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An Integrative Review of Social Determinants of Health Assessment and Screening Tools Used in Pediatrics

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Abstract

Problem—Social and physical contexts which make up social determinants of health (SDOH) have tremendous impacts on youth development, health and well-being. Despite knowledge and evidence of these impacts, few pediatric SDOH screening tools are known. The purpose of this review was to identify and evaluate available pediatric SDOH screening tools.

Eligibility Criteria—Articles were limited to studies in the English language, with pediatric populations, conducted in the United States, and were peer-reviewed, primary studies.

Sample—Search of 3 databases (PsychInfo, CINAHL and PubMed) yielded 499 articles, 486 were excluded. Total of 13 articles were appraised and synthesized using the SDOH framework outlined by Healthy People 2020.

Results—Thirteen articles relevant to the assessment of SDOH domains were evaluated. Majority of studies were limited in both the number of SDOH domains screened and the depth of screening. Tools were heterogeneous in methods used to assess SDOH risks and few were validated. Limited number of studies included youth or families in the initial development of tools.

Conclusions—Despite growing recognition across healthcare that SDOH greatly influence pediatric health risks, management and outcomes, there is a dearth of available high quality, multidimensional, comprehensive screening tools for pediatric care professionals.

Implications—This review emphasizes the need for the continued development of effective, comprehensive and practical tools for assessing pediatric SDOH risk factors. Pediatric nursing care includes the assessment of the youth and family context to effectively evaluate resource needs. Pediatric nurses are well poised to address this knowledge and resource gap.

Keywords

social determinants; pediatric; tools; screening; social risks; disparities

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Clinical Problem

Social Determinants of Health

Social determinants of health (SDOH) are described as, “the circumstances in which people are born, grow up, live, work, and age and the systems put in place to deal with illness” (Marmot et al., 2008, p. 1661). Collectively, they contribute significantly “to the social patterning of health, disease, and illness” (CDC, 2014a, para. 4). Examples of SDOH risks include poor environmental conditions, housing instability, poverty, neighborhood violence, and inadequate health insurance. These aspects of an individual’s life are typically “shaped by economics, social policies and politics” (CDC, 2014b, para. 1).

Context Matters: SDOH Impact on Health

For decades it has been known that the context and social circumstances in which youth live have a tremendous impact on youth development, health and overall well-being (Frank et al., 2010; Garg et al., 2007; Larson, Russ, Crall & Halfon, 2008). This impact often precludes birth, in that the SDOH of mothers during pregnancy have been shown to affect infant development in utero (Tarazi, Skeer, Fiscella, Dean, & Dammann, 2016), and SDOH risks of childhood often persist into adulthood (Shonkoff & Garner, 2012). Furthermore, as SDOH risks increase, health and development has been shown to worsen (Frank et al., 2010; Larson et al., 2008). In total, it is estimated that the social, environmental and behavioral factors that make up the SDOH account for nearly 75% of one’s health (CDC, 2014). Additionally, poor SDOH are risk factors for costly hospital readmission rates (Sills et al., 2016).

Accumulation of Multiple Social Risks

Resource issues often do not exist in isolation (Beck et al., 2014), such that, many youth and families who are affected by SDOH also experience significant overlap of multiple health related social problems (Baer, Scherer, Fleegler., & Hassan, 2015). For example, if a family is experiencing poverty, they are also likely to be at high risk for experiencing food insecurity, poor transportation and housing issues. As a result, they may have trouble paying for medications, getting to medical appointments or seeking appropriate care. Furthermore, the stress of these SDOH can exacerbate existing chronic conditions, or spur additional health related conditions. Without assessing the multiple layers of risks, clinical teams often inadvertently develop treatment or care plans that are practically and materially infeasible for families to follow, despite a family’s desire and willingness to follow care regimens.

Professional and Practice Guidelines

The growing awareness of the significant impact that SDOH have on health outcomes has prompted many leaders in the field of national and pediatric health to develop professional practice guidelines that take into consideration addressing SDOH during clinical encounters and recommend routine screening for SDOH in primary care settings (American Academy of Pediatrics-Bright Futures (Hagan, Shaw & Duncan, 2008); Healthy People 2020 (Healthy People, 2017); Institutes of Medicine Committee on Recommended Social and Behavioral Domains and Measures for Electronic Records (IOM, 2013); National Prevention Strategy under the Affordable Care Act (USDHHS, 2011)).

Barriers to Screening SDOH

Despite consistent research and knowledge documenting the negative impact that SDOH have on youth health outcomes and the positive effects addressing SDOH has on reducing health disparities (Gilbert & Downs, 2015), clinicians rarely screen for, or address, SDOH in pediatric clinical care settings (Kogan et al., 2014). This is due in part to healthcare provider behaviors, attitudes and perceptions. Clinician barriers such as time constraints, having inadequate risk assessment training and a lack of knowledge of available community resources for addressing SDOH (Beck, Klein & Kahn, 2012), in addition to concern or discomfort discussing sensitive topics such as income or domestic violence with patients and families (Beaune et al., 2014; Beck et al., 2012) have been reported. Other barriers to screening include the belief that assessing SDOH is outside the purview of clinical medical care (DeJong et al., 2016), or that it is a task that is better handled by trained social work teams (Pai et al., 2016). Finally, clinicians may also have the perception that SDOH are not remediable and therefore, assessment serves no purpose (Klein et al., 2013).

Other major reasons for the lack of routine screening of SDOH in pediatric clinical settings are the limited available screening resources to address risks and little evidence to guide screening practices for identifying SDOH needs (Baer et al., 2015). Furthermore, current screening tools tend to focus on high risk behaviors or activities, thereby ignoring or neglecting to assess basic unmet material needs (Klein et al., 2013). They also narrowly focus on single domains or a single cause, such as poverty, food insecurity or domestic violence. As a result, families are often unable to access resources due to under recognition of needs by clinical teams (Baer et al., 2015). Research in the area of SDOH screening tools and behaviors is still quite limited and in need of expanded development.

To date, there have been limited published reviews of SDOH screening tools used in pediatric settings for assessing “social risks” of children (Pai, Kandasamy, Uleryk & Maguire, 2016). A single 2016 review, by Pai et al., focused solely on identifying tools used among hospitalized children, non-inclusive of those appropriate for ambulatory pediatric care and included measures focused on individual or single domains of social risk rather than comprehensive multi-domain screening tools. Therefore, the purpose of this review is to identify available SDOH screening tools used *across* pediatric settings and to evaluate their comprehensiveness and validity in assessing *multiple* SDOH. To our knowledge, this is the first review of existing multidimensional pediatric SDOH risk screening tools used in the United States.

Search Strategy

A systematic review of the literature was conducted that focused on SDOH screening tools used in pediatrics. Three online databases (PsychInfo, CINAHL and PubMed) were searched. Search inclusion criteria were limited to articles that were peer reviewed, written in the English language and conducted in the United States (U.S.). Additionally, only articles that pertained to pediatric services and that used some form of assessment for SDOH with patients or families were included. Exclusion criteria included studies that focused on adult populations, were retrospective or secondary data analysis studies, were duplicate articles of an original tool development study, or theoretical papers. Boolean searches included the

following relevant search terms: social determinants of health, pediatric, screening, assessment, and pediatric nursing (See Table 1). Although additional SDOH screening tools may exist internationally, given the unique social, cultural, economic and political climate and the specific healthcare delivery system resources of the U.S., only tools used and developed in U.S. pediatric healthcare settings were included in this review.

The search yielded a total of 492 articles, of which 462 were excluded after title and abstract review for inclusion and exclusion criteria. A total of 30 full text articles were reviewed and reference lists were examined to identify additional literature. Seven additional eligible studies were found by reference list searches. Of the original 499 articles, 13 articles met full eligibility criteria for this review and were evaluated (Appendix A: Figure 1- PRISMA diagram). Data were abstracted using an evaluation matrix for relevant elements related to the *pediatric population assessed*, the *SDOH domains or variables assessed*, the *methods used by authors to assess SDOH domains* (i.e. paper and pencil or electronic format), *methods used to validate the tool*, and *how the tool was developed* (i.e. literature reviews or focus groups). Tools were then appraised and synthesized using the five key domains of SDOH outlined by Healthy People 2020 (this framework is described in detail in the Critical Appraisal section). A detailed overview of these articles is presented in Table 1- *Summary assessment of SDOH screening tools*.

The data collection and screening process was conducted independently by the primary author. The primary author also singlehandedly reviewed the full text of all relevant articles and conducted data extraction using the aforementioned SDOH domains outlined in Healthy People 2020 (Health People, 2017).

Critical Appraisal

Whittemore & Knafl (2005) described integrative reviews as, “the broadest type of research review methods allowing for the simultaneous inclusion of experimental and non-experimental research in order to more fully understand a phenomenon of concern” (p. 547). Due to the heterogeneity of types and methods of SDOH screening employed in both experimental and non-experimental studies, across a wide range of pediatric settings, the integrative review methodology was selected for this review.

As noted previously, the Healthy People 2020 guidelines were used as the framework to appraise and evaluate the SDOH screening tools and methods used in this review (Healthy People, 2017). In 2010 the United States Healthy People 2020 task force set objectives and guidelines for addressing SDOH, with the goal to “create social and physical environments that promote good health for all,” over the next decade (Secretary’s Advisory Committee, 2010, para. 4). Healthy People 2020’s “place-based” organizational framework is reflected across five key domains of SDOH: *Economic Stability, Education, Social and Community Context, Health and Health Care, and Neighborhood and Built Environment*. *Economic Stability* encompasses four critical components: poverty, employment, food insecurity and housing instability. Critical components of *Education* include, high school graduation, enrollment in higher education, language and literacy and early childhood education and development. *Social and Community Context* is comprised of the critical components of

social cohesion, civic participation, discrimination, and incarceration while *Health and Health Care* includes access to health care, access to primary care and health literacy. Finally, the *Neighborhood and Built Environment* determinant comprises access to foods that support healthy eating patterns, quality of housing, crime and violence and environmental conditions.

Population and SDOH Domains Assessed

Of the 13 studies reviewed all but one (Hassan et al., 2013) sought assessments from populations of caregivers of pediatric patients in primary care settings. This is an appropriate use of a proxy reporter, given that most pediatric patients are between the ages of 0–18 years old and are typically dependent upon caregivers for their own basic social and physical determinant needs.

Appraisal of the five SDOH domains assessed revealed that *Economic Stability* was the primary and most comprehensive domain assessed across all 13 studies. The majority of studies included at least one question pertaining to each of the four sub-components of *Economic Stability* (poverty, employment, food insecurity and housing stability). In order of priority, *Social and Community Context* was second most assessed domain across 10 of the 13 studies. However, most studies only included one single question relating to intimate partner violence or incarceration from this category. Last of the top three priority domains, *Health and Health Care* was assessed among 9 of the 13 studies. However, not a single study asked about health literacy. Across all studies, *Education* and *Neighborhood and Built Environment* were not highly prioritized domains assessed. Seven of the 13 studies assessed *Education* based on only one or two questions pertaining to either the child or the parent, but not both. The lowest priority domain was *Neighborhood and Built Environment*, with less than half of the 13 studies assessing any component of this domain. Of the studies that did assess this domain (6 total), all but one (Gottlieb, Tirozzi, Manchanda, Burns, & Sandel, 2014) asked a single question either pertaining to crime and violence or to housing quality. Overall, 85% (11) of studies included assessment of 3 or more domains of SDOH, with most focusing on *Economic Stability*, *Social and Community Context* and *Health and Health Care*. In contrast, only 15% (2) of studies (Hassan et al., 2013; Orr, James, & Charney, 1989) included at least one question from all of the 5 SDOH domains. Finally, no single study included questions pertaining to each subcomponent under the 5 SDOH domains.

Methods Used to Assess

Various methods were used to assess the SDOH of patients and family members, including in person and telephone interviews, and self-report surveys. Predominant administration methods used to assess the SDOH included web-based and paper and pencil based self-report questionnaires. Several studies employed an embedded social history template into the electronic medical record, for easy in person assessment during a clinical encounter (Beck et al., 2012; Gottlieb et al., 2015). Two of the medical-legal partnership studies used telephone and in person interviews to assess SDOH domains (DeJong et al., 2016; Weintraub et al., 2010). In contrast Kenyon, Sandel, Silverstein Shakir and Zuckerman (2007) used a helpful IHELLP mnemonic, which stood for income, housing/utilities, education, legal status/immigration, literacy, and personal safety, to guide clinicians during

clinical encounters. Overall, across studies there was significant heterogeneity in methods used to assess SDOH.

Methods Used to Validate

Screening tools are validated in a multitude of ways depending on the purpose of their use. Content validity is used to ensure that the questions being asked in a survey adequately cover the construct domain (Polit & Beck, 2012). Face validity is a measure of whether questions appear to be screening what is intended to be screened (Polit & Beck, 2012). The majority of studies (62%) in this review did not use any methods to validate the screening tools and methods they employed. Two studies compiled an itemized sampling of questions derived from various previously validated surveys, but did not re-validate using the revised formats (Fleegler, Lieu, Wise & Muret-Wagstaff, 2007; Gottlieb, 2014). Only two studies minimally assessed some form of both face or content *validity* and test-retest *reliability* (Garg et al., 2007; Orr et al., 1989). Similar to validity and reliability, screening tools are often assessed in terms of their sensitivity and specificity to accurately discern families in need of resources from those who are not in need. Therefore, in lieu of validation, Keller, Jones, Savageau and Cashman (2008) evaluated the quality of their tool's sensitivity and specificity in accurately capturing those in need of services.

How Tools Were Developed

Methods used to develop an initial tool can include a number of strategies such as literature reviews, sampling of prior created tools, expert consultation and consumer participation. Among the studies evaluated 77% (10) studies included a discussion of how their tool was initially developed. Across all studies, only 30% (4) included community members in the initial development of the screening tool (i.e. through focus groups, home interviews, or cognitive interviews) (Gilbert et al., 2015; Keller et al., 2008; Orr et al., 1989; Page-Reeves et al., 2016). In contrast, 38% (5) relied on using a limited sampling of questions from various previously validated single domain SDOH measures and assessment tools (Beck et al., 2012; Fleegler et al., 2007; Garg et al., 2007; Gottlieb et al., 2014; Hassan et al., 2013).

Synthesis of the Literature

It is well known that social and physical resource risks tend to aggregate and accumulate. It is more often the case that youth and families who are at risk have more than just one SDOH domain of risk. A growing list of guidelines and professional statements from healthcare leadership (Healthy People 2020, the Health and Medicine Division (formerly the Institute of Medicine)) and the American Academy of Pediatrics, Bright Futures have outlined the social and physical components that comprise SDOH. Despite the availability of these guidelines, not one tool included a comprehensive assessment of each SDOH domain deemed important for living well. Although the tools assessed reflect the most recent attempts to make SDOH screening more comprehensive, a lack of high quality, multidimensional tools still persists. Historically, high quality, effective social risk screening tools have focused on single individual domains, such as poverty or food insecurity. However, although effective tools do exist for these individual domains, it would be onerous for a family to complete a lengthy assessment comprised of a combination of multiple single

domain tools. Researchers have attempted to minimize this burden and have customized screening tools by creating web-based branched logic tools, relying on algorithms that allow respondents to either skip irrelevant questions or delve deeper into select domains (Fleegler et al., 2007; Hassan et al., 2013). This method allows for more focused assessment of SDOH needs, and helps care providers tailor interventions and resources to the individual patient or family needs.

It is widely accepted among health equity researchers working with vulnerable populations, that community engagement and consumer participation through the use of community based participatory research (CBPR) methods yield more commitment to and involvement in research, and increased intervention effects (De La Nueces, Hacker, DiGirolamo & Hicks, 2012; Vaughn, Wagner & Jacquez, 2013). These methods also ensure the content and interventions developed are relevant and salient to those they are intended for, in particular to youth and families experiencing health disparities (Israel et al., 2005). Despite this knowledge, less than half of the studies reviewed consulted with the communities or families of interest to garner feedback on their particular needs, priorities and values before developing tools or methods.

In summary, similar to prior systematic reviews of social risk screening tools for use in pediatric settings (Pai et al., 2016), this review found that the majority of tools focused on only a limited number of SDOH domains and lacked exploration of the individual components within each domain. There was significant heterogeneity among methods used to assess SDOH risks, and existing tools lacked content validation and consistency among SDOH domains assessed. Finally, among the tools and methods evaluated, few included community participation in their initial development.

Discussion

Current perspectives in social welfare and health equity sciences acknowledge that youth and families are situated within larger community contexts, which have far greater influence over their health than isolated encounters with the healthcare system. Because of their health advocacy role, pediatric nurses generally have broad and sustained access to youth and families across various community contexts, such as in schools, hospitals, clinics, community centers and home settings. They are therefore well poised to assess and address SDOH of youth and families. As such, the findings of this review have important implications for both clinical nursing practice and future research.

Clinical Implications

First, in terms of clinical relevance, evidence suggests that systematic screening and referral for SDOH risks in clinical encounters leads to increased receipt of community based resources for families (Garg et al., 2015). By increasing SDOH risk screening efforts nurses and other healthcare professionals have an opportunity to garner valuable information regarding social contexts and stressors known to influence family and youth health behaviors, health management and health outcomes. In this way, nurses can have a vital role in appropriately directing patients and families towards relevant community resources. Second, interventions addressing SDOH risks demonstrate positive effects on child and

family health and well-being (Gilbert et al., 2015) and are cost effective (Beck et al., 2016). Employing a system of routine screening of youth and family SDOH by pediatric nurses upon first clinic encounter or during admission intake, and again at regular follow-up intervals, would be an initial step in assessing population needs to tailor resource interventions. Vast opportunities also exist for pediatric nurses to develop community based referral systems and enhance community resource connections to link patients to resources. Additional examples of possible nurse-led SDOH interventions could include devising community relevant resource lists available to patients in clinic waiting rooms, or reorienting clinic spaces to accommodate WIC (Supplemental Nutrition Program for Women, Infants and Children) or insurance specialists in clinic or community settings. Individualized SDOH interventions could be developed by collaborating with multidisciplinary teams comprised of legal experts, community agencies, patient and family advisory boards and technology experts, to erect patient and family accessible community resource kiosks in clinic and hospital waiting rooms, local libraries or community centers. Clinically, given their diverse roles, contextual and holistic training and sustained access, pediatric nurses could have substantial impact on paving the way for enhanced SDOH screening in clinical and community settings.

Research Implications

Specific implications of this review for pediatric researchers and clinicians may include looking to international studies for effective models and methods of SDOH screening, as promising methods for SDOH screening and surveillance are being employed internationally. For example, population-level indexes such as the Deprivation Index and the Material and Social Deprivation Index have been successfully used abroad for quantifying and gathering proxies for individual level SDOH risks and to evaluate health inequalities, such as socioeconomic levels (SES, education), family structure, workforce eligibility, housing instability, ethnicity and immigration (Zuijdwijk, Cuerden & Mahmud, 2013). More recently a promising individualized screening method comprised of a multidimensional tablet-based social history SDOH screening tool, Family fIRST (Family-based, Interactive, Risk, Screening Tool) was evaluated for feasibility in a school-based clinic in Canada (Cohen-Silver, Laher, Freeman, Mistry & Sgro, 2017). The multi-domain tool included items across several SDOH domains such as income, transportation, housing, education, literacy, legal status, personal support and safety. Caregivers and physicians regarded the tool positively and providers found that it improved the quality of the social history (Cohen-Silver et al., 2017).

Given the cumulative nature of multiple social risks, there is a great need for effective and comprehensive SDOH risk screening and assessment tools. Tools should focus on multiple simultaneous needs. High quality, validated tools would increase early recognition and action, improve connection to social and community service resources and enable closer monitoring. Tools should be designed to increase health equity for marginalized and vulnerable groups by encouraging collaboration between healthcare teams, families and communities, employing methods borrowed from community based participatory research. Finally, high demand exists for across the healthcare continuum for creating services, policies and education to increase healthcare's ability to address and treat the upstream

factors of SDOH, rather than attempting to ameliorate downstream outcomes such as chronic health conditions and poor well-being.

Study Strengths and Limitations

Strengths of this study include the use of an objective standard national criteria (Healthy People, 2020 guidelines) for evaluating SDOH domains among screening tools and methods. This review is also the first of its kind to evaluate existing multidimensional SDOH risk screening tools for use in pediatric ambulatory care settings. There were several limitations to this review. First, the eligibility criteria for review of articles was restricted to only those written in English, limiting generalizability to non-English populations. Second, the literature search was limited to only 3 databases and the use of snowball reference list searches. Additional tools may exist that were not captured within this scope of search. Third, search term criteria was purposefully broad, however, given the heterogeneity of terms used to describe social determinants it is possible that additional sources of social risk tools classified other than as SDOH may have been missed. Lastly, this review was conducted by a single appraiser. Having additional reviewers evaluate and appraise tools would enhance study evaluation rigor.

Conclusion

In conclusion, in order to best address health disparities attributed to SDOH, effective, valid, reliable, accessible and comprehensive assessment of SDOH domains must be integrated into routine pediatric care. Pediatric nurses have traditionally served as patient and family advocates, community providers and caretakers. Hence, the field of pediatric nursing is rife with opportunity to lead the way in the development, evaluation and application of tools, services and care delivery systems that provide screening, referral and interventions to address the SDOH risks of vulnerable children and families.

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Appendix A

Figure 1.
PRISMA diagram.

Appendix B

Table 2

Search Term Histories.

Psych Info:
(social determinants of health) AND pediatric
CINAHL:
"social determinants of health" AND "pediatric" AND "screening and assessment"; "social determinants of health" AND "pediatric nursing"; "Social determinants of health" AND "pediatric" (limited to US, English only, peer reviewed)
PubMed:
"Social determinants of health" AND "pediatrics"; "Social determinants" AND "screening"

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Highlights

- Available SDOH screening tools focus on limited domains of SDOH and lack validity.
- Screening and intervention for SDOH risks are associated with better pediatric health outcomes.
- Development of comprehensive pediatric SDOH screening tools are needed.
- Future development of SDOH screening tools should use community based participatory research methods.
- Future tools should attempt to incorporate all SDOH domains outlined in Healthy People 2020.

Table 1

Summary of assessment of SDOH screening tools

Author, Year	Population Assessed	Healthy People Domains	Tool SDOH Variables Assessed	Methods Used to Assess	Methods Used to Validate Tool	How Tool Was Developed	Tool used
Beck et al., 2012	Parents of infants, primary care pediatric clinic	1, 3, 4	Income, Public Benefits, Food, Housing, Interpersonal Violence/Safety, Mental Health	Embedded electronic social history template in EHR	Not validated	Literature review, prior validated surveys, multidisciplinary staff consultation	
DeJong et al., 2016	Families, primary care pediatric clinic	1, 2, 4	Housing Instability, School Concerns, Denial of Benefits, Financial Distress, Legal Documents	Telephone based structured interviews	Not validated	Review of tools used by other medical-legal partnerships	In-depth telephone interviews
Fleegler et al., 2007	Families, primary care pediatric clinic English/Spanish, urban clinic	1, 3, 4	Access to health care, Housing, Food Security, Income Security, Intimate Partner Violence.	Self-report computer based questionnaire (response-driven, branched questionnaire, 90 to 166 questions)	Used previously validated questions and scales and new questions added	Literature review, previously validated questionnaire items and key informant interviews, Modified Delphi technique used to select top 5 relevant domains.	The Online Advocate
Garg et al., 2007	Caregivers, primary care pediatric clinic	1, 2, 3	Education, Employment, Food Security, Homelessness, Depression, Substance Use, Intimate Partner Violence, Child Care Needs	10 item self-report, paper and pencil survey	Parent focus groups to assess face validity. Content validity established by faculty member and social worker. Two week test-retest reliability conducted with first 20 participants (high reliability, $r = 0.92$).	Used Bright Futures pediatric intake form as initial guide. Additional domains identified from literature review, staff member discussion, social worker, lawyer advocate, internal medicine colleagues, and primary researcher.	WE CARE (Well-child Care Visit, Evaluation, Community Resources, Advocacy, Referral, Education) intervention
Gilbert et al., 2015	Caregivers, urban primary care pediatric center clinics.	1, 5	Housing Insecurity, Substandard Rental Conditions, Energy/Utility Insecurity, Food Insecurity	Individualized paper or electronic screener form completed by	Not validated	Multidisciplinary group of professionals, community focus groups and	Child Health Improvement through Computer Automation-Medical Legal Partnership (CHICA-MLP) process

Author, Year	Population Assessed	Healthy People Domains	Tool SDOH Variables Assessed	Methods Used to Assess	Methods Used to Validate Tool	How Tool Was Developed	Tool used
Gottlieb et al., 2014	Caregivers (Spanish/English speaking), urban children's hospital ED	1, 3, 4, 5	Health Insurance, Healthcare Access/ Services, Health Problems, Mental Health, Tobacco, Exercise, Housing Condition & Costs, Income Security, Food Security, Benefits/Services, Childcare, Transportation, Employment, Child Safety, Child Support, Interpersonal Violence, Substance Abuse, Incarceration, Immigration Status	families in waiting room 23 items, computer based self-report completed in waiting room, at home, or face-to-face interview	Not validated as a whole, used sample of questions from previously validated surveys	community engagement. Questions adapted from prior studies and prior validated surveys	iScreen
Gottlieb et al., 2015	Caregivers, pediatric primary care clinic	1, 2, 3, 4	Income, Residential Status, Education, Health Insurance, Employment, Childcare, Social Service Involvement	Embedded in electronic medical record	Not validated	Not stated	Social history form embedded in clinic EMR
Hassan et al., 2013	Adolescent/Young adult patients (15 to 25 years)	1, 2, 3, 4, 5	Exercise/Nutrition, Education, Safety Equipment Use, Healthcare Access, Housing, Food Security, Income Security, Substance Use, Sexual Health, Intimate Partner Violence	Web-based self-report, 120 questions, branched logic questionnaire	Not validated	Adopted from previous study (Fleegler et al., 2007), developed from prior validated surveys	The Online Advocate
Keller et al., 2008	Caregivers, pediatric primary care clinic	1, 3, 4	Housing, Financial Stability, Dignity and Safety, Access to Services	paper and pencil self-report questionnaire completed in waiting room	Sensitivity and specificity determined	From clinical practice guideline queries from legal advocacy at local medical center, pretested by parents and modified, cognitive interviews with caregivers assessed readability and clarity.	Medical-legal advocacy screening questionnaire (MASQ)

Author, Year	Population Assessed	Healthy People Domains	Tool SDOH Variables Assessed	Methods Used to Assess	Methods Used to Validate Tool	How Tool Was Developed	Tool used
Kenyon et al., 2007	Caregivers, pediatric clinics	1, 2, 3, 5	Income, Housing/ utilities, Education, Legal Status/ Immigration, Literacy, Personal Safety	Series of health care visits, or focused visit if significant risk factor for poor health identified.	Not validated	Not stated	IHELLP mnemonic
Orr et al., 1989	Mothers, primary care pediatric clinic	1, 2, 3, 4, 5	Marital Relationships, Family Health, Employment, Housing, Finances, Children, Schools, Parents, Crime/law	35 item paper and pencil self-report questionnaire	Reliability and validity tested in random clinic sample	Home interviews to generate domains, ranking of items by respondents	SEI- Social Environment Inventory
Page-Reeves et al., 2016	Caregivers, family medicine clinics	1, 2, 3, 5	Food Insecurity, Housing, Utilities, Income, Employment, Transportation, Education, Substance Abuse, Child Care, Safety, and Abuse.	11 items self-report paper and pencil questionnaire	Not validated	Providers and community health workers from clinics identified domains of greatest social need. Literacy specialist ensured "low literacy" level of questions.	WellRx
Weintraub et al., 2010	Caregivers, primary care pediatric clinics	1, 4	Demographics, Missed school, Avoidance of health care for child due to barriers, Public benefits, Socio-economic status, Health insurance, Child health status, Need for legal and social services	Assessment performed by trained members of research team, conducted at clinical sites, in homes, or via telephone.	Not validated	Not stated	Medical-legal partnership baseline assessment

Footnote: Healthy People 2020 SDOH Domains d1. Economic stability, 2. Education, 3. Social and community context, 4. Health and health care, 5. Neighborhood and built environment.