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The Development of Social Determinants of Health Outcome Measures: The Role of Multisector Partnerships and Community Validation

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Abstract

Purpose: To develop a set of social determinants of health (SDOH) measurements.

Problem: Despite burgeoning interest in addressing both SDOH and health-related social needs, the evidence on what works is limited due in part to the lack of standardized measures for evaluation.

Methods: In 2020, the Centers for Disease Control and Prevention (CDC) National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) identified 5 SDOH domains related to chronic disease for future programmatic work. These included built environment, community connections to clinical care, tobacco-free policies, social connectedness, and food and nutrition security. Subsequently, NCCDPHP launched an effort to develop a set of SDOH

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measures for evaluating funded programs in these domains. The approach involved a literature scan and a rating process based on 5 criteria relevant to NCCDPHP's SDOH priorities. A complementary community review by 13 multisector community partnerships (MCPs) applied a real-world public health practice lens to measure development. MCPs' ratings were analyzed to create summary scores for each measure, and open-ended feedback was synthesized using rapid qualitative analysis.

Results: The internal workgroup identified 59 measures from the initial 200 measures. Feedback from the MCPs identified issues of relevancy and burden of measures. Their high scores narrowed the 59 measures to 22 covering all 5 domains. In response, CDC is honing the original measures review criteria to include community perspectives.

Conclusion: Public health measures development is often an academic pursuit. Engaging MCPs lends real-world credibility to the development of common SDOH measures.

Keywords

health-related social needs; measures; multisector partnerships; public health; social determinants of health

Introduction

Social determinants of health (SDOH) are the non-medical factors that affect our health. They range widely from our physical environment to our access to safe affordable housing, nutritious food, and optimal education and have more influence on health than medical care.[1,2] Throughout the United States, grave disparities in social determinants contribute to health inequities.[3,4] SDOH also contribute to individuals' health-related social needs (HRSN), which are inextricably linked to health outcomes.[3] For example, when a community does not have affordable access to healthy food, it is difficult for an individual to obtain such food and manage a chronic condition like diabetes.

Today, health care providers are increasingly focused on strategies to assess and address patients' unmet HRSN in part due to a recent rule issued by the Centers for Medicare and Medicaid Services. This rule requires health care providers to screen for HRSN[4] in 5 core domains: food insecurity, housing instability, transportation needs, difficulty paying utilities, and interpersonal safety. Health care screening and referral are important tools, but not enough to address the broader community-level SDOH. These broader SDOH reflect the community context and can support or create barriers to health.[4,5,6,7] We need to learn more about what works to improve health outcomes at both the individual and population levels by addressing SDOH, but consistent measures are lacking.

Multisector community partnerships (MCPs) and coalitions are essential elements of a comprehensive approach to address SDOH and advance health equity.[5,6] MCPs are generally made up of representatives from a broad spectrum of organizations (eg, public health, human services, healthcare, transportation, and faith-based), as well as community residents.[6] MCPs work to improve community health on a population basis, including changes to policies, practices, and systems that target the upstream causes of health inequities.[7]

As interest in addressing both SDOH and HRSN grows and evidence on what works to improve HRSN and SDOH is accumulating, there are still gaps that need to be addressed.[8,9] Currently there is no standard set of measures to help enhance the evidence base. Within the health care system, there is some evidence that addressing an individual's HRSN can lead to reduction in health care utilization.[10] At the community level, there is some evidence that MCPs can drive changes that promote health (eg, complete streets policies, improved walkability of communities, incentivizing food accessfarmers markets, and mobile delivery).[7,11] However, more consistent and validated evidence is needed to demonstrate how addressing SDOH at the community level can improve health outcomes.[12] Therefore, it is critical that we move toward a measurement framework that integrates community- and individual-level data from multiple sources and settings. An integrated measurement framework could help grow the evidence base for, and maximize the impact of, investments in comprehensive SDOH interventions. This paper describes the approach applied by the Centers for Disease Control and Prevention (CDC) National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) to develop a set of SDOH measures that could be used in evaluations of funded programs and highlights the value of gathering real-world feedback from MCPs working to address SDOH at the community level.

Methods

In 2020, NCCDPHP prioritized 5 SDOH domains that are strongly tied to chronic disease: built environment (BE), community connections to clinical care (community-clinical linkages [CCL]), tobacco-free policies (TFP), social connectedness (SC), and food and nutrition security (FNS). Subsequently, as part of NCCDPHP's ongoing commitment to health equity and to reducing disparities in chronic disease, the center developed a strategic framework for addressing SDOH in 2022.[3]

Developing a set of SDOH measures

After establishing a strategic framework for addressing SDOH, NCCDPHP established a SDOH measurement workgroup to develop a set of SDOH measures that could be used to advance programmatic work in the 5 prioritized SDOH domains. The workgroup consisted of 21 staff members from across the NCCDPHP with subject matter expertise in program evaluation, measurement, and SDOH. The workgroup was charged with developing a standard set of outcome measures for the 5 SDOH domains to be used in new notice of funding opportunity announcements (NOFOs). To fulfill this charge, the workgroup conducted a review of the published literature and an environmental scan of publicly available datasets, reports, and program resources, across the 5 SDOH domains. The scan also included SDOH-related data sources currently in use by NCCDPHP programs. The literature review and environmental scan were conducted through: (1) PubMed, ProQuest, MEDLINE via OVID, PsycINFO via OVID, and a review of national datasets (Census, BRFSS, PRAMS, NHIS, NHANES, American Community Survey [ACS], County Health Rankings, AHRQ SDOH Database, and the Social Vulnerability Index); (2) a review of publicly available NCCDPHP SDOH program resources; and (3) input from CDC and external subject matter experts. Search terms included: SDOH policy and health-related outcomes relevant to the 5 SDOH domains (ie, BE, SC, CCL, TFP, and nutrition security),

health status (eg, blood pressure, tobacco use, physical activity, and quality of life), health equity, and populations at increased risk for developing chronic disease. The findings from the literature review and environmental scan resulted in a total of 200 measures and associated data sources across all 5 SDOH domains. To further define the scope of work, the workgroup developed a conceptual model or roadmap to ensure the SDOH measures selected could be used to demonstrate progress in improving health outcomes, reducing health disparities, and advancing health equity. The SDOH measurement roadmap illustrated in Figure 1 was drawn from the literature review and environmental scan and was shared informally with national partners (Association of State and Territorial Health Officials [ASTHO], National Association of City and County Health Officials [NACCHO], and Public Health Institute), NCCDPHP leadership, and other CDC Centers, Institutes and Offices for feedback.

The roadmap consists of 5 measurement categories or components to visually illustrate the inputs, key activities, and intended effects associated with the implementation of an SDOH project or program. The 5 measurement categories include MCPs (called coalitions in the figure), community capacity, SDOH outcomes, (the workgroup's focus), health outcomes, and equity outcomes. The MCPs and community capacity process measures lead to SDOH, health outcomes, and equity outcomes. Importantly the measures incorporate community engagement and empowerment, which are essential for identifying SDOH interventions that align with community resources, needs, and priorities.[13] SDOH and health outcome measures cover expected changes at the individual, organizational, and community levels. Equity outcome measures focus on reducing inequities in chronic diseases and risk factors with an emphasis on improving outcomes for disproportionately affected groups. Contextual measures describe the environments where interventions are needed, including social and economic characteristics and population demographics.

Following the development of the roadmap, the workgroup developed and applied the following criteria to further review, score, and prioritize the 200 measures identified through the literature review and scan:

1. Is the measure clearly defined?
2. Is the measure a direct indicator of 1 or more of the 5 domains specified in the NCCDPHP SDOH framework?
3. Is the measure applicable across settings, populations, and geography?
4. Is the measure useful for assessing change in the underlying determinant?
5. Are the data for each measure accessible to the public?

To conduct the review, workgroup members were assigned to 1 of 5 SDOH measurement subgroups. Within each subgroup, members evaluated whether a measure met each of the 5 criteria (yes/no): Measures that met at least 4 or more criteria were prioritized.

In addition, members from each measurement group considered: (1) the type of data source used to capture each measure (primary vs secondary data sources) and (b) how each measure might be reported or tracked by a CDC award recipient. Workgroup members provided

qualitative feedback on each measure with a recommendation to “Keep,” “Revise,” “Need More Information,” or “Remove.” As a result, 59 measures out of the original 200 were prioritized by the workgroup for further review and analysis (Supplemental Digital Content, Table, available at http://links.lww.com/JPHMP/B389).

Community review

As part of the Year 2 Improving Social Determinants of Health—Getting Further Faster (GFF) retrospective evaluation, NCCDPHP collaborated with the ASTHO, the NACCHO, 14 established MCPs, and Research Triangle Institute (RTI) International to gather practice-based evidence that can inform future community-driven SDOH initiatives. RTI International, as a contractor to the ASTHO, engaged 13 MCPs from the Year 2 Improving SDOH-GFF evaluation to conduct a community validation review process to assist with refining the 59 measures among the 5 SDOH domains.[14] Adapting review methods applied on similar projects, the RTI team created profiles for each of the 59 measures, drafted review forms with standard criteria for rating and providing feedback on each measure, synthesized review data, and discussed and interpreted results with MCPs.[15,16] Profiles summarized key information required to review each measure, including existing data sources, time frames for existing data collection, the geographic level at which data are available, and population groups included in existing data sources (Supplemental Digital Content, Table, available at http://links.lww.com/JPHMP/B390).

Profiles were paired with review forms that included a cost- vs labor-intensive matrix item; 5-point Likert scale items for rating perceived usefulness of measures to funders, policymakers, and MCP partners and staff; and a 5-point Likert scale on perceived importance of the measure to the community members the MCPs served. To gauge how challenging it may be for community partnerships to adopt the measures, items were included to capture whether participating MCPs already collected data on a measure, as well as reasons the measure had not been used. Review forms also included an overall “thumbs up/thumbs down” rating on measures’ overall usefulness for evaluating SDOH initiatives and an open-ended feedback field.

RTI conducted a virtual training to orient MCPs to review tasks and materials, which helped promote a consistent review process. To minimize the burden and facilitate full completion of review forms, each MCP was assigned 2 SDOH domains, and MCPs were asked to identify 2 potential reviewers who could rate and provide feedback on assigned measures. SDOH domain assignments also aligned with the focus of MCPs’ interventions included in the GFF evaluation. Reviewers represented a range of organizations, including nonprofit organizations, health departments, and health care settings. Job titles were similarly diverse, including executive directors, vice presidents of communications, community epidemiologists, physicians, and project and program managers.

Data analysis and synthesis

Data from all received review packets were compiled into one Adobe database and then exported to an Excel workbook for analysis in Power BI. Applying methods common in rapid qualitative analysis, an analyst reviewed and categorized responses to open-ended

items in Excel to identify commonly reported reasons measures were not used and summarize reviewers' recommendations for alternate measures, additional data sources, and strategies for facilitating the use of the measures.[17,18] A senior researcher reviewed the qualitative analysis and debriefed the analyst to reach consensus on conflicting interpretation. Initial, high-level results were shared with reviewers during a virtual debriefing for participant validation.[19]

Final analyses summarized the distribution of measures across the resources review category, as well as the distribution of measures in the highest rating responses for the acceptability to various audiences and collecting data review categories. To help inform the selection of measures to be used in NCCDPHP NOFOS, a summary score was created based on aggregate ratings across the 6 review categories. For each of the 6 rating categories, 1 point was allocated if most reviewers (ie, >50%) gave a positive rating, defined as "Not labor- or cost-intensive" for the resources item, "Very useful or extremely useful"/ "Important or Very Important" for acceptability to vey audiences, "Yes" for ever collected data, and selection of the thumbs-up icon for overall helpfulness for evaluating community-driven SDOH initiatives.

Results

Of the 26 invited reviewers, 21 completed reviews, with at least 1 reviewer from each of the 13 MCPs, and we surpassed our goal of at least 3 reviews for each measure. Although no measure achieved a perfect summary score of 6, there was enough variation in scores to support using a summary score range of 3 to 5 to cull down the list of measures. Twenty-two measures had summary scores within the 3 to 5 range, covering all 5 SDOH domains (Table 1). From the original set of 59 measures, all 10 measures in CCL domain had a summary score of 3 or higher. Five of 13 FNS measures and 3 of 13 TFP measures had summary scores of 3 or higher. SC had 2 of 13 measures and BE had 2 of 10 measures with summary scores of 3 or higher.

Key findings: Measurement considerations

Five core and interrelated measurement considerations emerged from qualitative feedback and debriefing discussions with MCPs' reviewers: scope of practice, MCPs' influence, data collection and analysis capacity, quality over quantity, and equity.

- *Scope of practice*: Some measures were outside of the geographic or programmatic scope of practice for MCPs. For example, some measures were calculated at the city or state level, whereas MCPs SDOH initiatives were focused on neighborhood-level changes. Additionally, some measures for specific populations did not align with MCPs' priority populations. For example, one reviewer noted that the measure focused on social and emotional support for children and adolescents was not relevant for their partnership's efforts to improve social and emotional support for older adults.
- *Partner influence*: Some measures evaluated outcomes that are outside of MCPs' influence or control. This issue was commonly raised for the price of tobacco measure with reviewers noting that partnerships can educate policymakers and

encourage policy changes. However, ultimately, multiple policies at the city, county, state, and federal levels decide the price of tobacco, so it would be challenging for MCPs to move the needle on this measure.

- *Data collection and analysis capacity*: Many reviewers noted that if measures are not already collected in surveys or incorporated into workflows, it is very cost- and labor-intensive for MCPs to collect primary data. In fact, most reviewers said that all but 6 measures were labor and or cost-intensive. Some reviewers also shared that even when there is an existing data source, they have limited resources—including staff, time, and funding—to compile and analyze the data. They suggested that questions be added to national surveys like the Behavioral Risk Factor Surveillance System or the American Community Survey so they can be used as data sources for the draft set of NCCDPHP measures and noted that building that data collection capacity at the national level would be hugely impactful.
- *Quality over quantity*: Reviewers noted that the wording of the measures sometimes specified (and thereby valued) the number of implemented policy changes, but the number of policy changes does not necessarily reflect the quality of the policy changes. In the words of one reviewer, “Number and percent of policies addressing improved food access doesn’t really tell me anything important, I’d be more interested in the content of those policies and what resources are dedicated to implementing those policies to improve access to healthy food.” Others also mentioned the importance of tracking policy implementation and adherence, as well as how frequently the policy is updated or applied in the work of the MCP.
- *Equity*: Reviewers encouraged assessing the equity implications of measures. Using the measure of the average price of tobacco to a consumer as an example, a reviewer noted that although raising the price of tobacco can prevent new users, it also disproportionately burdens those who already have tobacco addiction. Furthermore, marginalized communities often have higher rates of tobacco use, so increasing the price would increase financial hardship for communities already disproportionately burdened by tobacco-related illness. Therefore, policy changes intended to curb health risks need to be paired with resources and community changes that help mitigate unintended negative consequences. During the debriefing meeting, reviewers also emphasized that evaluation measures need to align with communities’ health equity goals. Finally, reviewers also noted that no measures explicitly prioritized communities most affected by oppression, and they encouraged the measures workgroup to consider ways to explicitly address equity and oppression that are meaningful and widely applicable across levels of geography and populations.

Discussion

To date, public health research and evaluation has focused heavily on the process of establishing MCPs, the implementation of MCP-driven SDOH interventions, and

community change outcomes that promote health, but the evidence for the population health outcomes of this work is limited.[5] As national efforts to address SDOH ramp-up,[20] it is critical to establish common SDOH measures. Common measures will support the kinds of rigorous implementation, cost, and outcome evaluations that are needed to strengthen the evidence base for public health approaches for addressing SDOH. NCCDPHP's initial approach to identifying a set of measures for specific SDOH domains involved an extensive literature scan and a rating process based on 5 criteria relevant to the center's role as a funder, which involves monitoring performance and curating evidence.

A complementary community review by MCPs applied a real-world public health practice lens to measures development. The community review provided key insights around the perceived value of each measure for community members, MCP partners and staff, and funders of MCPs' SDOH efforts. Feedback related to the feasibility of data collection and opportunities to better integrate health equity considerations were particularly helpful for refining both the set of measures and the measures review criteria. Not unexpectedly, all but 6 measures were deemed either labor- or cost-intensive by the majority of reviewers. This speaks to the reality of limited resources in the field for data collection. However, minimally, if measures are easy to obtain, already collected, this can minimize the burden on MCPs. In response to community review results, the SDOH measures workgroup is honing the original measures review criteria as noted in italicized font:

1. Is the measure clearly defined?
2. Is the measure a direct indicator of 1 or more of the 5 SDOH domains?
3. Is the measure applicable across settings, populations, and geography *in a manner that allows for community-level tailoring?*
4. Is the measure useful for assessing change in the underlying SDOH?
5. *Are measure data easily accessible from existing local or national data sources?*
6. *Does the measure align with community health equity goals?*

Measures development in public health is often the purview of academics. The process described in this paper lends real-world credibility to the development of a set of common SDOH measures, which could facilitate data collection, reporting, and use. In turn, broad adoption of a common set of SDOH measures can help enhance the evidence base for public health approaches to addressing the multiple domains of SDOH.

Conclusion

Public health and health care have an unprecedented opportunity to standardize SDOH and HRSN measurements, which would enable communities to better assess, identify, and implement effective SDOH interventions that improve health outcomes and reduce health disparities. SDOH can be evaluated at an individual level (HRSN) or a community level and outcome measures are useful at both levels. As with other disciplines, public health measures development is often an academic pursuit that does not include those that support the planning and delivery of the intervention. MCPs are essential partners in SDOH interventions.[9,10] They are on the ground working together to change policies, practices,

and systems that target the upstream causes of health inequities. Thus, engaging MCPs lends real-world credibility to the development of common SDOH measures. Obtaining their feedback on feasibility, value, and acceptability of measures is critical to successful implementation.

For both sectors, it is important to understand the support needs of individuals and the underlying factors affecting the community in which the individual lives. Conceptualizing and measuring SDOH and HRSN are key to creating national, state, or local policies and practices to improve population health.

Limitations

The work described has inherent limitations. First, the community review was completed by a small number of MCPs and is not representative of all MCPs. Furthermore, to minimize the burden of review on MCPs, a subset of reviewers, ranging from 7 to 11, rated measures under each domain. Considering that health priorities vary by community, some ratings may have received different scores from other reviewers. However, given the participating MCPs' extensive experience in SDOH work as established in prior work, we expect that the feedback they provided is broadly relevant for other long-standing MCPs.[21] But their perspectives may differ from MCPs that are just starting or early in their trajectories. Also, for standardization, the NCCDPHP and community review processes applied a set of criteria that narrowed the focus of the review. The standardized review processes did not cover the universe of considerations for measures development. However, both processes allowed reviewers to document general comments and incorporated group discussions, which allowed us to gather feedback beyond the scope of the review criteria. Lastly, we applied a cross-sectional measures development approach. Considering the ramp-up of national efforts to address SDOH, repeated reviews will be needed to ensure measures reflect current best practices and data sources.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Implications for Policy & Practice

- A reliable, feasible set of SDOH measures could help maintain the momentum for upstream interventions.
- MCPs, with representatives from public health, health care, human services, and community-based organizations, are engaged in collective action to improve conditions where people live, play, learn, work, and age.
- This upstream work to change policies, systems, and environments takes coordination, collaboration, and time.
- Public health agencies and departments have a significant role to play, including bringing leadership, regulatory authority, data, and funding resources to the table.
- However, measures of success to inform investments in SDOH work are needed to identify the most effective SDOH actions and demonstrate the value of MCP-driven SDOH interventions.
- The development and adoption of a common set of SDOH measures could help strengthen the evidence base for public health approaches to addressing SDOH.

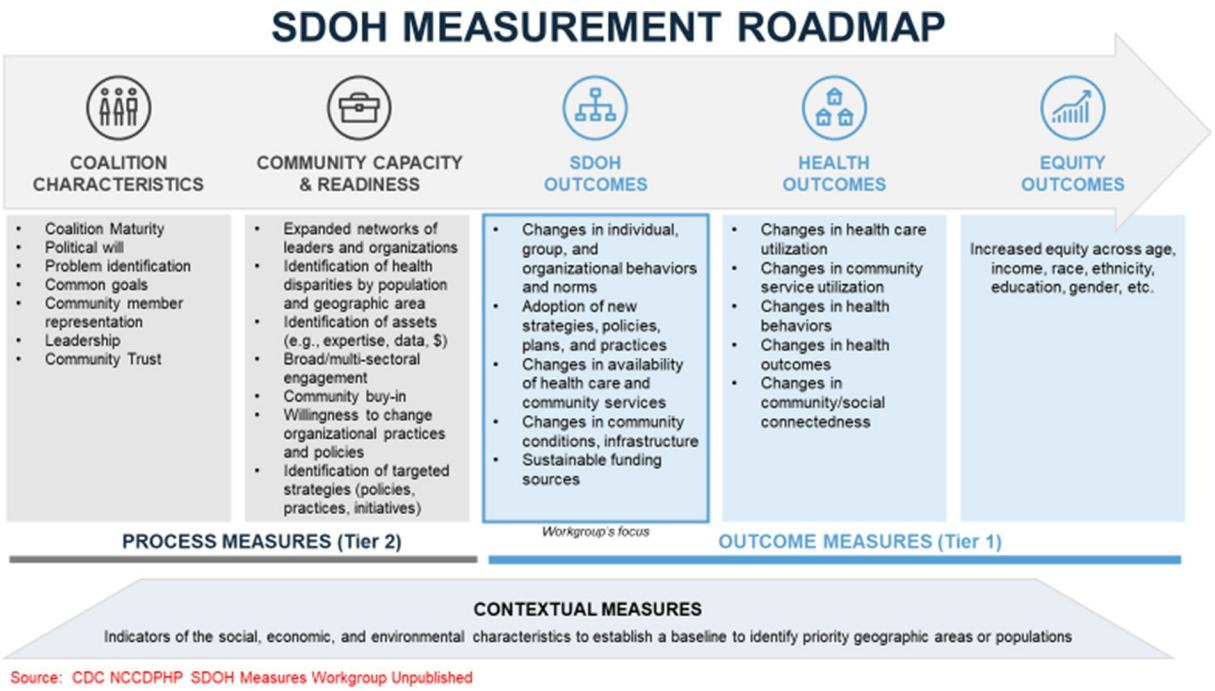

FIGURE 1.
Social Determinants of Health Measurement Roadmap

TABLE 1

Measures With Summary Scores of Three or Higher

Measure	Resources	Useful to Funders, Policy Makers and Decision-Makers	Useful to Partners and Staff	Important to Community Members	Ever Collected Data	Helpful for Evaluation	Total Summary Score
CCL11. Number and percent of patients with improved self-management of chronic disease(s) (increased medication adherence, improved BP, HbA1C, screenings, exercise, and smoking cessation)	0	1	1	1	1	1	**5**
CCL12. Number of SDOH screenings in clinical settings	0	1	1	1	1	1	**5**
CCL15. Number and percent of patients seen by community health workers or health care extenders	0	1	1	1	1	1	**5**
CCL2. Number and percent of patients receiving referrals to community resources (ie, health/mental health resources)	0	1	1	1	1	1	**5**
FNS12. Number of clinical produce prescription or clinic Food Farmacy programs	0	1	1	1	1	1	**5**
FNS13. Prevalence of household food insecurity by demographics	0	1	1	1	1	1	**5**
FNS18. Percent of adults and adolescents meeting recommendations for fruit and vegetable intake	0	1	1	1	1	1	**5**
FNS9. Number and percent of food retailers (brick-and-mortar, farmers' markets, mobile markets, etc) with access to EBT equipment	0	1	1	1	1	1	**5**
BE3. Percent of jurisdictions that have adopted inclusionary zoning policies	0	1	1	1	0	1	**4**
BE7. Percent of jurisdictions with funding criteria for transportation and public development that prioritize health and equity	0	1	1	1	0	1	**4**
CCL1. Number and types of new bidirectional systems established in health care and community-based settings	0	1	1	1	0	1	**4**
CCL13. Number of health care systems that employ community health workers or health care extenders	0	1	1	1	0	1	**4**
CCL14. Number of community health workers or health care extenders in health care systems	0	1	1	1	0	1	**4**
CCL23. Number and percent of residents or families who report receiving the health care services they need and want	0	1	1	1	0	1	**4**

Measure	Resources	Useful to Funders, Policy Makers and Decision-Makers	Useful to Partners and Staff	Important to Community Members	Ever Collected Data	Helpful for Evaluation	Total Summary Score
CCL9. Number of culturally adapted or culturally tailored programs for priority populations	0	1	1	1	0	1	**4**
SC16. Number of people who report interacting with family and friends on a regular basis	0	1	1	1	0	1	**4**
TP14. Number and reach of tobacco-free policies in childcare settings, K-12 schools, and/or colleges and universities	0	1	1	1	0	1	**4**
TP23. Comprehensive Medicaid coverage that covers all evidence-based cessation Services without barriers	0	1	1	1	0	1	**4**
CCL10. Number and percent of patients reporting participation in evidence-based community behavioral change programs	0	1	1	0	0	1	**3**
FNS30. Percent of food dollars purchasing local foods (farm to institution)	0	0	1	1	0	1	**3**
SC11. Proportion of residents who report that their community has safe communal areas for people to gather (eg, parks, recreation centers, and community centers)	0	1	0	1	0	1	**3**
TP7. Proportion of taxes (percent allocated) and/or absolute amount of state and local tobacco tax increases used to fund state tobacco control programs	0	1	1	0	0	1	**3**

Abbreviations: BE, built environment; CCL, community-clinical linkages; FNS, food and nutrition security; SC, social connectedness; SDOH, social determinants of health; TP, tobacco policies; BP, blood pressure; HbA1C, glycated hemoglobin; EBT, electronic benefit transfer.

For each of the 6 rating categories, 1 point was allocated if most reviewers (ie, >50%) gave a positive rating, defined as “Not labor- or cost-intensive” for the resources item, “Very useful or extremely useful“/”Important or Very Important” for acceptability to key audiences, “Yes” for ever collected data, and selection of the thumbs-up icon for overall helpfulness for evaluating community-driven SDOH initiatives.