices as a result of a particular policy or innovation whereas determinants are factors which can be leveraged to increase the likelihood of implementation success (32–35). Grounded in the model by Proctor et al., implementation outcomes transcend beyond simply “meeting requirements” and include: adoption, acceptability, appropriateness, cost, fidelity, feasibility, penetration, and sustainability (32). Through measuring multiple implementation outcomes, researchers and practitioners are able to see the implementation processes in addition to examining fidelity, which can greatly enhance understanding of how school policies are diffused into practice (32, 36). Further, although research has examined influential factors on school health-related policy implementation, matching these factors to address specific implementation determinants derived through D&I research frameworks (37–39) will allow for greater use in other school health-related policy topics, and increase the credibility of school-based D&I research and practice.

Accordingly, the aims of this systematic review were to: (1) identify quantitative school health policy measurement tools developed to measure implementation at the school, district, or state/provincial levels, (2) describe the policy implementation outcomes and determinants assessed and identify the trends in measurement, and (3) assess pragmatic and psychometric properties of identified implementation measures to understand their quality and suitability for broader application.

Methods

This review of school-based policy implementation measures was conducted with a similar protocol from a broad review of health policy implementation tools (36). Both reviews followed procedures conducting a systematic review of implementation measurement tools (40), and adhered to PRISMA reporting guidelines (see Fig. 1 and Supplemental Table S1) (41). The review was guided by three prominent D&I frameworks: the Implementation Outcomes Framework (IOF) by Proctor and colleagues (32); the Consolidated Framework for Implementation Research (CFIR) by Damschroder and colleagues (37); and the Policy Implementation Determinants Framework by Bullock and Davis (42, 43). Through a combination of constructs from these frameworks, we sought to gain a deeper understanding of the implementation outcomes, determinants, and processes for school health policy implementation which are assessed through measurement tools. The same definitions of public policy and policy implementation were utilized in accordance with the review by Allen et al. (36). Specifically, public *policy* includes federal/nation, state/province/county, regional unit, or local level legislation or policies mandated by governmental agencies (44, 45). The *implementation* of policy conceptualizes the processes by which the mandate is carried out by public or private organizations (45). For the purpose of this review, the organizations of interest comprised states/provinces, school districts, and primary and secondary pre-university schools as implementing sites.

Searches

We searched six databases in April 2019 and again in August 2020 to ensure inclusion of recent articles in the present review: MEDLINE, PsycInfo, and CINAHL Plus through EBSCO; and PAIS, Worldwide Political, and ERIC through ProQuest. We searched terms at four domains: health, public policy, implementation, and measurement; see Supplemental Table S2 for search terms and syntax. Development of the search strings and terms was based on frameworks in D&I and policy research, with details previously described (36).

Inclusion And Exclusion Criteria

The inclusion criteria comprised English-language peer-reviewed journal articles published from January 1995 through August 2020 and utilized quantitative self-report, observational, and/or archival tools to assess implementation of a government-mandated policy (36). The broad review conducted in 2019 included empiric studies from any continent on policy implementation in any clinical or non-clinical setting on a broad range of health policy topics. Exclusion criteria can be found in Supplementary Table S3. Specific deviations from inclusion/exclusion criteria in the Allen et al. article were: 1) research must have taken place in/with school settings serving students in primary and secondary (ages 5–18; pre-university) schools; 2) measured implementation of school policies already passed or approved that addressed overall

wellness, tobacco, physical activity, nutrition, obesity prevention, and mental health/bullying/social-emotional learning; and 3) policy-specific and setting-specific measures were included in the present review but excluded in the initial broad review (which sought generalizable measures that could be applied across multiple settings and topics). Our review included multi-item measures; articles were excluded if the tool included only one relevant item.

Screening

Two members of the research team used Covidence systematic review software (46) to independently screen all abstracts for inclusion and exclusion. Full texts of all empiric studies of school setting public policy implementation that passed abstract screening in 2019 were rescreened independently in summer 2020 by two coauthors (GMM, PA) for potential inclusion into the present review, with decisions and exclusion reasons coded in Excel. The school-setting full text rescreening was conducted because the initial review had excluded measures worded specifically for a certain setting or policy topic, whereas such specific measures were included in the present review. The two coauthors also conducted dual independent full text screening of newly identified 2019–2020 studies that passed abstract screening after the August 2020 updated database searches. The two coauthors met to reach consensus on any inclusion/exclusion disagreements. A third coauthor was consulted if consensus could not be reached. One of the pre-identified exclusion reasons was attributed to each excluded article (for more information see PRISMA chart; Fig. 1).

Extraction

A comprehensive extraction procedure was implemented in which co-author (GM, PA, CWB) pairs conducted dual non-independent extraction. A primary reviewer entered relevant information into the extraction database and the secondary reviewer checked data entry for accuracy and completeness. The co-authors met regularly to reach consensus. Information extracted on the measurement properties included: 1) type of measurement tool (i.e., survey, archival, observation); 2) implementation setting (i.e., elementary/primary, middle, high/secondary school, combination of two or more levels); 3) school policy topic (i.e., wellness, physical activity, nutrition, mental health, tobacco, sun safety, etc.); and 4) level of educational entity directing implementation of the governmental mandate (i.e., school, district, state/province, national). Following the three chosen D&I frameworks, all implementation outcomes from the Proctor framework were extracted from measures, followed by selected CFIR constructs which were used in the previous review article and found to be pertinent to policy implementation, and the actor relations/networks and actor context domains from the Bullock and Davis framework. Finally, following the procedures outlined by Lewis and colleagues regarding the Psychometric and Pragmatic Evidence Rating Scale (PAPERS) (40, 47–51), pragmatic (i.e., brevity, cost, readability, training, interpretation) and psychometric (i.e., internal consistency, validity, norms) properties were extracted from each measure to ascertain the quality of each tool. These scoring classifications assign scores from – 1 to 4 based on the degree to which the measures meet each criterion; higher scores on each construct reflect higher quality of the measurement tool (Supplemental Tables S4, S5).

Data Synthesis

Upon achieving consensus on all measures, descriptive analyses were run to gather frequency of items in each school health policy topic. A subset of tools were widely used and/or based on national samples: the Centers for Disease Control and Prevention School Health Policies and Practices Study (school, district, state) (52); the Wellness School Assessment Tool (53); the Maryland Wellness Policies and Practices Project surveys (school and district level) (54); and the Health Enhancing Physical Activity Europe policy audit (55). We term these “large-scale” tools. Other less frequently reported measures with smaller sample sizes were called “unique tools.” Where appropriate, these measures were analyzed and presented separately when reporting characteristics, given the distinctive differences in methodology and utilization.

Results

Figure 1 shows the PRISMA flowchart which outlines the steps taken from identifying records through database searching to the studies included in the final review. There were 67 studies included in this review; from these 86 measures were extracted for tool characteristics. Of the measures, the vast majority were developed in the United States (n = 60; 69%), followed by Canada (n = 10; 11.6%), European countries (n = 6; 6.9%), and Australia (n = 5; 5.8%). Finally, 2 were developed in India, and 1 each was developed in Indonesia, Mexico, and Taiwan. The 6 studies conducted in Europe were from Denmark (1), the Netherlands (1), Spain (1), or were conducted in multiple countries (3). Table 1 shows the breakdown of tools by school health policy topic and type of tool (i.e., survey, observation, archival). The majority of tools were surveys (n = 75; 87.2%); the most common topic was general wellness policy (i.e., more than two health policy areas; n = 35, 40.6%), followed by nutrition (n = 21; 24.4%) and physical activity (n = 11; 12.7%). Roughly half (n = 42; 49%) of the tool items were generated by experts and 29 measures (33.7%) were piloted with a representative sample. In the included studies, authors reported reliability/validity testing data on pilot testing for 15 measures (17.4%). Of the measures we extracted, psychometric data were available for 28 tools (32.5%).

Table 1
Measures by Policy Topic and Type (N = 86)

Wellness topic	Type of Measurement Tool		
	Archival	Observation	Survey
Health Education			2
Mental Health			1
Nutrition	1	1	19
Nutrition and Physical activity			4
Physical Activity	2		9
Sun Safety			3
Tobacco/Drug			9
Wellness Policy	6	1	28
Total	9	2	75

Table 2 displays the implementation outcomes, processes, and determinants extracted for the overall sample and then shown separately for large-scale tools and unique tools. The most common implementation outcomes assessed were Fidelity (n = 70; 81.4%), Adoption (n = 32; 37.2%), and Acceptability (n = 18; 20.9%). The most prevalent implementation determinants in the sample were Actor Relations/Networks (n = 45; 52.3%), followed by Readiness for Implementation- Non-training resources (n = 43; 50.0%) and Leadership for Implementation (n = 42; 48.8%). Figure 2 illustrates the most 10 commonly measured constructs for the whole sample. Tools varied in their assessment of fidelity, ranging from asking respondents to report their implementation on a Likert scale, to asking about implementation of multiple “best practices” and reporting frequency of utilization/execution. Adoption typically manifested through asking respondents about their intentions to implement a policy or practice, or about planning activity which has occurred in order for implementation to be successful.

Table 2

Implementation outcomes and determinants assessed in measurement tools (N = 86), then split by large-scale and unique tools

Domain		Included Measures (N = 86)	(%)	Large-Scale Tools (n = 23)	(%)	Unique Tools (n = 63)	(%)	Definition	Source
Implementation Outcomes	Acceptability	18	20.9%	0	0.0%	18	28.6%	Perceptions by staff in organizations mandated to implement the policy, or perceptions of other stakeholders, that the policy mandate is agreeable, palatable, or satisfactory	Proctor 2011(1)
	Adoption	32	37.2%	10	43.5%	22	34.9%	Intention and initial actions of mandated organizations to revise their organizational policies to address policy mandates (Not policy development or passage of bills into law.)	Proctor 2011
	Appropriateness	9	10.5%	0	0.0%	9	14.3%	Perceived fit, relevance, or compatibility of the [policy] for a given practice setting, provider, or consumer; and/or perceived fit of the [policy] to address a particular issue or problem; context fit	Proctor 2011
	Feasibility	8	9.3%	1	4.3%	7	11.1%	Extent to which a new [policy] can be successfully used or carried out within a given agency or setting; Level of administration required to implement a policy, often called policy automaticity	Proctor 2011
	Fidelity/ Compliance	70	81.4%	21	91.3%	49	77.8%	Degree to which a [policy] was implemented as it was prescribed	Proctor 2011

1. Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, et al. Outcomes for Implementation Research: Conceptual Distinctions, Measurement Challenges, and Research Agenda. *Administration and Policy in Mental Health and Mental Health Services Research*. 2011;38(2):65–76.

2. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Science*. 2009;4(1):50-.

3. Bullock HL. Understanding the implementation of evidence-informed policies and practices from a policy perspective: a critical interpretive synthesis in: How do systems achieve their goals? the role of implementation in mental health systems improvement [Dissertation]. Hamilton, Ontario: McMaster University; 2019.

Domain		Included Measures (N = 86)	(%)	Large-Scale Tools (n = 23)	(%)	Unique Tools (n = 63)	(%)	Definition	Source
	Penetration	15	17.4%	8	34.8%	7	11.1%	Integration of a [policy] within a service setting and its subsystems	Proctor 2011
	Sustainability	3	3.5%	1	4.3%	2	3.2%	Extent [new policy] is maintained or institutionalized within a service setting's ongoing, stable operations	Proctor 2011
	Cost of Implementation	5	5.8%	0	0.0%	5	7.9%	Cost impact of an implementation effort	Proctor 2011
Policy/Innovation Characteristics	Adaptability	3	3.5%	0	0.0%	3	4.8%	Degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs	Damschroder, 2009 (2)
	Complexity	3	3.5%	0	0.0%	3	4.8%	Perceived difficulty of implementation, reflected by duration, scope, radicalness, disruptiveness, centrality, and intricacy and number of steps required to implement	Damschroder, 2009
Organizational Characteristics/ Inner Setting	Champions	6	7.0%	0	0.0%	6	9.5%	Field or practice leaders, people who can facilitate and support practice change among professionals	Damschroder, 2009
	Organizational Culture and Climate	9	10.5%	1	4.3%	8	12.7%	Culture: "Norms, values, and basic assumptions of a given organization"; or Climate: "Absorptive capacity for change", extent policy compliance will be rewarded, supported, and expected within their organization"	Damschroder, 2009; Bullock, 2019 (3)
	Policy Implementation Climate (IC)	4	4.7%	0	0.0%	4	6.3%	Organizational climate specific to the policy mandate	Damschroder, 2009

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Domain		Included Measures (N = 86)	(%)	Large-Scale Tools (n = 23)	(%)	Unique Tools (n = 63)	(%)	Definition	Source
	IC: Goals & Feedback	6	7.0%	3	13.0%	3	4.8%	Degree [the policy-mandate] goals are clearly communicated, acted upon, and fed back to staff and alignment of that feedback with goals	Damschroder, 2009
	IC: Relative Priority	21	24.4%	2	8.7%	19	30.2%	Individuals' shared perception of importance of the [policy] implementation within the organization, competing priorities	Damschroder, 2009
	Opinion Leaders	7	8.1%	0	0.0%	7	11.1%	Individuals in an organization who have formal or informal influence on attitudes and beliefs of their colleagues with respect to implementing the policy	Damschroder, 2009
	Readiness to Implement (RI)	5	5.8%	0	0.0%	5	7.9%		Damschroder, 2009
	RI: Communication of policy	41	47.7%	18	78.3%	23	36.5%	Communication plans and channels created for how the regulatory agency or implementing organization/s will disseminate policy mandate content information to implementers. Actions taken to disseminate policy requirements and guidelines to implementers.	Damschroder, 2009
	RI: Policy awareness/ knowledge	27	31.4%	2	8.7%	25	39.7%	Implementing staff/provider awareness the policy mandate exists, or knowledge of policy content	Damschroder, 2009

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Domain		Included Measures (N = 86)	(%)	Large-Scale Tools (n = 23)	(%)	Unique Tools (n = 63)	(%)	Definition	Source
	RI: Leadership for Implementation	42	48.8%	22	95.7%	20	31.7%	Commitment, involvement, and accountability of leaders and managers with the implementation	Damschroder, 2009
	RI: Non-training Resources	43	50.0%	15	65.2%	28	44.4%	Level of resources dedicated for implementation and on-going operations including money... physical space, and time other than training resources	Damschroder, 2009
	RI: Training	35	40.7%	16	69.6%	19	30.2%	Training of staff/providers in implementing organizations on how to implement the policy-mandated practices	Damschroder, 2009
	Structure of Organization	2	2.3%	0	0.0%	2	3.2%	The social architecture, age, maturity, and size of an organization	Damschroder, 2009
Implementation Process	Enforcement	10	11.6%	1	4.3%	9	14.3%	Strategies used to hold individuals accountable for implementation fidelity/compliance	From screening/ coding
	Evaluation	35	40.7%	18	78.3%	17	27.0%	Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience.	Damschroder, 2009
	General Barriers and Facilitators	20	23.3%	2	8.7%	18	28.6%	Factors which facilitate/enable and hinder implementation	From screening/ coding
	Collaboration	11	12.8%	7	30.4%	4	6.3%	Active involvement of other stakeholders in the organization to implement the policy	From screening/ coding

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Domain		Included Measures (N = 86)	(%)	Large-Scale Tools (n = 23)	(%)	Unique Tools (n = 63)	(%)	Definition	Source
	Innovation Participants	19	22.1%	10	43.5%	9	14.3%	Engaging individuals who will directly benefit/receive the policy action	Damschroder, 2009
Actor Relationships/ Networks	Actor Relationships/ Networks	45	52.3%	22	95.7%	23	36.5%	Presence and characteristics of relationships between parallel organizations that must collaborate for policy implementation to be effective	Bullock, 2019
	Visibility of policy role & policy actors	23	26.7%	8	34.8%	15	23.8%	Perceived presence and importance of different actors pertinent to implementation of the policy	Bullock, 2019
Actor Context	Political will for policy implementation	12	14.0%	3	13.0%	9	14.3%	Societal desire and commitment to generate resources to carry out policies	Bullock, 2019
	Target population characteristics	1	1.2%	0	0.0%	1	1.6%	Demographics, norms, and neighborhood environments of the population groups that are affecting policy implementation	Bullock, 2019
Other Domain (Not in Manual)	CFIR Process-Planning	2	2.3%	0	0.0%	2	3.2%	The degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance, and the quality of those schemes or methods.	Damschroder, 2009
	CFIR Innovation Characteristics-Relative advantage	1	1.2%	0	0.0%	1	1.6%	Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution.	Damschroder, 2009

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	CFIR Inner Setting- Tension for change	1	1.2%	0	0.0%	1	1.6%	The degree to which stakeholders perceive the current situation as intolerable or needing change.	Damschroder, 2009
1. Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, et al. Outcomes for Implementation Research: Conceptual Distinctions, Measurement Challenges, and Research Agenda. Administration and Policy in Mental Health and Mental Health Services Research. 2011;38(2):65–76.									
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For large-scale tools, the most commonly measured determinants were the CFIR readiness for implementation- leadership construct and actor relationships/networks (both n = 22; 95.7%), and the most commonly measured outcome was fidelity from the Proctor model (n = 21; 91.3%). Compared to the whole sample, some construct which were prevalent in large-scale tools only were the outcome of penetration and the innovation participants determinant from CFIR- implementation process construct (both n = 8; 34.7%). Among unique tools, fidelity was also the most commonly measured outcome (n = 49; 77.8%) with readiness for implementation- non-training resources (n = 28; 44.4%) as the most common determinant. In terms of least measured constructs, target population characteristics affecting implementation (n = 1) and structure of organization from the CFIR inner setting domain (n = 2) were least measured in the entire sample (see Table 2 for all constructs).

The PAPERS pragmatic scores are shown in Fig. 3 and show separate median scores for the large-scale and unique tools. In terms of brevity, large-scale tools were scored lower as they had a greater number of items (average = 150) compared to unique tools (average = 73). Almost all tools were free or available at very minimal cost to the public (i.e., not required to pay for article and tool if not subscribed to journal), although our team needed to request original items from the corresponding authors for a large proportion of the sample. Large scale tools scored higher on training for tool administration as most required no/minimal training, compared to unique tools which were often described more ambiguously. However, the unique tools were shorter, provided easier interpretation guidelines, and had lower grade-level reading scores than the larger-scale tools.

Psychometric PAPERS scores were low (0 median) across all components, with large-scale tools generally demonstrating higher quality according to internal consistency and validity (0.66 versus 0.56 mean PAPERS score, out of a possible lowest score of -1 to a possible highest score of 4). Overall, internal consistency α coefficient scores ranged from 0.40 to 0.98 across the studies. In addition, the sample sizes (2 versus 0.78 mean PAPERS score) used to deduce findings were larger for large-scale studies, ranging from 19 (56) to 6,504 schools (57); samples ranged in between these numbers and were at the student, teacher, school, district, and state/provincial level (See Supplemental Tables S4, S5 for scoring criteria). Very few tool development articles/documents provided concurrent and structural validity information; none of the large-scale tool studies provided such information. Overall, psychometric quality of tools was unknown or low. These results highlight areas for improvement in future tool development and reporting.

Characteristics and PAPERS scores for each tool are provided in Supplementary Table S6. Despite low scores overall, some tools were well-developed and validated according to best practices. One example is the Maryland Wellness Policies and Practices Project (MWPPP) district and school surveys (54), which each received a score of at least 10 (15 for district, 10 for school) for pragmatic and 12 for psychometric properties (Supplementary Table S6). This tool measures overall wellness policy implementation at the school and district levels, assessing multiple implementation outcomes (i.e., adoption, feasibility, fidelity) and determinants (i.e., implementation climate- goals and feedback; readiness – communication of policy, policy awareness/knowledge, leadership, non-training resources, training; actor relationships, visibility of policy role, evaluation, collaboration, innovation participants). This tool may be easily adapted for use within other states and countries depending on policy characteristics. Supplemental Table S6 displays PAPERS scores and tool characteristics for all 86 measured included in the review.

Discussion

The purpose of this study was to obtain a comprehensive understanding of quantitative implementation measurement tools for school health policy following a systematic review protocol. Findings revealed a large number of tools which covered a wide range of policy topics and implementation settings, with general wellness policy as the most commonly measured area of health promotion. Most of the tools assessing wellness policies more broadly were from the United States, which aligns with federal mandates for schools to develop and implement comprehensive wellness programming (15). Further, it should be noted that almost all tools were gathered from high-income countries, which draws attention to low- and middle-income countries (LMIC) and the potential for both policy development and implementation evaluation as a means to support ongoing health needs in such populations. Findings from systematic review research highlight a lack of policy/intervention initiatives from LMIC which sought to address child health promotion in the school setting (58). Accordingly, further work is warranted to examine the fit of existing tools for school contexts in LMIC countries, and to determine how tools from high-income countries may be adapted for use in LMIC to optimize efficiency and sharing of resources.

Integration of three prominent implementation frameworks in this study facilitated a rich understanding of implementation processes, outcomes, and determinants in a policy context. The finding that fidelity was the most commonly assessed implementation outcome aligns with findings of the broader review by Allen et al. (36), and highlights the high dependence on fidelity as an indicator of implementation success. Several tools only measured fidelity and/or adoption as the implementation outcomes, which draws concern for addressing constructs such as feasibility and sustainability, among others. Only 8 measures addressed feasibility, with 7 of those within unique tools; this is somewhat contradictory to the extant literature on school-based programming, as many studies have reported low feasibility for implementing policies and health promoting interventions (26, 59–61). Further, through qualitative and mixed-methods research it has transpired that, despite providing financial and logistical support to schools, districts, and states/provinces, most policies are difficult to sustain in absence of such support (61–63). The finding that only 3 tools measured sustainability is concerning given the emphasis on sustainability/maintenance as a key weakness in implementation science and policy research (64, 65). Accordingly, it is clear that a greater emphasis on other implementation outcomes and processes would be beneficial in school policy research, given the top-down nature of policy to practice and need to understand how policy and practice can be sustained over time. Measures of implementation outcomes are continuously being developed and tested for validity and reliability. For example, brief measures of acceptability, feasibility, and appropriateness were designed to add in a specific evidence-based practice (or policy) as the item referent; these have preliminary evidence for good reliability and validity (66). Luke and colleagues developed a measure to assess organizational capacity for sustaining public health and other programs that is reliable and has been tested for construct validity (67). Although many established measures in the implementation science literature have been developed for use in clinical or non-school based community settings, there may be potential for use in schools.

The finding that readiness for implementation as a general construct was most measured reflects prior research stressing the importance of assessing readiness and organizational capacity for implementation (22, 68–73). Within this broader construct, non-training resources was the most common determinant assessed; provision of financial resources and personnel support have been cited as supportive factors for policy and innovation implementation in school research (9, 74, 75). Following this, leadership for implementation was very prevalent in the measures, which again reflects extant knowledge that new innovations require a leader to succeed (61, 76, 77). Finally, the prevalence of items measuring communication of policy demonstrated the importance of engaging stakeholders in policy implementation through enhancing awareness of such initiatives. Such communication is somewhat understudied as a determinant of implementation in school-based literature based on systematic review research (78, 79), but is perhaps one of the most influential determinants of implementation success. School policy research may be further enhanced by studying the relationships between implementation determinants and outcomes to provide clearer evidence between frameworks such as CFIR and the Proctor outcomes framework (37, 65). Further, rather than developing completely new measurement tools, those previously tested in community and clinical settings may be used as is or adapted for school settings, facilitating transferability through implementation science (25).

Unlike readiness for implementation, there were a lack of measures to assess the inner setting and implementation process domains, with relative priority (inner setting) and evaluation (implementation process) identified as the most common among constructs. Research has demonstrated the importance of studying organizational culture and climate as a determinant of implementation (76), given that teachers' actions are encompassed by school- and district-level policies and practices (80, 81). Some innovations have indeed failed despite leadership for implementation (i.e., small group of leaders taking ownership) due to conflicting organizational practices and lack of priority placed on such initiatives (24, 82). For true diffusion of innovation to occur, institutional buy-in is essential (83, 84); future measures development should therefore integrate these constructs as a means to better understand what impacts policy implementation and bridge the research to practice gap.

Application of the PAPERS rating criteria for pragmatic and psychometric properties revealed areas of strength and need for future improvement (40, 50, 85). Findings for the pragmatic criteria demonstrated that school policy implementation measures found were generally low-cost and written to a lay audience. However, many tools were long and median scores were driven by large-scale tools such as the SHPPS (52, 86); a key barrier to conducting research and evaluation with schools is the limited time that stakeholders are able to spend completing surveys and other audit tools, which has implications for data quality and reliability (30, 85, 87, 88). Although a key need from this study is to

adopt pre-existing or develop comprehensive measures which examine implementation outcomes, processes, and determinants, this can lead to lengthy measurement tools which can become arduous to complete and lead to disenfranchisement from stakeholders. Finally, psychometric PAPERS protocols revealed that efforts to ensure quality of tools centered mainly on analyzing internal consistency, with little attention paid to other forms of validity and reliability. This trend is common across other reviews of implementation measures (47, 89), and has implications for broader tool use, specifically when trying to demonstrate implementation efficacy to other populations or policies within school settings. Accordingly, careful tool development should be a focus, and over time it may transpire that some determinants are more influential than others in the policy implementation field, facilitating a streamlined process for subsequent evaluation. Best practices such as field-based pilot testing based on representative samples and developing input from experts are therefore essential in enhancing the pragmatic capabilities of these tools.

Limitations

Although we conducted a rigorous systematic review following previously established protocols, there are several limitations to note. First, we only extracted tools which were available through online library searches and contacting authors directly where we could not find measures online. We used several approaches to retrieve all tools for extraction, but some tools were unavailable online or from the study authors. We were unable to analyze tools for which we could not access original items. Tools from the grey literature were also not included in this review; although we searched for manuals and tools available online, it was required they were cited in a peer-reviewed article first. Second, we did not explicitly screen for health equity constructs, but based on our review of included tools there was not much to be gleaned in terms of health equity and policy. Several implementation science frameworks integrate health equity and these help to provide guidance for future measurement development (90–96). Finally, although we took a comprehensive policy approach, some policy topics were excluded (i.e., not directly related to health/wellness topics), and in excluding these we may have overlooked other pertinent measurement tools.

Conclusions

What gets measured gets achieved (97) – our review suggests that more comprehensive measurement tools are needed for school policy research that come from or could potentially be transferred to other settings (i.e., community, clinical). Enhancing the quality of policy D&I research through high-quality pragmatic measures will mark a key step in bridging the policy to practice gap (48, 98, 99). Furthermore, given the lack of focus on addressing health equity, there is now an opportunity to develop tools which can help distinguish practices that worsen or mitigate health disparities. The WIC Child Nutrition Re-Authorization act (15) and USDA Healthy Hunger Free Kids Act (HHFKA)(100) are examples of policies which inherently are aimed at reducing health inequality given the focus on NSLP integration, but we know little about how their implementation may influence social determinants of health. Thus, more explicitly addressing health equity is a priority for future research and practice in health policy, in order to elicit a meaningful impact on population health.

Declarations

Ethics approval and consent to participate: Not applicable.

Consent for publication: Not applicable.

Availability of data and materials: A compendium of identified measures is publicly available for dissemination at <https://www.health-policy-measures.org/>. A link is provided on the website of the Prevention Research Center, Brown School, Washington University in St. Louis, at <https://prcstl.wustl.edu/>. The authors invite interested organizations to provide a link to the compendium on their own websites. Citations and abstracts of excluded policy-specific measures are available on request.

Competing interests: The authors declare that they have no competing interests.

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Authors' information (optional): GMM and RCB are with the Implementation Science Center for Cancer Control and Prevention Research Center, Brown School, Washington University in St. Louis, and the Division of Public Health Sciences (Department of Surgery), Washington University School of Medicine, Washington University in St. Louis. CWB and PA are with the Prevention Research Center, Brown School, Washington University in St. Louis.

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Figures

Figure 1

PRISMA Chart for Systematic Review

Figure 2

Top 10 most measured constructs of the sample (N=86)

Figure 3

Pragmatic PAPERS Scores, by large-scale and unique tools

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementalTablesSchoolPolMeasRevFINAL.docx](#)