


Perspective

Removing the roadblocks to promoting health equity: finding the social determinants of health addressed in standardized nursing classifications

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ABSTRACT

Providing 80% of healthcare worldwide, nurses focus on physiologic and psychosocial aspects of health, which incorporate social determinants of health (SDOH). Recognizing their important role in SDOH, nurse informatics scholars included standardized measurable terms that identify and treat issues with SDOH in their classification systems, which have been readily available for over 5 decades. In this *Perspective*, we assert these currently underutilized nursing classifications would add value to health outcomes and healthcare, and to the goal of decreasing disparities. To illustrate this, we mapped 3 rigorously developed and linked classifications: NANDA International (NANDA-I), Nursing Interventions Classification (NIC), and Nursing Outcomes Classification (NOC) called NNN (NANDA-I, NIC, NOC), to 5 Healthy People 2030 SDOH domains/objectives, revealing the comprehensiveness, usefulness, and value of these classifications. We found that all domains/objectives were addressed and NNN terms often mapped to multiple domains/objectives. Since SDOH, corresponding interventions and measurable outcomes are easily found in standardized nursing classifications (SNCs), more incorporation of SNCs into electronic health records should be occurring, and projects addressing SDOHs should integrate SNCs like NNN into their ongoing work.

Key words: social determinants of health, standardized nursing classifications, NANDA-I, NOC, NIC

BACKGROUND AND SIGNIFICANCE

Nurses comprise the majority of health care personnel in the world¹ and provide up to 80% of health care worldwide.² In providing holistic care, nurses focus on both the physiological and psychosocial aspects of health. Importantly, this includes the social determinants of health (SDOH), such as food insecurity, housing instability, lack of education, lack of social support, unemployment, and lack of transportation.^{3–8} Recognizing nurses' important role in SDOH, nursing informatics scholars developed standardized measurable terms to assess and treat issues with SDOH. Within their groundbreaking research they developed classification systems for problems that nurses address (nursing diagnosis), activities nurses do to address problems (nursing interventions) and measurable nursing-care-sensitive outcomes. These classification systems have been readily available for over 5 decades.^{9–13}

More recently, other groups such as the Gravity Project¹⁴ and the Social Interventions Research and Evaluation Network (SIREN),¹⁵ have been developing standardized guidelines that capture a person's social needs during a healthcare visit, for the electronic health record (EHR). In addition, the Office of the National Coordinator for Health Information

Technology (ONC) has developed a toolkit for SDOH information exchange¹⁶ to contribute to better health outcomes.¹⁷

Although these efforts are making important progress, drawing from the existing nursing evidence-based classifications that include SDOH could streamline and enhance this process. This existing nursing work should not only be acknowledged but should be included in ongoing efforts to incorporate SDOH in the EHR. We believe that existing standardized nursing terminologies provide a coded and interoperable way to identify SDOH, choose appropriate evidence-based interventions and measure the outcomes of the interventions over time. Importantly, the opportunity costs associated with not including these classifications in the EHR will delay efforts to eliminate health disparities. Therefore, the purpose of this paper is to highlight 3 of the well-developed standardized nursing classifications (SNCs): NANDA International (NANDA-I), Nursing Outcomes Classification (NOC), and Nursing Interventions Classification (NIC); and to illustrate their usefulness in the EHR, including an enhanced ability to track and impact SDOH outcomes when these classifications are incorporated into EHR documentation systems.

NURSING CLASSIFICATIONS AND THE SOCIAL DETERMINANTS OF HEALTH

To have terms that can demonstrate the value of nursing care, nursing informaticists began developing SNCs for health care documentation needs in the 1970s.^{9–13,18} Some of the SNCs currently in use work synergistically. For example, the NANDA-I diagnoses are used to diagnose a person's health problems, NOC are used to set goals and desirable health outcomes for those diagnoses, and the NIC provide the needed nursing care or interventions to achieve the NOC outcomes. Collectively referred to as NNN (NANDA-I, NIC, and NOC), these SNCs were selected for this project as they have been used most often in research and secondary data analysis worldwide,^{19–21} are suitable for use in secondary analysis of EHR data,²¹ and have sound taxonomic nursing structures (including definitions on all classification levels).^{13,22,23} Finally, since the NNN are classifications, not terminologies, their descriptors are observable or measurable,^{13,24,25} making them more amenable to mapping.

Although originally developed by nursing informatics scholars, these classifications are applicable to many health care disciplines, and are well-suited to the development of interprofessional and nursing-focused plans of care. Importantly, these classifications not only name and enable tracking of SDOH, but provide evidence-based interventions²⁴ and standardized ways to document progress on achieving patients' goals.²⁵

NANDA International (NANDA-I), Nursing Interventions Classification (NIC), Nursing Outcomes Classification (NOC)

Created in the 1970s, the NANDA-I Classification of Nursing Diagnoses contains health problems that can be applied at the individual, family, or community level. The NANDA-I includes a taxonomy of 13 domains, 47 classes, and 267 diagnoses, which contain definitions, clinical indicators, and etiological elements that are research-based and support accurate diagnoses. NANDA-I is a clinically validated classification with the number of NANDA-I diagnoses found to be a strong independent predictor of hospital length of stay and hospital mortality, while use of the classification adds accuracy to predictive models of mortality that include traditional predictive data like demographics, diseases, disease severity, and morbidity indexes.^{26–28} Studies conducted as early as the 1990s indicated the value of NANDA-I diagnoses, demonstrating relationships with hospital length of stay, Intensive Care Unit (ICU) length of stay, and total charges, and increased explanatory power when added to models with diagnosis related groups (DRGs) or all patients refined DRGs (APR-DRGs).²⁹

The NIC, first published in 1992, provides a way to exchange comparable information about the treatments that address health concerns (social and other). It contains 7 domains, 30 classes and 614 interventions, which are researched, have been effectively implemented in multiple settings worldwide, and are able to be used by multiple disciplines.^{24,30–33}

The NOC, first published in 1997, provides terms that capture changes in status after intervention. The NOC is measured on a 5-point Likert-type scale that allows clinicians to track their patient's progress, or lack thereof, over time. It contains 7 domains, 34 classes and 540 outcomes. Like the

NIC, it is researched, has been effectively implemented worldwide, and can be used by multiple disciplines.^{25,34–37}

It is important to note that, although NNN are not widely used by EHR vendors in the United States (US), they are broadly used in multiple settings worldwide (see [Figure 1](#)). Their usefulness in predictive health care models is documented in multiple studies from countries such as Italy, Spain, China, Brazil, and Turkey.^{26–28,38–42} Research conducted in health care organizations that use NNN produces meaningful data that are a valid representation of nursing care and amenable to efficient processing and analysis,⁴³ demonstrate relationships between nursing care plan components and patient outcomes,^{28,44} and assist the care provider in targeting areas of need, such as SDOH.⁴⁵

Social determinants of health

Though there are many categories of SDOH, the population disease prevention and health promotion work from the *Healthy People 1990* publication⁴⁶ provides a foundation for subsequent efforts, in conjunction with the World Health Organization.⁴⁷ Currently in its 5th iteration, *Healthy People 2030* has 42 priority areas and 1300+ objectives aimed at improving overall population health.^{17,46,48–51} Influenced by the WHO's publications and ongoing discussions of the effects of SDOH worldwide,⁴⁷ critical target areas were added to the existing *Healthy People* objectives to include an area of SDOH domains and objectives in the *Healthy People 2030* iteration.¹⁷ There are 5 SDOH domains of interest in the *Healthy People 2030* publications: Health Care Access and Quality, Social and Community Context, Economic Stability, Neighborhood and Built Environment, and Education Access and Quality.⁵² These SDOH are also a focus in *The Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity*,⁵³ which is a blueprint created by members of the National Academies of Sciences, Engineering and Medicine, and intended as a set of “bold recommendations to strengthen the capacity, education, and critical role of the nursing workforce” (p. ix). The *Healthy People 2030* SDOH, coupled with the *Future of Nursing* recommendations, have influenced the direction of several nursing research studies^{54,55} and nursing educational efforts.⁵⁶ These influences directed our selection of SDOH for this project.

Mapping of NNN with SDOH

To assess the usefulness of the NNN to SDOH care delivery, we formed a team of 5 nurse experts to identify socially relevant NNN terms that connect to the *Healthy People 2030* SDOH domains and their corresponding targeted objectives, using the following method: (1) 2 authors (CMW, CTL) mapped NNN labels to each SDOH objective, using the textbooks' taxonomies and reviewing page by page, while examining corresponding definitions, defining characteristics, activities, and indicators; (2) these initial mappings were placed into tables organized by SDOH domains and objectives; (3) a team of 3 authors (KDL, EAMM, GAJ) independently marked each mapping for agreement or disagreement; (4) a team of 4 authors met to develop consensus. During the consensus process, 305 decisions were changed and 99 terms were added.

[Figure 2](#) is a representation of the mapping data in the form of a heat map or diagram in which data values are represented as colors that indicate ranges of data. Red indicates no terms matched the objective, yellow indicates 1–2 terms matched,

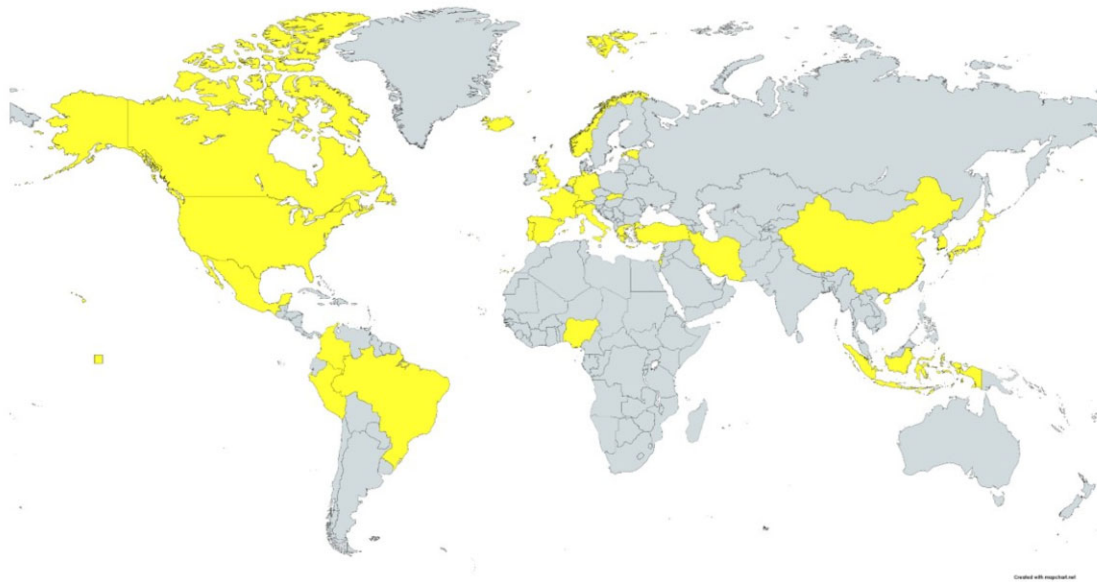


Figure 1. Countries using NANDA-I, NIC, and NOC. International use of NIC and NOC in education, practice, and/or research. Countries are Brazil, Canada, China, Colombia, Estonia, France, Germany, Greece, Iceland, Indonesia, Israel, Iran, Italy, Japan, Mexico, Netherlands, Nigeria, Norway, Peru, Portugal, Slovakia, South Korea, Spain, Switzerland, Turkey, United Kingdom, United States, and Wales.

and green indicates more than 2 terms of each individual NNN matched to an SDOH objective. The mapping revealed that all objectives in all domains are addressed by at least one set of NNN, and that multiple terms of the NNN mapped to more than one of the objectives in the domains. When duplicated terms were accounted for, a total of 109 unique NANDA-I, 159 unique NIC, and 173 unique NOC labels were found to address objectives in the Healthy People 2030 SDOH Domains.

DISCUSSION

The value of using SNCs in nursing care documentation is demonstrated in many international research publications and several from the US.^{26–28,38–42,44,57–59} These rigorously developed classification systems address a broad array of aspects of patient care and include SDOH evidence-based interventions and measurable outcomes. Nonetheless, for those making efforts to develop EHR terms that address SDOH, it may be a surprise that many terms suitable for interprofessional care documentation have already been developed, linked to evidence, and validated by nursing informatics experts. While we have focused in this *Perspective* on NNN, other classifications include SDOH, such as the Omaha System.^{58,59} When these classifications are used in the EHR, the ability to track and address a person's SDOH becomes simplified. Once a problem or a need is identified (using NANDA-I) in a nursing or interdisciplinary care plan, it is incumbent upon the clinicians to provide a means of addressing the issue. Multiple evidence-based interventions (at the individual, family, and public health level) that can address the problem (diagnosis) can be found in NIC with measurable outcomes in NOC. Therefore, NNN goes beyond

naming and tracking SDOH, to intervening and monitoring progress toward goals over time.

Selected examples of multidisciplinary care plans addressing the Healthy People SDOH objectives and using the NNN are noted in [Table 1](#). In practice, the use of these particular care plan components or any of the other unique NNN terms mapped to the SDOH would indicate that there is an SDOH need and the clinicians would be alerted to choose appropriate interventions in this area, thus promoting health equity.⁶⁰

So why are these classifications not extensively used in the EHR to assist in focusing health care on SDOH needs? Unfortunately, with the movement toward computerized health care using EHRs in the US, the knowledge of nursing informaticists with expertise in standardized nursing classifications is not always pursued. In addition, unlike many European countries (eg, Italy, Spain, Estonia, Finland), the US has not enacted federal policies for the use of standardized nursing languages. This has resulted in nursing documentation in EHR systems that focuses on flowsheets with check-boxing tasks and assessments.⁶¹ Thus, the intellectual and critical thinking work of nurses to identify patient problems, plan interventions and measure outcomes of those interventions is largely invisible in our current EHRs. Many documentation systems currently implemented by EHR vendors do not contain SNCs,^{62–68} thus creating missed opportunities to use NNN to target and address SDOH needs such as those arising from the recent pandemic.^{69–72}

If assessment and management of SDOHs are easily found in SNCs and these classifications are used regularly as part of the nursing process of care, more incorporation of SNCs into the EHRs should be occurring. The *Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity*⁵³ recommended that nursing expertise should be used in the design, generation, application, and analyzing of new technology in

Healthy People 2030	NANDA-I 12 th	NIC 8 th	NOC 6 th
Economic Stability Domain			
1. Reduce the proportion of adolescents and young adults who aren't in school or working	Green	Green	Green
2. Reduce the proportion of people living in poverty	Green	Green	Green
3. Increase employment in working-age people	Green	Yellow	Green
4. Increase the proportion of children living with at least 1 parent who works full time	Green	Yellow	Green
5. Reduce the proportion of adults with arthritis whose arthritis limits their work	Green	Yellow	Green
6. Reduce the proportion of families that spend more than 30 percent of income on housing	Green	Green	Yellow
7. Reduce household food insecurity and hunger	Green	Green	Green
8. Eliminate very low food security in children	Green	Green	Green
9. Reduce work-related injuries resulting in missed work days	Yellow	Yellow	Green
Social and Community Context Domain			
1. Reduce anxiety and depression in family caregivers of people with disabilities	Green	Yellow	Green
2. Increase the proportion of the voting-age citizens who vote	Green	Red	Yellow
3. Reduce the proportion of children with a parent or guardian who has served time in jail	Green	Yellow	Green
4. Increase the proportion of adolescents who have an adult they can talk to about serious problems	Green	Green	Green
5. Increase the proportion of adolescents in foster care who show signs of being ready for adulthood	Green	Green	Green
6. Increase the proportion of children and adolescents who communicate positively with their parents	Green	Green	Green
7. Increase the proportion of children whose family read to them at least 4 days per week	Green	Green	Green
8. Increase the proportion of children and adolescents who show resilience to challenges and stress	Green	Green	Green
9. Increase the proportion of adults who talk to friends or family about their health	Green	Green	Green
10. Increase the health literacy of the population	Yellow	Green	Green
11. Increase the proportion of adults who use IT to track health care data or communicate with providers	Green	Green	Green
12. Reduce bullying of transgender students	Green	Green	Green
13. Eliminate very low food security in children	Green	Green	Green
14. Reduce the proportion of people with intellectual and developmental disabilities who live in institutional settings with 7 or more people	Green	Green	Green
Education Access and Quality Domain			
1. Increase the proportion of high school students who graduate in 4 years	Green	Green	Green
2. Increase the proportion of high school graduates in college the October after graduating	Green	Yellow	Green
3. Increase the proportion of 8th-graders with reading skills at or above the proficient level	Green	Green	Green
4. Increase the proportion of 8th-graders with math skills at or above the proficient level	Green	Yellow	Green
5. Increase the proportion of children who are developmentally ready for school	Green	Green	Green

Figure 2. Heat map connecting NNN concepts by healthy people domains.

6. Increase the proportion of children who participate in high-quality early childhood education programs			
7. Increase the proportion of children and adolescents who get preventive mental health care in school			
8. Increase the proportion of children with developmental delays who get intervention services by age 4 years			
9. Increase the proportion of students with disabilities who are usually in regular education programs			
10. Increase the proportion of 4th-graders with math skills at or above the proficient level			
11. Increase the proportion of 4th-graders with reading skills at or above the proficient level			
12. Increase interprofessional prevention education in health professions training programs			
Neighborhood and Built Environment			
1. Reduce the rate of minors and young adults committing violent crimes			
2. Increase the proportion of schools with policies and practices that promote health and safety			
3. Increase the proportion of adults with broadband internet			
4. Increase the proportion of people whose water supply meets Safe Drinking Water Act regulations			
5. Reduce the amount of toxic pollutants released into the environment			
6. Reduce health and environmental risks from hazardous sites			
7. Reduce the number of days people are exposed to unhealthy air			
8. Increase the proportion of people whose water systems have the recommended amount of fluoride			
9. Reduce blood lead levels in children aged 1 to 5 years			
10. Reduce the proportion of families that spend more than 30 percent of income on housing			
11. Reduce deaths from motor vehicle crashes			
12. Increase the proportion of homes that have an entrance without steps			
13. Increase the proportion of adults who walk or bike to get places			
14. Increase the proportion of adolescents who walk or bike to get places			
15. Reduce asthma deaths			
16. Reduce emergency department visits for children under 5 years with asthma			
17. Reduce emergency department visits for people aged 5 years and over with asthma			
18. Reduce asthma attacks			
19. Reduce hospitalizations for asthma in children under 5 years			
20. Reduce hospitalizations for asthma in people aged 5 to 64 years			
21. Reduce hospitalizations for asthma in adults aged 65 years and over			
22. Reduce hospitalizations for COPD			
23. Reduce the proportion of adults who have hearing loss due to noise exposure			
24. Increase the proportion of smoke-free homes			
25. Increase the number of states, territories, and DC that prohibit smoking in worksites, restaurants, and bars			

Figure 2. Continued.

26. Reduce the proportion of people who don't smoke but are exposed to secondhand smoke			
27. Increase the number of states, territories, and DC that prohibit smoking in multiunit housing			
28. Increase trips to work made by mass transit			
29. Increase the proportion of worksites with policies that ban indoor smoking			
Health Care Access and Quality Domain			
1. Reduce the proportion of emergency department visits with a longer wait time than recommended			
2. Increase the proportion of adults who get recommended evidence-based preventive health care			
3. Increase the proportion of adolescents who had a preventive health care visit in the past year			
4. Increase the proportion of adolescents who speak privately with a provider at a preventive medical visit			
5. Increase the proportion of adults who get screened for lung cancer			
6. Increase the proportion of females who get screened for breast cancer			
7. Increase the proportion of adults who get screened for colorectal cancer			
8. Increase the proportion of females who get screened for cervical cancer			
9. Increase the proportion of people who discuss interventions to prevent cancer with their providers			
10. Increase the proportion of people with colorectal cancer who get tested for Lynch syndrome			
11. Increase the proportion of children with developmental delays who get intervention services by age 4 years			
12. Increase the number of community organizations that provide prevention services			
13. Increase the proportion of people with a substance use disorder who got treatment in the past year			
14. Increase the proportion of women who get needed publicly funded birth control services and support			
15. Increase use of the oral health care system			
16. Reduce the proportion of people who can't get medical care when they need it			
17. Reduce the proportion of people who can't get prescription medicines when they need them			
18. Increase the proportion of people with a usual primary care provider			
19. Increase the ability of primary care and behavioral health professionals to provide more high-quality care to patients who need it			
20. Increase the proportion of adults whose health care providers involved them in decisions as much as they wanted			
21. Increase the proportion of adults whose health care provider checked their understanding			
22. Decrease the proportion of adults who report poor communication with their health care provider			
23. Increase the proportion of adults with limited English proficiency who say their providers explain things clearly			

Figure 2. Continued.

24. Increase the proportion of adults offered online access to their medical record	Green	Green	Yellow
25. Increase the proportion of hospitals that exchange and use outside electronic health information	Green	Yellow	Yellow
26. Increase the proportion of hospitals with access to necessary electronic information	Green	Yellow	Yellow
27. Increase the proportion of doctors with electronic access to information they need	Green	Yellow	Yellow
28. Increase the proportion of doctors who exchange and use outside electronic health information	Green	Yellow	Red
29. Increase the proportion of people who can view, download, and send their electronic health information	Green	Green	Yellow
30. Increase the proportion of people who say their online medical record is easy to understand	Green	Green	Yellow
31. Increase the use of telehealth to improve access to health services	Green	Green	Yellow
32. Increase the proportion of people with health insurance	Yellow	Green	Green
33. Increase the proportion of people with prescription drug insurance	Yellow	Green	Green
34. Reduce the proportion of people under 65 years who are underinsured	Yellow	Green	Green
35. Increase the proportion of low-income youth who have a preventive dental visit	Green	Green	Green
36. Reduce the proportion of people who can't get the dental care they need when they need it	Green	Green	Green
37. Increase the proportion of people with dental insurance	Green	Green	Green
38. Increase the proportion of pregnant women who receive early and adequate prenatal care	Green	Green	Green
39. Increase the proportion of newborns who get screened for hearing loss by age 1 month	Yellow	Green	Green
40. Increase the proportion of infants who didn't pass their hearing screening who get evaluated for hearing loss by age 3 months	Yellow	Green	Green
41. Increase the proportion of infants with hearing loss who get intervention services by age 6 months	Yellow	Green	Green
42. Increase access to vision services in community health centers	Yellow	Green	Green
43. Reduce the number of new HIV infections	Green	Green	Green
44. Increase knowledge of HIV status	Green	Green	Green
45. Reduce the number of new HIV diagnoses	Green	Green	Green
46. Increase linkage to HIV medical care	Green	Green	Green
47. Increase viral suppression	Green	Green	Green
48. Reduce the rate of mother-to-child HIV transmission	Green	Green	Green
49. Increase the proportion of sexually active female adolescents and young women who get screened for chlamydia	Green	Green	Green
***Legend Red = 0 matches, Yellow = 1-2 Matches, Green = >2 matches			

Figure 2. Continued.

the workplace and in projects directed at enhancing that technology. The addition of nursing SNC expertise can serve to enhance these projects and further promote understanding of and attention to SDOH and their impact on overall ability to achieve good health.

CONCLUSION

We have demonstrated the promise of NNN to identify and promote health equity. It is clear from existing international

research that the use of standardized nursing classifications in documentation provides important insights into health and health outcomes in acute care, illustrating the promise of widespread use to focus on SDOH and health disparities.^{26-28,38-42,44,45,57-59} Importantly, NNN offer not just the identification of SDOH, but evidence-based and actionable interventions that the care team can implement, with measurable outcomes to determine the impact of these interventions. Future work that includes SNC expertise is needed to partner with organizations that focus on developing interoperable EHR terms for SDOH.

Table 1. Selected examples link healthy people domain objectives to NNN

Examples of objective mappings		
Economic stability domain		
Reduce work-related injuries resulting in missed work days—OSH—02		
NANDA—I (diagnosis) 12th edition	NOC 6th edition (outcome)	NIC 8th edition (intervention)
Risk for occupational injury	Personal safety behavior Risk control: environmental hazards	Body mechanics promotion
Social and community context		
Reduce anxiety and depression in family caregivers of people with disabilities—DH—D01		
Caregiver role strain	Caregiver well-being	Caregiver support
Education access and quality		
Increase the proportion of children who are developmentally ready for school—EMC—D01		
Risk for delayed child development	Knowledge: parenting	Child care Parental education: childrearing family Teaching: early childhood development
Neighborhood and built environment		
Reduce the amount of toxic pollutants released into the environment—EH—06		
Risk for contamination	Community risk control: environmental hazards	Community disaster preparedness
Health care access and quality		
Increase the proportion of adults with limited English proficiency who say their providers explain things clearly—HC/HIT—D11		
Readiness for enhanced health literacy	Client satisfaction: communication Client satisfaction: cultural needs fulfillment Health literacy behavior	Culture care negotiation Health coaching Health education Health literacy enhancement

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AUTHOR CONTRIBUTIONS

CMW: Lead on first draft and manuscript revisions; assisted with writing; created mapping; critical review of mappings for consensus; critical review of final draft of article. CTL: Assisted with writing; created mapping; critical review of final draft of article. GAJ: Assisted with writing; critical review of mappings for consensus; critical review of final draft of article. EAMM: Assisted with writing; created tables and figures; critical review of mappings for consensus; critical review of final draft of article. ED: Critical review of final draft of article. KDL: Assisted with writing; critical review of mappings for consensus; critical review of final draft of article.

CONFLICT OF INTEREST STATEMENT

The authors have no competing interests to declare.

DATA AVAILABILITY

Data available on request.

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