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ORIGINAL PAPER

School-Based Screening of Social Determinants of Health: A Scoping Review

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Abstract

School-based screening instruments have traditionally focused on assessing within-child factors, such as a student's academic, social, emotional, behavioral, or physical development. This emphasis in school-based screening may be a missed opportunity to assess and ameliorate contextual factors (i.e., social determinants of health) influencing child development. In this scoping review, we aim to describe the current landscape of screening for social determinants of health (SDOH) in school settings. Following established practices for scoping reviews, we searched PsycInfo, ERIC, and CINAHL Plus in December 2022 for articles describing the development or use of an SDOH measure in a school setting. From each eligible article, two coders independently extracted (1) study characteristics, (2) measure characteristics, (3) available psychometric or usability information, and (4) reported outcomes of measure implementation. Descriptive and content analyses were used to examine data. We identified six articles describing the development or use of SDOH measures in elementary, high school, or university settings. These articles yielded six unique SDOH measures, intended for either adolescent or young adult self-report, caregiver proxy-report, or both. Measures included 6–25 SDOH items, with additional items assessing demographics, health behaviors, or mental health (e.g., depression). Reported outcomes included increased referrals to services and implementation of school-based supports to reduce social risk (e.g., school food pantry). We discuss next steps for research evaluating the feasibility and social consequences of school-based SDOH screening.

Keywords Social determinants of health · Social risk · Screening · Measures · Scoping review · Schools · Education

Introduction

Youth mental health has become a public health concern, with as many as 1 in 5 adolescents in the United States experiencing severe impairment due to social, emotional, or behavioral (SEB) struggles (Merikangas et al., 2010). Although multiple factors contribute to the development of mental health problems, a growing research base highlights strong connections between contextual conditions and children's physical, cognitive, behavioral, and emotional health (Garg et al., 2007; Gottlieb et al., 2016; Hackman & Farah, 2009; Viner et al., 2012). For example, Shankar et al. (2017) found that children living in food insecure households experience developmental risks and negative outcomes related to emotional attachment, social skills, mental health symptoms, and cognitive ability scores. Multiple studies have documented that experiences of racism negatively impact early social-emotional development (Berry et al., 2021). More recently, Prokosch et al. (2022) found that children's odds of exhibiting behavioral problems increased as a function of the number of barriers to social and community support (e.g., adverse childhood experiences, lack of social support) experienced.

Collectively, these "conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks" (Office of Disease Prevention and Health Promotion [ODPHP], n.d., p. 1) have been referred to as social determinants of health (SDOH). Aligning with Bronfenbrenner's (1977, 1979, 1992) ecological

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systems theory, social determinants of health recognize the bidirectional influence of environmental, cultural, and historical factors on development and outcomes. Although multiple frameworks exist for conceptualizing SDOH, Henrikson et al. (2019) identified six primary domains through their review of various social risk taxonomies (e.g., Kaiser Family Foundation, Healthy People 2020, Centers for Disease Control and Prevention [CDC], World Health Organization [WHO]): economic stability, education, social and community context, health and clinical care, neighborhood and physical environment, and food. Economic stability includes income, expenses, debt, medical bills, and support. Education captures educational attainment, educational access (e.g., early childhood education), language, literacy, and vocational training. Social and community context involves discrimination, incarceration, social integration, social systems, community engagement, and immigration or refugee status. The health and clinical care domain contains access to health care, health coverage, provider availability, provider linguistic and cultural competency, and quality of care. Neighborhood and physical environment includes safety, crime and violence, environmental conditions, quality of housing, housing instability, transportation, parks, playgrounds, and walkability. Lastly, the food domain contains hunger, food insecurity, and access to healthy options.

Given the linkages that have been documented between SDOH and children's health and development (Pearce et al., 2019), numerous professional organizations have advocated for the use of SDOH screening within primary care settings (e.g., American Association of Pediatrics, 2016; Chung et al., 2016). That is, these organizations have recommended that healthcare providers ask all caregivers a standard set of self-report questions designed to proactively identify any SDOH that may require intervention during routine pediatric healthcare visits (Barton et al., 2019). Although there is agreement on the importance of screening for SDOH, there is not necessarily consensus regarding how this should be done (Henrikson et al., 2019). In fact, four recent reviews (i.e., Henrikson et al., 2019; Moen et al., 2020; Morone, 2017; Sokol et al., 2019) illustrate the broad landscape of SDOH measures currently available. Across these four systematic reviews, authors identified between 5 (Moen et al., 2020) and 11 (Henrikson et al., 2019) unique screening measures that have been used to assess SDOH in pediatric populations. Although the majority of identified measures assessed one or more of Healthy People's (ODPHP, 2020) five domains of social risk (i.e., economic stability, education, health and clinical care, neighborhood and physical environment, social and community context), measures varied widely with regard to the (a) format of administration (i.e., self-report, interview), (b) manner in which domains were defined, (c) number of domains assessed, and (d) comprehensiveness of construct coverage (i.e., number of items per scale). In fact, one of the only commonalities appeared to be setting, with nearly all measures used in pediatric healthcare settings despite acknowledgement of potential utility of SDOH screening in alternative settings such as schools (Sokol et al., 2019).

Expanding SDOH Screening in School Settings

In comparison to any other institution, schools serve the largest proportion of children in the United States and therefore may be optimal settings to conduct SDOH screening. Schools already have a strong history of implementing universal screening to identify social, emotional, behavioral, and physical student needs (Eklund & Dowdy, 2014; Houri & Miller, 2020; Jenkins et al., 2014); however, current screeners remain limited to a focus on within-child factors (e.g., internalizing behaviors, externalizing behaviors). Unfortunately, this within-child focus has resulted in missed opportunities to identify and assess critical components of the broader context in which children develop.

Screening efforts are assessed, in part, by their ability to achieve positive effects. Messick (1995, 1998) introduced the term *consequential validity* to describe the social consequences of measure use. These include the short- and long-term intended and unintended consequences, which can be either positive or negative. Intended positive consequences are typically the desired goal of screening efforts. Because many SDOH are believed to be malleable factors that we have influence over (Bierman & Dunn, 2006), integrating SDOH screening into schools could have multiple benefits. For one, it may be possible to connect youth to resources that address root causes of challenges in equitable ways. Although connecting families to outside supports is the goal of SDOH screening conducted in primary care settings, known barriers to accessing medical care exist such that many youth under 18 do not report having recommended well child visits (Uddin al., 2016). Because the majority of youth do attend schools, however, SDOH school-based screening may reach more children to identify social risk (e.g., food insecurity, housing instability) and connect children to associated supports. Expanding SDOH screening may allow for children's basic needs to be met before social risk factors have long-lasting effects on health and educational outcomes (Kruse et al., 2020). Relatedly, SDOH data may be used by schools to make decisions regarding the prioritization of resources and supports. Data suggesting that greater challenges are faced by particular subgroups of students, for example, may be used to help ensure that available supports are most equitably distributed (National Center for School Mental Health, 2020). In addition, school-based SDOH screening may have the potential to build a sense of empathy between students and educators. Educators often see the

academic, social, emotional, and behavioral challenges associated with contextual adversity, but may not recognize the underlying causes (Koslouski et al., 2023). Okonofua et al. (2016) demonstrated that increasing educators' perspective-taking (and related understanding and empathy for student experiences) may lead to reductions in punitive discipline and improved teacher-student relationships. SDOH screening may therefore offer an opportunity to provide schools with contextualized understandings of the root causes of student challenges.

Purpose of Study

School-based SDOH screening may hold potential to proactively identify and mitigate social risk for many students, reduce health disparities, and improve health and educational outcomes. Given that reviews conducted to date have largely focused on the use of SDOH screening measures in healthcare settings (e.g., Henrikson et al., 2019; Moen et al., 2020; Morone, 2017), the extent to which SDOH screening has actually been extended to school settings is unknown. Thus, the purpose of this study was to gather evidence of (a) if and (b) how school-based SDOH screening has occurred, and (c) reported results of that screening. This information may guide future directions for expanding this practice or illuminate areas warranting additional research. Using Henrikson et al. (2019) six domains of social risk, we conducted a scoping review to identify studies that document the development or use of SDOH measures in school settings. Specifically, our research questions were:

1. What measures of SDOH have been developed or adapted for use in school settings, and what are the characteristics of these measures?
2. With whom, in what settings, and for what purposes have these measures been used?
3. What outcomes and consequences have been reported from use of these measures?

Methods

Following scoping review methods outlined by Peters and colleagues (2015), we conducted a scoping review to identify existing examples of SDOH measurement in school settings. Our three research questions focused on synthesizing literature on current approaches to SDOH measurement in schools, documenting any existing evidence of implementation effectiveness, and identifying gaps in research. We preregistered our study through the Open Science Framework (OSF Registration osf.io/cy73f).

Information Sources and Search Strategy

Articles describing school-based SDOH assessment could be published in education, psychology, or school health journals. Thus, we searched the ERIC, PsycInfo, and CINAHL Plus databases on December 16, 2022. In consultation with a research librarian, we developed detailed search terms related to SDOH, measurement, and school settings. Specifically, the three databases were searched for ("social determinants of health" OR "health-related social conditions" OR "social condition" OR "social risk" OR sdoh OR "determinant of health" OR "structural determinant" OR "social factor" OR "health equity" OR "health inequity" OR "health inequities" OR "health inequality" OR "social inequity" OR "social inequities" OR "social inequality" OR "social disparity" OR "social disparities" OR "behavioral determinant" OR "social determinant" OR "social determinants" OR "sbd" OR "social and behavioral determinants" OR "social need" OR "social needs" OR sbdohs) AND (measure* OR assessment* OR "self-report" OR "self report" OR rating* OR scale* OR questionnaire* OR survey OR instrument OR screen* OR test* OR batter* OR inventor* OR checklist* OR interview*) AND (educator OR "k-12" OR k12 OR school OR prekindergarten OR "pre-kindergarten" OR "head start" OR "reengagement program" OR "re-engagement program" OR classroom OR college OR university). By requiring articles to include at least one term related to SDOH, measurement, and school settings, we optimized the likelihood of finding articles focused on school-based measurement of SDOH.

We searched the title, abstracts, and subjects in each database. Once duplicates were removed, the combined searches yielded 2,487 articles. Our PRISMA diagram is shown in Fig. 1.

Selection Process

Article Inclusion and Exclusion Criteria

Articles were included if they (1) described the development or use of an SDOH measure in a school setting; (2) assessed at least two SDOH domains with at least one item in each of the two domains; (3) assessed youth ages 0–25 through self, caregiver, or school personnel (e.g., teacher, school psychologist) report; and (4) the measure items were available in the public domain. Articles were limited to those published in peer reviewed journals, published in English, and published in the year 2000 or later.

Exclusion criteria included: (1) book chapters; (2) book reviews, case studies, or qualitative studies; (3) unavailable full texts or abstract-only papers; (4) dissertations, theses, conference papers, or opinion/perspective papers; (5) articles focused on surveillance measures of health risk behaviors

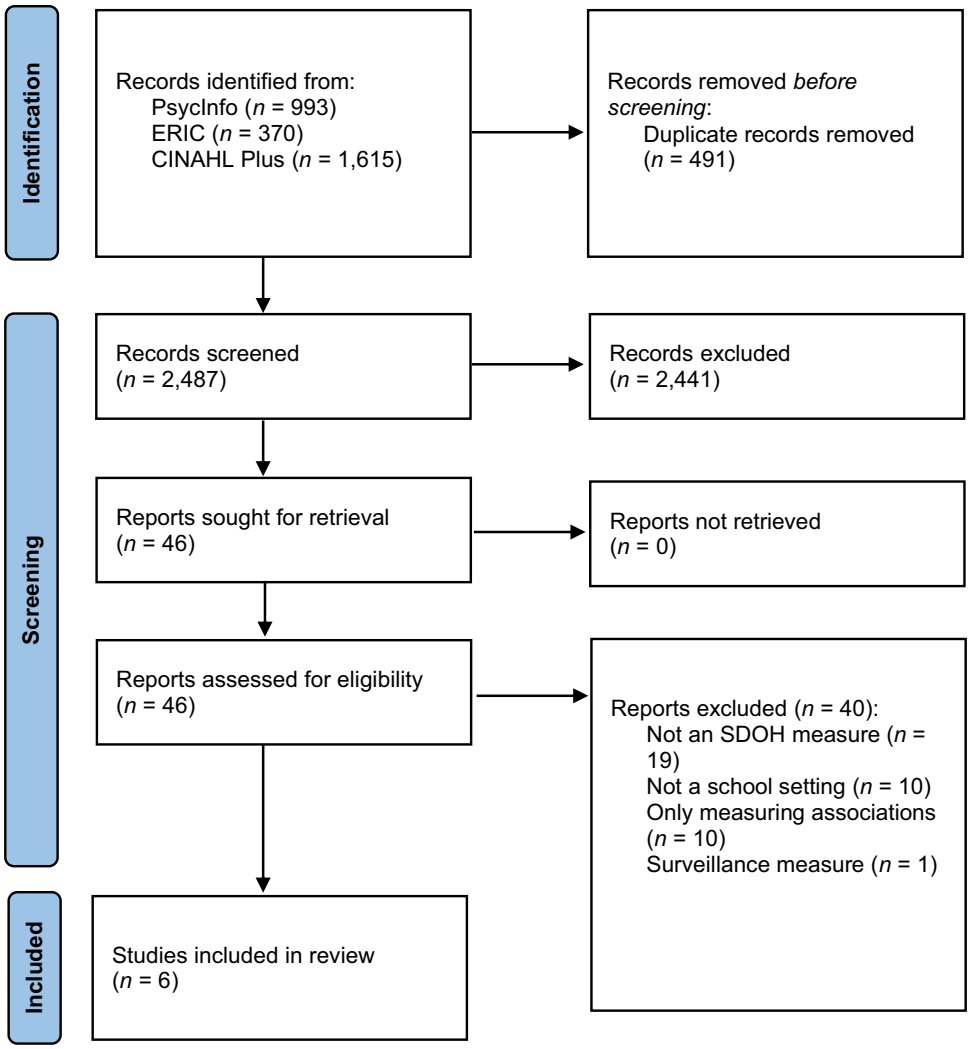

Fig. 1 PRISMA diagram

(e.g., Youth Risk Behavior Surveillance System [YRBSS]; CDC, 2021) and (6) articles describing measures implemented solely to answer a researcher's question (e.g., associations between SDOH and alcohol consumption). As school-based measurement of SDOH is a relatively new area of exploration, we were interested in literature with high credibility and high outlet control (the extent to which content is produced using explicit and transparent knowledge creation criteria; Adams et al., 2017). Thus, we excluded dissertations and theses. We excluded both surveillance measures and measures used only to answer a researcher's question because these do not tell us about school's use or review of data related to their students' experiences of SDOH. Surveillance measures assess trends at the population level and are almost always anonymous. The anonymity of these measures likely affects the types of questions that can be asked, and schools cannot use the data to inform individual supports. Similarly, we excluded measures implemented only to answer an external researcher's question because these data are not used by the school and do not inform interventions at the individual or school level. The purpose of this review was to investigate if and how schools are conducting SDOH screening, and reported outcomes of that screening.

Screening Process

Using Covidence software (Veritas Health Innovation, 2021), the title and abstract of each article was independently screened by two trained coders. Coders received two hours of structured training and practice from the first author at each stage of the review as well as ongoing supervision. Coding discrepancies were reviewed by the first author for a final decision. Borderline cases were reviewed by the first and second authors. Consensus was reached for all decisions. As a result of title and abstract screening, 46 articles were retained for full text review. Next, the full text of each article was independently reviewed by two trained coders. Again, any discrepancies were resolved by the first author or the first and second authors. Forty studies were excluded at

this stage (reasons outlined in Fig. 1) and six articles were retained for inclusion.

Data Collection and Analysis

Continuing with Covidence software (Veritas Health Innovation, 2021), two coders independently extracted data from the included articles and data were then analyzed to answer each of the three research questions. Our first research question asked what measures of SDOH have been developed or adapted for use in school settings, and what are the characteristics of these measures. To answer this question, we extracted measure characteristics from each article. Measure characteristics included measure names, measure authors, number of items, intended audience (e.g., age, setting), informants (e.g., caregiver, teacher), reference periods (e.g., last 12 months, last 6 months), languages, administration method (e.g., interview, paper/pencil, electronic), and any reported psychometric or usability information. We then located each measure. Three were available within the articles, two were cited and located via web searches, and one was provided by the measure author. We extracted each item, response options, and any instructions provided on the measure.

We answered our first research question descriptively by naming existing measures of SDOH developed or used in school settings and running descriptive statistics of the number of items, informant, languages, reference periods, response options, and administration methods. We used directed content analysis (Hsieh & Shannon, 2005) to examine the types of psychometric (e.g., test–retest, inter-rater reliability, content validity) and usability (e.g., effectiveness, efficiency, satisfaction) evidence reported for each measure. Directed content analysis draws on previous theory or key concepts to develop initial coding categories (Hsieh & Shannon, 2005). In this case, categories of psychometric (American Educational Research Association et al., 2014) and usability (International Organization of Standardization, 2018) evidence were used to code extracted data.

We also conducted directed content analysis (Hsieh & Shannon, 2005) of the SDOH domains and subdomains assessed by each measure to report the scope, breath, and depth of these measures. Each measure item was independently coded by the first and fifth authors for the SDOH domain it represented. We used the six domains outlined by Henrikson and colleagues (2019); however, modeling from Sokol et al. (2019), we added "family context" as an additional SDOH domain to separate determinants occurring within the family environment (e.g., intimate partner violence, family strengths or crises) from those occurring in the neighborhood or community. The first and fifth authors also independently coded the valence of each SDOH item as positive, negative, or neutral. We coded items that assessed assets, strengths, or access as positive. We coded items that assessed barriers, challenges, or lack of access as negative. Items that asked information that neither assessed an asset or barrier (e.g., current living situation) were coded as neutral. The coders had 93% agreement in their coding and all discrepancies were resolved through discussion. A codebook with definitions and examples is shown in Table 1.

Our second research question addressed the settings and populations with whom measures were implemented as well as the purposes for implementation. To answer this research question, we extracted study settings, sample characteristics, and purposes for measure use. Sample characteristics included demographics related to race, ethnicity, socioeconomic status, and age. We used conventional content analysis (Hsieh & Shannon, 2005) to identify patterns in these data. Conventional content analysis allows codes to be developed from the data.

Finally, our third research question aimed to assess the reported outcomes and consequences of SDOH measure use in school settings. To answer this research question, we extracted reported outcomes, including consequences of measure implementation for students, families, and schools as well as lessons learned, recommendations, or cautions related to assessing SDOH in school settings offered by study authors. We used conventional content analysis (Hsieh & Shannon, 2005) to analyze these data. Sample codes included referral to services, changes in educational practices, and lessons learned.

Results

Characteristics of SDOH Measures Developed or Adapted for Use in School Settings

The six articles included six distinct SDOH measures: Accountable Health Communities (AHC) Health-Related Social Needs (HRSN) Screening Tool (Billioux et al., 2017); COVID-19 Survey of Low-Income Households with Children (Sharma et al., 2020); Priorities and Experiences of Racism Among Black Male Youth and their Caregivers (Brady et al., 2018); Social and Behavioral Determinants of Health (SBDOH) Screening Bundle (Barton et al., 2019); Student Perception Appraisal Revised Pretest (SPA-R1; Jeffreys, 2012); and The LIFESCREEN-C (TLS-C; Johnson et al., 2022). Attributes of the six measures are shown in Table 2.

Measure informants and administration methods varied. Two (33.33%) measures were intended for high school student self-report, two (33.33%) for college student self-report, and one (16.67%) was intended exclusively for caregiver report. Brady and colleagues (2018) designed their measure to obtain upper elementary and middle school student

Table 1 SDOH domains and subdomains (From Henrikson et al., 2019)

Code	Definition	Example
SDOH domains		
Economic stability[a]	Item assessed one or more of the following subdomains: a) employment b) income c) expenses, including utilities d) debt e) medical bills f) support	How hard is it for you to pay for the very basics like food, housing, medical care, and heating?
Education[a]	Item assessed one or more of the following subdomains: a) early childhood education and development b) high school graduation c) enrollment in higher education d) language e) literacy, includes health literacy f) vocational training	If you need help with homework or studying, do you get the help you need?
Health and clinical care[a]	Item assessed one or more of the following subdomains: a) access to health care or primary care b) health coverage c) provider availability d) provider linguistic and cultural competency e) quality of care	Have you been unable to visit the dentist due to lack of insurance?
Neighborhood and physical environment[a]	Item assessed one or more of the following subdomains: a) safety, crime, and violence b) environmental conditions c) (Quality of) housing, includes housing instability d) transportation e) parks f) playgrounds g) walkability	I do not have a steady place to live (living in shelter, staying with others, in a car, etc.) or I worry about not having a steady place to live.
Social and community context[a]	Item assessed one or more of the following subdomains: a) discrimination b) incarceration c) social integration d) support systems or loneliness e) community engagement f) immigration or refugee status	I have close friends or family members (parent/guardian) that I can depend on to be there for me and they are willing to listen to my problems.
Food[a]	Item assessed one or more of the following subdomains: a) hunger or food insecurity b) access to healthy options	Are you sometimes hungry because there isn't enough food at home?
Family context[b]	Item assessed one or more of the following subdomains: a) intimate partner violence b) adverse childhood experiences occurring in the household c) family stressors d) family strengths	Sometimes my partner physically hurts me, threatens to harm me, or insults/talks down to me.
Valence		
Positive	Item asked about assets, strengths, or access	Can you access basic needs near your home?
Negative	Item asked about barriers, challenges, or lack of access	In the past year, how often have you been treated badly by other people because you are an African American?
Neutral	Item asked an information question that neither assessed assets or barriers	What is your living situation today?

[a]SDOH domains and definitions drawn from Henrikson et al. (2019)

[b]SDOH domain drawn from Sokol et al. (2019)

self-report data and caregiver report data. Stated administration methods included electronic ($n = 3$, 50.0%) and interviews ($n = 2$, 33.3%). Kruse and colleagues (2020) stated that students filled out a form, but it was unclear if this was administered electronically or via paper/pencil.

Three articles did not specify languages in which the measures were available. One measure (Barton et al., 2019) indicated availability in English. Sharma et al. (2020) and Sokol et al. (2022) made their measures available in both English and Spanish. The AHC HRSN Screening Tool

Table 2 Characteristics of included measures

Measure Name	Informant	Administration setting	Number of Items	SDOH domains assessed						
				Econ	Edu	SCC	HCC	NPE	Food	FC
Accountable Health Communities (AHC) Health-Related Social Needs (HRSN) Screening Tool (adapted) Sokol et al. (2022)	Student (adolescent) Some matched with caregiver report	High school	16 (13 SDOH + 3 mental health)	X	X	X		X	X	
COVID-19 Survey of Low-Income Households with Children Sharma et al. (2020)	Caregiver	Remote (families enrolled in a coordinated school-based nutrition program)	28 (20 SDOH + 8 health behaviors and demographics	X	X		X	X	X	X
LIFESCREEN-C (TLS-C) Johnson et al. (2022)	Student (college)	University	18 (10 SDOH + 8 health behaviors and mental health)	X	X	X		X	X	X
Priorities and Experiences of Racism Among Black Male Youth and their Caregivers Brady et al. (2018)	Student (youth) Matched caregiver	Elementary school	Student: 24 (19 SDOH + 5 related to social skills and mental health) Caregiver: 23 (20 SDOH + 3 caregiver mental health)	X	X	X		X		X
Social and Behavioral Determinants of Health (SBDOH) Screening Bundle Barton et al. (2019)	Student (high school)	High school school-based health center	22 (6 SDOH + 16 demographics, mental health, and health behaviors)		X			X	X	
Student Perception Appraisal Revised (SPA-R1) Kruse et al. (2020)	Student (college)	University	27 (25 SDOH + 2 study habits)	X	X	X	X	X		X

Econ = economic stability, Edu = education; SCC = social and community context, HCC = health and clinical care, NPE = neighborhood and physical environment, FC = family context

(used by Sokol et al., 2022) is available in several additional languages (Billioux et al., 2017).

Only one measure used a consistent reference period for all items. The TLS-C (Johnson et al., 2022) instructed students to consider the past 12 months when answering all questions. The remaining five measures used varied reference periods across questions (e.g., two weeks, last month, past year, or during your life). The SPA-R1 (Jeffreys, 2012) was designed as a pre-post measure to be used at the beginning and end of a university course or semester.

Item Analysis

Measures included between 16 and 28 items ($M = 22.6$); however, item analysis revealed that not all items were focused on SDOH. As noted in Table 2, all six measures included questions that extended beyond SDOH domains. Most often, these were inquiring about demographics, health behaviors (e.g., exercise, drug use) or mental health (e.g., depression, anxiety, suicidality). Measures had between 6 and 25 SDOH items ($M = 16.1$). Two measures only used dichotomous "yes/no" questions to assess SDOH and one measure used a 5-point Likert scale across SDOH items. The remaining three measures used a combination of dichotomous "yes/no" and Likert scale response options (e.g., 3–5 points, ranging from never to frequently) to assess SDOH in students' lives. More than half of items (56.6%) were negatively valenced (e.g., *I have found it hard to make more than 3 friends in college*). Approximately 22.1% of items were positively valenced (e.g., *My teachers really care about me*) and 21.2% of items were neutral (e.g., *What is your living situation today?*).

Measures assessed 3–6 SDOH domains ($M = 5.2$). Two domains were assessed on all six measures: neighborhood and physical environment (with anywhere between 1–3 items) and education (with anywhere between 1 and 11 items). Regarding *neighborhood and physical environment*, five measures assessed housing instability, including not having a steady place to live, living in a shelter, or sleeping outside or in a car. Housing quality was assessed on two measures with items that asked about the presence of mold, bugs, mice, rats, peeling paint, or water leaking where the student lived. Three measures assessed transportation, such as whether a lack of reliable transportation had interfered with daily functioning (e.g., getting to work, getting to medical appointments). Finally, two measures assessed neighborhood safety, such as whether students felt safe at night. Regarding *education*, four measures inquired about available educational supports (e.g., tutoring, engaging schoolwork) or needing more help with schoolwork or homework. Two measures assessed access to childcare and one assessed post-secondary aspirations or expectations. Only one measure assessed health literacy and did so in the context of the COVID-19 pandemic.

The next most frequently assessed domain was *economic stability* ($n = 5$; 83.3%), which was assessed with anywhere between 1 and 5 items. Measures asked about employment, income, and ability to pay for basic needs (e.g., utility bills). Two measures asked about using social service benefits (e.g., food stamps, childcare vouchers). Both of the measures developed for college students included an item about student loans or financial aid.

The domains of social and community context, food, and family context were each assessed on four measures (66.7%). Regarding *social and community context*, three measures assessed social support (e.g., family and friends you can count on) and two assessed bullying or interpersonal abuse (e.g., being threatened with harm). Two measures assessed discrimination. One measure assessed club or extracurricular belonging and one assessed the presence of caring adults. One measure assessed negative interactions with the police. No measures assessed immigration concerns. Measures assessing *food* specifically focused on food insecurity. Two measures used Hager et al.'s (2010) 2-item Hunger Vital Signs food insecurity screener. One measure also assessed use of a food pantry. Two measures asked about access to healthy options (e.g., consumption of fruits and vegetables). Finally, measures assessed *family context* with 1–3 items each. Questions assessed intimate partner violence, caregiver discord (e.g., parental arguing), and the presence or absence of family emotional support, family responsibilities, and family crises.

Health and clinical care was the least frequently assessed domain. Only two of the six (33.3%) measures assessed *health and clinical care*, each with one question. One assessed access to a doctor or clinical care and another assessed access to college counseling services.

Reported Psychometric and Usability Testing of SDOH Measures

Studies had a variety of purposes (e.g., measure development, reporting implementation outcomes), which impacted the amount of psychometric, feasibility, and usability data presented. Barton et al. (2019), Sharma et al. (2020), and Brady et al. (2018) reported drawing upon previously validated items, and Brady et al. (2018) reported Cronbach alphas for each subscale. Two studies focused on psychometric testing of their measures, and thus contained much more information. Johnson et al. (2022) reported results of a confirmatory factor analysis as well as internal consistency reliability, test–retest reliability, and convergent validity outcomes of the TLS-C. Sokol et al. (2022) found low concordance between adolescent and matched caregiver reports on the AHC-HRSN. The authors reported that caregivers

typically under-reported the social and mental health concerns of their adolescents. In contrast, adolescents under-reported their family's material needs, though, at times, adolescents reported material needs that caregivers did not. Sokol et al. (2022) suggested that a dual-informant approach should be used, with adolescents reporting material, social, and mental health needs and caregivers reporting material needs. The authors stressed that although this may generate some false positives, lower specificity in service of higher sensitivity is warranted given the adverse and long-lasting consequences of unaddressed social need. Although not formally testing concordance, Brady et al. (2018) also reported differences between student and caregiver reports of perceived discrimination. On average, caregivers endorsed higher levels of perceived discrimination towards their children than the students did for themselves.

Feasibility and usability information were limited. Three studies reported time to complete on their measures, with two studies reporting 10 min (Sharma et al., 2020; Sokol et al., 2022) and one study reporting an average time of less than 5 min (Barton et al., 2019). Barton et al. (2019) also asked students if any questions were too confusing or personal. Some students reported items related to sexual behavior were too personal.

Described Settings and Populations of SDOH Measure Implementation

SDOH measures were implemented with students in elementary schools ($n=1$, 16.7%), high schools ($n=2$, 33.3%), universities ($n=2$, 33.3%), and remotely for students enrolled in a school-based nutrition program ($n=1$, 16.7%). One of the measures used in a high school was used in a school-based clinic in a nontraditional high school (Barton et al., 2019). Three measures were implemented by school partners: a school-based nutrition program (Sharma et al., 2020), a community organization (Brady et al., 2018), and nurse practitioners in a school-based health center (Barton et al., 2019).

Study samples were found to be diverse with regard to race, ethnicity, and socioeconomic status. Brady and colleagues (2018) implemented their screener with a sample entirely of Black youth, whereas Barton et al. (2019), Sharma et al. (2020), and Sokol et al. (2022) implemented their screeners with predominantly Hispanic/Latino samples. More than half (54.4%) of Johnson et al.'s (2022) participants were White; 19.5% were Black or African American, 14.6% were multiracial, and 11.4% reported being another race. Nearly all studies ($n=5$, 83.3%) reported measuring SDOH of students from low-income households or areas believed to have a high number of residents with significant social needs.

All six articles stated a goal of improving student or family support through measure development or implementation. Although most studies used their SDOH measure as their primary means of gathering SDOH data from students, Kruse et al. (2020) implemented the SPA-R1 (Jeffreys, 2012) within a broader nursing retention program aimed at neutralizing the impact of social risk factors. In addition to collecting data at baseline and annually using the SPA-R1 (Jeffreys, 2012), students met with a social work success coach once per semester to integrate data and identify needed referrals and supports. Brady and colleagues (2018) implemented their measure alongside a bullying prevention program in the school.

Reported Outcomes of SDOH Measure Use

Many studies focused on the school-based settings of their SDOH screeners, with some emphasizing the favorable environment of schools, and others noting specific school-based implementation considerations. One issue brought forth across papers was the need to tailor screening measures to local settings. Barton et al. (2019) pointed out that schools need to weigh the advantages and disadvantages of using a standardized screening tool versus customizing a tool to meet the needs of their students. Brady et al. (2018) discussed the importance of tailoring survey items and communications to each community to reduce the likelihood of participants feeling labeled or stereotyped. However, Sokol et al. (2022) cautioned that less common needs should not be overlooked in the process of addressing prevalent concerns in the community.

Another issue brought forth by authors related to the feasibility of screening procedures. Johnson et al. (2022) cautioned against long measures in school settings. Sokol et al. (2022) discussed the challenges they encountered in collecting data from caregivers by distributing measures through schools (9% caregiver vs. 73% student participant response rate). Barton et al. (2019) suggested that schools might begin by screening for one concern (e.g., homelessness, food insecurity) and expanding as systems and comfort are developed.

In addition to cautions and recommendations, the majority of authors discussed student-, family-, or school-level outcomes and consequences of SDOH measure implementation. Three studies described increased referrals and connections to services resulting from implementation of SDOH measures. Sharma et al. (2020) described the development of online resources about accessing government assistance programs, mental health resources, and COVID-19 testing. The program also partnered with nonprofit organizations to provide masks for families. Barton et al. (2019) detailed increased connections to behavioral health supports, social services, and nutritional health services as a result of their SDOH screening efforts in a school-based health clinic.

Kruse et al. (2020) described extensive student and family referrals made for students in a university nursing program. A social worker referred students and their families to counseling and behavioral health services, emergency assistance (i.e., food, clothing, utilities), housing assistance, legal services, and childcare.

Lastly, two studies discussed changes in school-based settings resulting from the implementation of the SDOH screeners. Barton et al. (2019) reported the opening of a food pantry, increased availability of mental health services within the school-based clinic, and considerations of updating school curriculum (i.e., strengthening family planning and sexual health curricula). Brady et al. (2018) used their measure to identify areas of unaddressed student need, including family transitions and mobility, as well as to identify areas for city- and county-level advocacy (e.g., affordable housing, criminal justice reform).

Discussion

This scoping review illustrates the landscape of existing school-based efforts to measure SDOH. We identified six empirical articles describing the development or use of SDOH measures for use across elementary, high school, and university settings. The majority of measures focused on adolescents and young adults, with only one measure specifically developed for use with elementary populations. Measures were relatively brief and assessed an average of five SDOH domains. Neighborhood and physical environment, education, economic stability, food, and family context were assessed by the majority of measures. As has been found for SDOH screeners used in medical settings (Morone, 2017), however, the level of detail gathered within each of these domains varied widely. For example, the items per domain ranged from 1–11. The number of items appeared related to the implementation context or purpose in some cases. For example, Sharma et al. (2020) implemented their measure in conjunction with a school-based nutrition program, and included 10 questions related to food. However, TLS-C (Johnson et al., 2022), a measure for college students, only included one question related to education. It may be that education was less pertinent as the students were already being educated at the college level.

Some notable omissions in SDOH domains and items were also apparent. Only two of the six measures assessed health and clinical care, and each with only one item. Screening for health care access may be an important consideration for school-based SDOH screening as health and academic achievement are closely linked (Basch, 2011). No measures assessed for immigration issues, a concern for many undocumented, refugee, or asylum-seeking students and families. Incarceration of a family member was only assessed in one measure. Assessing for incarceration may alert schools to a substantial loss for a child and a family stressor that is disproportionately experienced by Black students (Annie E. Casey Foundation, 2022; Hollins, 2022; Murphey & Cooper, 2015). Assessing SDOH indicators that disproportionately affect minoritized groups may be crucial to reducing health disparities and achieving equitable and positive academic outcomes.

Another relevant finding was that most items captured in this review were negatively valenced. This framing raises two key concerns. First, negatively valenced items might induce negativity bias (Rozin & Royzman, 2001), and therefore contribute to reinforced deficit-thinking about students and families. Second, as pointed out by Johnson et al. (2022), the absence of social risk does not indicate the presence of social support. Most items captured in this review assessed barriers, challenges, or lack of access in students' lives. Far fewer items assessed assets, strengths, or access. Understanding both the contextual assets and barriers in students' lives opens the possibility to leverage student assets and provide strength-based supports.

Across the reviewed measures, screening of younger students was conducted through caregiver proxy-report or a dual-informant approach (student, caregiver), whereas self-report measures were used for high school and university students. Sokol et al.'s (2022) results suggest that a dual-informant approach is warranted, with adolescents reporting material, social, and mental health needs and caregivers reporting material needs. Similarly, Brady et al. (2018) reported that caregivers endorsed significantly higher levels of perceived discrimination in their child's life than children did themselves. No measures used educators as an informant. Further research is needed to understand if educators can be reliable informants of these data as this may reduce the effort and burden required to collect these data. Blodgett and Lanigan (2018) used teacher reports of student adversity. Although the authors discuss the potential underestimates that might result because teachers are only reporting known adversities, results indicated similar prevalence of student adversity to that reported by parents on the National Survey of Children's Health. Triangulating student, parent, and educator reports would yield insight into the reliability of educator report of student SDOH, but must be evaluated with attention to cost–benefit. Additionally, in considering equitable opportunities for student and parent report, and depending on implementation contexts, it is important to consider that measures may need to be translated into multiple languages.

Finally, studies reported many positive consequences of school-based SDOH screening, including student or family referrals to address social risk. Examples included referrals to emergency assistance, legal services, counseling and behavioral health services, and childcare. The collection of

SDOH data that led to these outcomes, however, likely benefited from pre-existing school initiatives and partnerships. Four of the six studies implemented their SDOH measure in the context of a larger effort to support positive student development (e.g., food or healthcare access) and three of the six studies described school partners (e.g., school-based health center, school-based nutrition program) collecting the SDOH data. These efforts and partners may have generated a priori student and family trust that may not exist in other settings.

Limitations

There are several important limitations to this scoping review. First, although we carefully constructed a thorough set of search terms, additional SDOH measures implemented in school settings may not have been captured. For example, the study team knows of the Family fIRST measure developed by Cohen-Silver et al. (2017), which was not captured in this search due to a slight variation in abstract language in that article. We also intentionally excluded measures implemented solely for researchers' purposes because the data were not reviewed or used by schools to inform intervention at the individual or school level. Instead, these measures were implemented by external researchers to answer an empirical question. These measures may have potential to be adapted by schools, but further research would be needed to evaluate if students and families are willing to share the same information with school personnel as they do in anonymous researcher-implemented measures. Lastly, although we intentionally excluded dissertations and theses, these may have yielded additional examples of SDOH measures implemented in school settings.

In addition, some items were challenging to code because they seemed to contain more than one SDOH domain or it was unclear if they were assessing intrapersonal or contextual factors. For example, Brady and colleagues (2018) used the item, "The teachers at my school behave in a way that is racist or discriminatory." We coded this item as social and community context because of its specific focus on discrimination; however, we recognize that discrimination by teachers would affect educational experiences and outcomes (i.e., education). Items related to fruit and vegetable consumption also raised questions about whether they were assessing food availability (i.e., food deserts) or health behaviors (choosing to eat fruits and vegetables). However, by reporting the types of items assessed within each SDOH domain, we aimed to provide clarity as to the breadth and depth of measure items. Lastly, the limited total number of captured articles hindered the strength of conclusions we were able to draw about how SDOH screening might be effectively implemented in schools.

Conclusions and Directions for Future Research

Building from established practices of screening for SDOH in medical settings, schools have begun to explore the potential to screen for SDOH. As the six articles captured in this scoping review were all published in the last five years, it is likely that efforts to measure SDOH in school settings will expand over the next decade. This scoping review provides an important first look at the landscape of possibilities for SDOH screening in schools, and points to several future directions and important considerations for those researching, developing, and implementing SDOH measures in school settings.

Perhaps most importantly, because this review only identified six articles describing school-based SDOH screening, additional work is needed to more fully evaluate both intended and unintended consequences. First, families' and students' comfort with sharing sensitive SDOH information with schools has not yet been explored to date. The potential for stigmatization has been highlighted as a potential barrier to school-based screening more generally (National Academies, 2009), and may prove to be a more substantial concern when data are gathered about not just student functioning but family functioning as well. As suggested by Brady and colleagues (2018), screening efforts will be unsuccessful (or even harmful) if families feel labeled or stereotyped by SDOH measure items or screening efforts.

Second, although a potential positive intended consequence of SDOH screening in schools may be to increase educators' empathy for contextual factors that affect student performance, a potential negative unintended consequence is SDOH measures may induce bias amongst school personnel. Future research is therefore needed to ensure that SDOH screening does not cause or reinforce implicit or explicit bias towards students based on their identities or exposure to environmental risk. It is likely that the purpose and intended consequence of SDOH screening (e.g., connecting students to supports) needs to be well stated and reinforced over time through demonstration of positive intended consequences being achieved and negative, adverse consequences being avoided. Finally, ethical concerns arise if implementation of screening occurs in the absence of associated supports. That is, if schools proactively seek to identify which supports students may need to bolster success, it is important to ensure that access to needed supports is either available (e.g., school-based academic or SEB interventions) or can be coordinated (e.g., by facilitating connections to outside agencies). Screening for SDOH is intended to reduce environmental risk by connecting students to services and

supports before long-term negative impacts occur. However, future research is needed to confirm these intended positive consequences can be realized.

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Declarations

Conflict of interest The authors have no conflicts of interest to disclose.

Ethical Approval As a scoping review of literature, this research did not involve human subjects, and therefore informed consent was not collected.

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