

# Identifying and Addressing Social Determinants of Health in the Primary Care Clinical Training Environment: A Survey of the Landscape

Aaron Parzuchowski, MD, MPH  
Katherine Wright, PhD, MPH  
Dawid Lipiszko, MPH  
Andrew J. Cooper, MPH  
Stephen D. Persell, MD, MPH  
Paul A. Ravenna, MD  
Wivine Ngongo, MPH  
Matthew J. O'Brien, MD  
Mita Sanghavi Goel, MD, MPH

**Abstract: Introduction.** This study surveyed the use of systematic strategies to address social determinants of health in the primary care clinical training environment. **Methods.** We designed a 51-item questionnaire targeting medical educators from internal medicine, pediatrics, and family practice to assess strategies to identify and mitigate social needs, the role of trainees in this process, and barriers/facilitators to systematic approaches. **Results.** The survey was completed by 104 medical educators from 77 institutions. Of the 104 respondents, 28% were not familiar with any standardized tools used for screening for social needs, 27% use geospatial (GIS) or geographic information system (GIG) data, and 35% reported that trainees were not involved in any part of assisting. **Conclusion.** Nearly one third of medical educators lack familiarity with standardized screening tools for social needs. More than one third reported that trainees are not involved with mitigating social needs. Geospatial and GIS data are not utilized frequently.

**Key words:** Geographic information systems, social determinants of health, medical education.

Since the launch of the World Health Organization's Commission on Social Determinants of Health in March 2005, it has become increasingly apparent how influential socioeconomic and political factors are in shaping health outcomes of individuals and communities.<sup>1,2</sup> It is estimated that medical care is responsible for only 10%–15% of preventable mortality in the United States.<sup>3,4</sup> Given this significance, health care delivery systems have begun investing in efforts to identify and address unmet health-related

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AARON PARZUCHOWSKI is an internal medicine resident at McGaw Medical Center of Northwestern University Department of Medicine. The rest of the authors are affiliated with Northwestern University Feinberg School of Medicine.

social needs in an effort to improve outcomes.<sup>5-7</sup> Geographic information systems (GIS)—where geographic information is integrated with software programs so that spatial information can be created, stored, manipulated, analyzed, and visualized<sup>8</sup>—have been used successfully with electronic health records (EHRs) in providing clinicians and health systems with potent methods for identifying and addressing negative social determinants of health (SDH).<sup>9-15</sup> Clinical examples of GIS technology include, NowPow, Purple Binder, Aunt Bertha and HealthLandscape. In addition to delivery of health care, medical education has integrated SDH curricula at the undergraduate and graduate levels, particularly in non-clinical care settings to train future clinicians in the importance of these influences.<sup>16-19</sup> Acknowledging the importance of emerging technologies and approaches, and integrating them into clinical educational settings, we sought to appreciate approaches to SDH in the clinical context involving physician learners in the UME and GME settings, as well as physician assistant and nurse practitioner students training in the primary care setting.

To accomplish this goal, we developed a survey in order to identify the systematic strategies to take into account health-related social needs in settings where future primary care clinicians are being trained, with a particular focus on the use of GIS technology. It is critical to collect and disseminate this information as training primary care providers in addressing social determinants of health has the potential to improve patient outcomes at both local and national levels as graduates disperse to diverse practice locations.

Uptake of strategies routinely to identify and mitigate social needs within the clinical setting has been difficult for several reasons.<sup>20,21</sup> First, existing screening instruments require time and training to administer. Second, responding to positive screens requires having the ability to connect to resources, if a resource even exists within the health system or community to address the need. Third, evidence that systematic screening leads to improved health outcomes is scarce. Fourth, there are many logistical challenges with capturing and following data for social needs longitudinally. Lastly, while numerous tools for assessing social needs exist, few have been validated.

As newer strategies emerge for identifying and addressing social needs, it is important to evaluate the training environment for primary care physicians. Historically, training for physicians has not incorporated clinical skills needed to identify and mitigate social needs. Current recommendations by the Liaison Committee on Medical Education (LCME) and Accreditation Council for Graduate Medical Education (ACGME) include awareness of SDH, but they do not explicitly require that learners engage in identifying and addressing social needs in clinical practice.<sup>22,23</sup> This study will provide further insight on trainee involvement and educational practices surrounding the identification and mitigation of SDH in the clinical practice environment.

## Methods

**Study design and setting.** To assess the clinical learning environments for primary care trainees, we surveyed educators within the primary care fields of family medicine, internal medicine, and pediatrics who reported teaching medical students, medical residents, nurse practitioner students, or physician assistant students. We accomplished

this by distributing an online survey to recipients of list-servs for academic primary care organizations. These were: Society of Teachers of Family Medicine, National Collaborative for Education to Address SDH, Society of General Internal Medicine (SGIM), Teaching SDH Interest Group of SGIM, Primary Care Training Enhancement T0B, PMR D33, National Research Service Award T32 Grant, Training Primary Care Champions, Integrated Behavioral Health in Primary Care, Academic Units for Primary Care Training and Enhancement (AU-PCTE), Career Development, and SGIM weekly newsletter. Survey data were collected from May 2019 to August 2019 and analysis was conducted in September to November 2019. The study was approved by the Northwestern University Institutional Review Board.

**Survey instrument.** We designed a 51-item questionnaire to assess the learning environment in four large areas: systematic strategies to identify social needs, strategies to mitigate social needs, role of trainees in identifying and mitigating social needs, and barriers/facilitators to systematic approaches. We developed questions to assess each domain using an iterative process involving feedback from a diverse team composed of health services researchers, medical educators, data analysts, and residents, before making our initial survey final.

We piloted the survey using a test link via Research Electronic Data Capture (REDCap), allowing internal reviewers to provide feedback. This review process occurred on three separate occasions prior to dissemination. Each review period produced valuable feedback regarding wording of questions, answer choices, type of question to use (open text or multiple choice), and the order of questions to ensure survey completion was a smooth process. Once feedback from the pilot testing was incorporated, the survey was made final and entered into REDCap to allow for electronic distribution.

The survey instrument consisted of 51 items and included multiple choice and open-text responses. The terms GIS and geospatial were defined at the beginning of the survey for respondents with examples of currently used clinical tools (see Appendix for details). Skip patterns were implemented based on whether or not GIS tools were used in the respondent's clinical setting and whether or not trainees were involved in intervening on social determinants of health needs (see Appendix for details). With the skip patterns, the minimum number of questions presented was 21 and the maximum was 51. The total time required for completion ranged from 10 to 20 minutes, depending on the number of questions presented.

**Participant recruitment and data collection.** Potentially eligible participants received an email from the research staff describing the study and inviting them to complete the survey with a link to the Internet-based consent form and questionnaire. Survey responses were collected using REDCap on secure servers hosted at Northwestern University Feinberg School of Medicine. Data were not collected from participants who declined to consent. Data were not used if participants provided consent but: (a) failed to complete the questionnaire, or (b) were not teaching in the United States, or (c) were not clinical educators for primary care clinicians. The target learner population of self-identified primary care clinical educators included medical students (undergraduate medical education), medical residents (graduate medical education), nurse practitioner students, and physician assistant students. Given the implementation of the skip pattern, data regarding learners were only collected from those who indicated GIS use.

**Table 1.**  
**CHARACTERISTICS OF THE 104 RESPONDENTS**

Variables	Frequency (%)
Gender	
Female	77 (74)
Male	27 (26)
Prefer not to say	0 (0)
Self-describe	0 (0)
Race/Ethnicity	
White or Caucasian	80 (77)
Asian	12 (12)
Black or African American	7 (7)
Hispanic or Latino	5 (5)
Other	3 (3)
Refused	1 (1)
Terminal Degree	
M.D/D.O	76 (73)
PhD	19 (18)
PA	3 (3)
NP	3 (3)
RN/BSN/LPN	1 (1)
Other	6 (6)
Specialty	
Family Medicine	51 (49)
Internal Medicine	25 (24)
Pediatrics	7 (7)
OB/gynecology	2 (2)
Other	23 (22)

Those completing the consent form and questionnaire were automatically entered into a raffle for a chance to win either a \$500 or \$250 Amazon e-Gift card. Participants each received up to three reminder emails to complete the survey. Because of our use of list-servs to recruit eligible participants (with recruitment postings read by an unknown number of eligible people), we were unable to establish an accurate denominator; we were unable to calculate a response rate.

**Statistical analysis.** Descriptive statistics including frequencies, means, and standard deviations were calculated to summarize the responses to quantitative survey items and to examine their distributions (Table 1). Data were analyzed using STATA, version 15.1 (StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC) for multiple choice questions. Open-text responses were reviewed. Given the nature of the responses (limited text with a single theme—e.g., *time, staff, resources*) one open-text item is reported in the results as a quantitative response regarding barriers to a formal assessment of social determinants of health.

## Results

**Geographic distribution of survey respondents.** The distribution of all institutions involved is presented in Figure 1. The survey was completed at 77 academic and health system institutions from 30 states across the United States.

**Demographic characteristics of survey respondents.** Demographic and other respondent characteristics are reported in Table 1. The survey was completed by 104 self-identified clinical educators. Most participants were female (74%) and White (77%). Most respondents (73%) reported having a Medical Doctor (MD) or Doctor of Osteopathic Medicine (DO) degree. The majority of respondents' primary roles were reported as professors. The most frequent specialties included: family medicine (49%) and internal medicine (24%). Median time since completion of training was 19 years (0–47).

**Identifying and addressing social determinants of health.** *Knowledge and use of geospatial tools.* Tools for SDH and GIS use are reported in Table 2. Of the 104 respondents, 75 (72%) reported being familiar with at least one standardized tool for identifying SDH; 29 (28%) reported unfamiliarity with any tool. Of those familiar with at least one standard tool, the majority were familiar with the American Academy of Family Physicians Social Needs screening tool (46%) or the Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences (30%). A majority were very



Figure 1. Distribution of participating institutions.

**Table 2.****TOOLS USED TO IDENTIFY AND INTERVENE**

Variables	Frequency (%)
Familiar Tools for Identifying SDOH (N=104)	
American Academy of Family Physicians	48 (46)
PREPARE	31 (30)
Accountable Health Communities	29 (28)
HealthLandscape	16 (15)
Other	20 (19)
None	29 (28)
Online Tools Used to Intervene (N=30)	
No	73 (70)
Yes	31 (30)
Which Online Tools Used to Intervene (N=30)	
Aunt Bertha	11 (37)
EveryONE Project Neighborhood Navigator	7 (23)
Now Pow	5 (17)
Other	13 (43)
Use GIS in Clinical Practice (N=104)	
No	76 (73)
Yes	28 (27)
Who Uses Familiar Tools to Identify SDH (N=28)	
Faculty	15 (54)
Social workers	13 (46)
Medical residents	10 (36)
Students (MD, PT, RN, etc.)	9 (32)
Administrative staff	6 (21)
Medical assistants	4 (14)
Other	4 (14)
Use Frequency (N=28)	
Very Frequently ( $\geq 25$ times per year)	8 (29)
Frequently (12–24 times per year)	7 (25)
Never (1 time per year)	4 (14)
Rarely (2–5 times per year)	4 (14)
Occasionally (6–12 times per year)	3 (11)
Unsure	2 (7)

or somewhat confident that a formal assessment of SDH would work in their clinical practice environment (72%), with the major barriers being time and resources (68%). In addition, 30% (31/104) reported using online tools to intervene on identified SDH. Most commonly cited online tools used included Aunt Bertha (11/31, 37%), EveryONE Project Neighborhood Navigator (7/31, 23%) and Now Pow (5/31, 17%).

Of all respondents, 28 (27%) participants use GIS to identify and/or address social needs in a clinical practice that includes learners. Of GIS users, a majority reported

using SDH screening tools fewer than 25 times in a calendar year (71%). When used, SDH screening tools are used mostly by faculty (15/28, 54%) and social workers (13/28, 46%); residents were identified as using these tools less frequently (10/28, 36%).

**Learner involvement.** Responses regarding learners are reported in Table 3. Of the 104 respondents, 68 (65%) reported trainees being involved in addressing social needs, with most working in concert with social workers (85%), supervising faculty (82%) or behavioral health providers (59%). Programs that have trainees address social needs used a variety of different training methods including noon conferences (29%), small groups (34%), individual training (39%) and other didactic formats (49%). The primary objective of these training sessions was to increase knowledge about specific questions when screening patients (69%). When asked what is needed to engage trainees further, responses included EHR integrated tools (68%), dedicated staff (68%), funding (61%), standardized training modules (47%), and a faculty champion (43%).

For the 28 GIS or geospatial tool users in clinical practice settings with learners, the majority of learners are medical residents (68%) and medical students (21%). Educators are typically in contact with learners for five or more hours per week (57%) for 12 or more weeks a year (96%). Learners were primarily taught in outpatient settings (67%) in longitudinal primary care clinics (61%), and within academic centers (77%) rather than in community-based preceptorships (12%). Fifty-two percent (52%) of educators reported that specific recommendations from accrediting bodies such as the ACGME or LCME would influence their educational practices surrounding SDH.

## Discussion

This survey captures the practices of screening for and addressing unmet health-related social needs in the primary care clinical training environment with a particular focus on GIS use and trainee engagement. Responses show that a large number of educators are unaware of SDH screening tools and GIS resources available to screen systematically and then intervene on identified social needs. In addition, trainees are often left out of this process.

Prior research has shown that medical students and residents recall formal educational content in this area, but feel unprepared to identify and address SDH, though numerous curricula exist to address health inequities.<sup>18,19,24</sup> Prior studies have not specifically examined the clinical educational environment for learners' involvement with identifying and addressing SDH. Given the effects of a potential hidden curriculum, understanding the clinical learning environment may provide opportunities for effective interventions.

Several assessment tools have been developed to aid clinicians in identifying and addressing unmet health-related social needs in the clinical setting.<sup>21,25</sup> In surveying primary care educators across the country, our results indicate a lack of systematic use of these tools despite some demonstrated efficacy of screening approaches.<sup>26-31</sup> Perhaps the non-use reflects lack of awareness of such approaches, as indicated by nearly one-third of respondents reporting lack of awareness of any screening tools. This may be an underestimation given the survey sample population, as most respondents surveyed

**Table 3.**  
**LEARNERS**

Variables	Frequency (%)
Learners Involved in Addressing SDH (N=104)	
Yes	68 (65)
No	36 (35)
Who Do Learners Collaborate with to Address SDH (N=68)	
Social Workers	58 (85)
Supervising Faculty	56 (82)
Behavioral Health Providers	40 (59)
Dedicated Staff Members	23 (34)
Medical Assistants	16 (24)
Other Trainees	16 (24)
Other	6 (9)
No One	0 (0)
Objective of Training (N=67)	
Increase knowledge about questions to ask	46 (69)
Increase skill/comfort in using the instruments	29 (43)
Increase awareness about instruments	27 (40)
Working with other team members	24 (36)
Other	15 (22)
Format of Training (N=66)	
Other Didactic Format	33 (49)
Individual Training	26 (39)
Small Groups	23 (34)
Noon Conferences	19 (29)
Other	7 (10)
GIS User Specific Questions Direct Contact Hours (N=28)	
≤1	0 (0)
1-3	9 (32)
3-5	3 (11)
>5	16 (57)
Weeks in Direct Contact (N=27)	
≤1	0 (0)
2-4	1 (4)
4-12	0 (0)
>12	26 (96)
Where Learners Use GIS (N=27)	
Outpatient	18 (67)
Inpatient	1 (4)
Both	8 (30)
Primary Teaching Setting (N=28)	
Longitudinal Primary Care Clinics	17 (61)
Lecture	5 (18)

(continued on p. 314)



**Table 3. (continued)**

Variables	Frequency (%)
Primary Teaching Setting (N=28)	
Concentrated Clinical Rotations	4 (14)
Concentrated Primary Care Blocks	2 (7)
Noon Conferences	0 (0)
None	0 (0)
Primary Longitudinal Outpatient Setting for Learners (N=17)	
Academic	13 (77)
FQHC	2 (12)
Community-based Preceptorships	2 (12)
VA	0 (0)
Other	0 (0)

were primary care educators in academic systems with nearly two decades of experience who self-selected to complete a survey regarding SDH and GIS use. Even for those who are aware of such tools, other barriers may further limit the uptake of systematic screening and intervention, including, but not limited to inadequate training, perceptions of inadequate time and clinic resources, challenges of integrating data into the EHR, as well as awareness and access to community resources (if they exist) to address unmet social needs.<sup>15,32,33</sup>

In this investigation of the patterns of systematic screening for SDH in the primary care clinical training environment, we sought specifically to assess the use of GIS tools or geospatial data in these settings. Only one-quarter of the respondents report any use of these tools to identify and/or address social needs. Even by those who use GIS tools in clinical practice, use of SDH screening tools is infrequent (about twice a month) and most without participation of trainees. In fact, the respondents indicated that over one-third of learners are not involved in addressing SDH. The two-thirds who do participate in addressing SDH learn in a variety of educational formats, but mostly with the objective of increasing knowledge of questions to ask patients rather than systematic approaches to identify and address patients' social needs. As promising as are the benefits of systematic approaches to identify and address SDH in primary care clinical training environments (particularly using GIS tools), changes are needed to integrate geospatial technologies in physician training.

In this study, a large majority of respondents indicated that a formal assessment of SDH would work in their clinical practice environment. Most respondents report that further clarification and guidance on integration of SDH in the clinical curriculum by accrediting bodies would influence practices. In addition to direct curricular changes, the respondents identified that EHR integrated tools, increased funding and dedicated staff would also be drivers of change. Given that the respondents frequently reported funding as a barrier, perhaps further incorporation of SDH into risk adjustment models

or reimbursement through standardized CPT codes can further incentivize integration of SDH into routine clinical care, with the advantage of creating a robust data repository for additional research.<sup>34-36</sup>

This study has several limitations. Universal links to the survey were distributed via targeted listservs and professional societies to yield as many responses as possible, however this approach does not allow us to track responses or calculate a response rate. This method also does not allow for verification of self-reported responses, including whether the respondents are truly primary care clinical educators (though all respondents self-identified as clinical educators and were in theory contacted through primary care-focused listservs). Respondents may also lack awareness of educational resources or programs within their institution and, as a result, their responses may not reflect their broader clinical educational environment. In addition, educators may not have readily recognized regular practices as GIS strategies and, therefore, not reported them in the survey. However, as previously discussed, respondents self-selected as clinical educators to complete a survey described as medical educator and trainee use of GIS to address SDH, with the majority of respondents self-identifying as faculty associated with a university health system. Given the methods of survey distribution, response collection and self-selection, this is likely a biased sample of the overall primary care population, but one that likely reflects those with a special interest in or knowledge of this topic. Nevertheless, this is the first survey (to our knowledge) to collect information on the use of GIS in the clinical educational environment focused on identifying, addressing, and teaching SDH. Our findings are relevant to a wide group of medical educators and educational organizations.

**Conclusion.** Addressing health-related social needs is an important strategy for improving health outcomes of patients and communities. However, this survey indicates that nearly one-third of medical educators in primary care clinical training environments lack familiarity with any standardized screening tool for social needs, and more than one-third reported that trainees are not involved with mitigating patients' social needs, revealing a gap in training. Nor are GIS and geospatial data used frequently to identify and address SDH in this setting. Clearer recommendations from authoritative bodies would increase training in and uptake of systematic approaches to screening for and mitigating SDH.

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## References

1. Marmot M. Social determinants of health inequalities. *Lancet*. 2005 Mar 19–25;365(9464):1099–104.  
[https://doi.org/10.1016/S0140-6736\(05\)71146-6](https://doi.org/10.1016/S0140-6736(05)71146-6)
2. Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. *Public Health Rep*. 2014;129 Suppl 2(Suppl 2):19–31.  
<https://doi.org/10.1177/00333549141291S206>  
PMid:24385661 PMCID:PMC3863696
3. McGinnis JM, Williams-Russo P, Knickman JR. The case for more active policy attention to health promotion. *Health Aff (Millwood)*. 2002;21(2):78–93.  
<https://doi.org/10.1377/hlthaff.21.2.78>  
PMid:11900188
4. Hood CM, Gennuso KP, Swain GR, et al. County health rankings: relationships between determinant factors and health outcomes. *Am J Prev Med*. 2016 Feb;50(2): 129–35. Epub 2015 Oct 31.  
<https://doi.org/10.1016/j.amepre.2015.08.024>  
PMid:26526164
5. National Academies of Sciences, Engineering, and Medicine. A framework for educating health professionals to address the social determinants of health. Washington, DC: National Academies Press, 2016 Oct 14. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK395983/doi:10.17226/21923>.  
<https://doi.org/10.17226/21923>  
PMid:27854400
6. Marmot MG, Bell R. Action on health disparities in the United States: commission on social determinants of health. *JAMA*. 2009;301(11):1169–71.  
<https://doi.org/10.1001/jama.2009.363>  
PMid:19293419
7. Chaiyachati KH, Grande DT, Aysola J. Health systems tackling social determinants of health: promises, pitfalls, and opportunities of current policies. *Am J Manag Care*. 2016 Nov 1;22(11):e393–4.
8. Wiczorek WF, Delmerico AM. Geographic information systems. *Comput Stat*. 2009;1(2):167–86.  
<https://doi.org/10.1002/wics.21>  
PMid:20717487 PMCID:PMC2921721
9. O'Toole TP, Johnson EE, Aiello R, et al. Tailoring care to vulnerable populations by incorporating social determinants of health: The Veterans Health Administration's "Homeless Patient Aligned Care Team" program. *Prev Chronic Dis*. 2016 Mar 31;13:E44.  
<https://doi.org/10.5888/pcd13.150567>  
PMid:27032987 PMCID:PMC4825747
10. Hatf E, Searle KM, Predmore Z, et al. The impact of social determinants of health on hospitalization in the Veterans Health Administration. *Am J Prev Med*. 2019 Jun;56(6):811–8. Epub 2019 Apr 17.  
<https://doi.org/10.1016/j.amepre.2018.12.012>  
PMid:31003812
11. Hu J, Gonsahn MD, Nerenz DR. Socioeconomic status and readmissions: evidence from an urban teaching hospital. *Health Aff (Millwood)*. 2014 May;33(5):778–85.

- <https://doi.org/10.1377/hlthaff.2013.0816>  
PMid:24799574
12. Bazemore AW, Cottrell EK, Gold R, et al. "Community vital signs": incorporating geocoded social determinants into electronic records to promote patient and population health. *J Am Med Informatics Assoc.* 2016 Mar;23(2):407–12. Epub 2015 Jul 13. <https://doi.org/10.1093/jamia/ocv088>  
PMid:26174867
  13. Lindau ST, Makelarski J, Abramssohn E, et al. CommunityRx: a population health improvement innovation that connects clinics to communities. *Health Aff (Millwood).* 2016;35(11):2020–9. <https://doi.org/10.1377/hlthaff.2016.0694>  
PMid:27834242 PMCID:PMC5573228
  14. Gold R, Cottrell E, Bunce A, et al. Developing Electronic Health Record (EHR) strategies related to health center patients' social determinants of health. *J Am Board Fam Med.* 2017 Jul–Aug;30(4):428–47. <https://doi.org/10.3122/jabfm.2017.04.170046>  
PMid:28720625 PMCID:PMC5618800
  15. Cantor MN, Thorpe L. Integrating data on social determinants of health into electronic health records. *Health Aff (Millwood).* 2018 Apr;37(4):585–90. <https://doi.org/10.1377/hlthaff.2017.1252>  
PMid:29608369
  16. Committee on the Recommended Social and Behavioral Domains and Measures for Electronic Health Records; Board on Population Health and Public Health Practice; Institute of Medicine. Capturing social and behavioral domains and measures in electronic health records: Phase 2. Washington, DC: National Academies Press, 2015 Jan 8. Available at: <https://pubmed.ncbi.nlm.nih.gov/25590118/>.
  17. Hunter K, Thomson B. A scoping review of social determinants of health curricula in post-graduate medical education. *Can Med Educ J.* 2019 Jul 24;10(3):e61-71. <https://doi.org/10.36834/cmej.61709>
  18. Doobay-Persaud A, Adler MD, Bartell TR, et al. Teaching the social determinants of health in undergraduate medical education: a scoping review. *J Gen Intern Med.* 2019;34(5):720–30. <https://doi.org/10.1007/s11606-019-04876-0>  
PMid:30993619 PMCID:PMC6502919
  19. Gard LA, Peterson J, Miller C, et al. Social determinants of health training in U.S. primary care residency programs: a scoping review. *Acad Med.* 2019;94(1):135–43. <https://doi.org/10.1097/ACM.0000000000002491>  
PMid:30334837
  20. Andermann A. Screening for social determinants of health in clinical care: moving from the margins to the mainstream. *Public Health Rev.* 2018 Jun 22;39:19. <https://doi.org/10.1186/s40985-018-0094-7>  
PMid:29977645 PMCID:PMC6014006
  21. O'Gurek DT, Henke C. A Practical approach to screening for social determinants of health. *Fam Pract Manag.* 2018 May–Jun;25(3):7–12.
  22. Liaison Committee on Medical Education (LCME), Association of American Medical Colleges and American Medical Association. Functions and structure of a medical school. Washington, DC: LCME, 2019. Available at: <https://rfums-bigtree.s3.amazonaws.com/files/resources/2019-20-functions-and-structure.pdf>.

23. Accreditation Council for Graduate Medical Education (ACGME). ACGME common program requirements (residency). Chicago, IL: ACGME, 2020. Available at: <https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRResidency2020.pdf>.
24. Marshall JK, Cooper LA, Green AR, et al. Residents attitude, knowledge, and perceived preparedness toward caring for patient from diverse sociocultural backgrounds. *Health Equity*. 2017 Feb 1;1(1):43–9. <https://doi.org/10.1089/heq.2016.0010> PMID:28905046 PMCID:PMC5586003
25. Cartier Y, Fichtenberg C, Gottlieb L. Screening tools comparison tables. San Francisco, CA: Siren, 2018. Available at: <https://sirenetwork.ucsf.edu/tools-resources/resources/screening-tools-comparison-tables>.
26. Gottlieb L, Hessler D, Long D, et al. A randomized trial on screening for social determinants of health: the iScreen Study. *Pediatrics*. 2014 Dec;134(6):e1611–8. Epub 2014 Nov 3. <https://doi.org/10.1542/peds.2014-1439> PMID:25367545
27. Buitron de la Vega P, Losi S, Sprague Martinez L, et al. Implementing an EHR-based screening and referral system to address social determinants of health in primary care. *Med Care*. 2019 Jun;57(Suppl 6):S133–9. <https://doi.org/10.1097/MLR.0000000000001029> PMID:31095052
28. Gottlieb LM, Hessler D, Long D, et al. Effects of social needs screening and in-person service navigation on child health. *JAMA Pediatr*. 2016 Nov 7;170(11):e162521. Epub 2016 Nov 7. <https://doi.org/10.1001/jamapediatrics.2016.2521> PMID:27599265
29. Garg A, Toy S, Tripodis Y, et al. Addressing social determinants of health at well child care visits: a cluster RCT. *Pediatrics*. 2015;135(2):e296–304. Epub 201 Jan 5. <https://doi.org/10.1542/peds.2014-2888> PMID:25560448 PMCID:PMC4306802
30. Taveras EM, Marshall R, Sharifi M, et al. Comparative effectiveness of clinical-community childhood obesity interventions. *JAMA Pediatr*. 2017 Aug 7;171(8):e171325. Epub 2017 Aug 7. <https://doi.org/10.1001/jamapediatrics.2017.1325> PMID:28586856 PMCID:PMC6075674
31. Hassan A, Blood EA, Pikcilingis A, et al. Youths' health-related social problems: concerns often overlooked during the medical visit. *J Adolesc Health*. 2013 Aug;53(2):265–71. Epub 2013 May 1. <https://doi.org/10.1016/j.jadohealth.2013.02.024> PMID:23643339
32. Gottlieb L, Tobey R, Cantor J, et al. Integrating social and medical data to improve population health: opportunities and barriers. *Health Aff (Millwood)*. 2016 Nov 1;35(11):2116–23. <https://doi.org/10.1377/hlthaff.2016.0723> PMID:27834254
33. Krist AH, Davidson KW, Ngo-Metzger Q. What evidence do we need before recommending routine screening for social determinants of health? *Am Fam Physician*. 2019 May 15;99(10):602–5.

34. National Academies of Sciences, Engineering, and Medicine. Accounting for social risk factors in Medicare payment: criteria, factors, and methods. Washington, DC: National Academies Press, 2016.
35. Galloway I. Using pay-for-success to increase investment in the nonmedical determinants of health. *Health Aff (Millwood)*. 2014 Nov;33(11):1897–904.  
<https://doi.org/10.1377/hlthaff.2014.0741>  
PMid:25367983
36. Ash AS, Mick EO, Ellis RP, et al. Social determinants of health in managed care payment formulas. *JAMA Intern Med*. 2017 Oct 1;177(10):1424–30.  
<https://doi.org/10.1001/jamainternmed.2017.3317>  
PMid:28783811 PMCID:PMC5710209

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