Social Determinants of Health and Their Effect on Health and Health Care

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Efforts to address social determinants of health (SDOH) in health care have received renewed attention in recent years, building on studies and other initiatives dating back to the 1990s. The Centers for Disease Control and Prevention (CDC) defines SDOH as "the conditions in which people are born, grow, work, live and age, and the wider set of forces and systems shaping the conditions of daily life," which is adopted from the World Health Organization (WHO). The United States (US) Department of Health and Human Services (HHS) Healthy People 2030's definition of SDOH includes "the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks," which expands the elements of people's day-to-day lives and the influence those elements have on their health.

It is estimated that only 20% of a person's health status is influenced by the health care services they receive, whereas the other 80% is the result of social, physical, and economic factors. Therefore, the majority of someone's health status is related to social drivers that encompass multiple levels of factors. Structural determinants are the overarching social policies and hierarchies that have been established through history, laws, regulations, practices, and norms. The structural determinants in turn shape the SDOH of a community (see Figure 1). Health care systems have been making strides in addressing SDOH at the community level by investing in building more inclusive and sustainable local economies.

SDOH consist of the following five domains:

1. **Economy:** a person's access to employment, their employment status, stability of employment, income, and poverty level.
2. **Education:** a person's ability to reach their highest level of education, which is related to access to quality day care, schools, and adult education.
3. **Health care:** a person's access to high-quality health care, insurance, and other health care needs.

4. **Physical infrastructure:** a person's neighborhood and physical environment and the availability of housing, transportation, food, green spaces, and safe air and water.
5. **Social and community:** a person's social and community network, including social support, cohesion, and demographics (eg, race, ethnicity, religion, gender).

Figure 1. Social and Individual Drivers of Health

*Upstream are the broad, macro-level factors and influences, whereas downstream are the individual-level factors and influences.

While SDOH exist at a community level, they affect individuals in diverse ways. No two people experience the interplay of community and SDOH the same. Likewise, people who live in the same community and share many similar SDOH still have diverse needs. Physicians and other qualified health care professionals (QHPs) are more likely to have a positive influence on their patients' lives when they screen for SDOH, understand the structural barriers, and use the data in their delivery of care.

For example, two females, both in their mid-to-late twenties, who live in the same urban neighborhood were recently diagnosed with type 2 diabetes. The first female attends college in another area of the city and works part-time. She has a close-knit group of friends and a supportive family. She is covered by her parent's health insurance and has access to onsite health care at the university. The second female is a single mother of three school-aged children. The children's father was incarcerated, resulting in the family's loss of public housing, and she has limited support from other family members. She works two part-time jobs and has no health insurance coverage. The college student frequently leaves her neighborhood to attend school where she has access to healthier food options, parks and recreational areas, and friends with whom to spend time. The single mother is limited to staying within her neighborhood because of her jobs and the need to be close to her children's schools. She is limited to the less-healthy food options in the neighborhood and its lack of green spaces. When it comes to treating their diabetes, the college student can take her medications as prescribed, receive routine checkups, and access other educational resources, whereas the single mother cannot always fill her prescriptions and frequently skips follow-up appointments because of her work schedule and restricted transportation access.

If the physician of the single mother were to focus only on her adherence to her treatment needs, it would be easy to label her as noncompliant. However, her bigger picture includes barriers that impede her ability to take better care of herself. In certain circumstances, addressing just one or two of the SDOH

factors an individual faces can start to improve their health outcomes. To create long-term change, the physician could engage through professional societies and other collective action to support policy change to address these structural barriers.

Screening for and Collection of SDOH

Policy changes are necessary to address the structural barriers, but SDOH-based needs can be met at the community level. Access to quality, de-identified data about individuals' SDOH is key to making a difference in these upstream conditions; however, the focus at the individual level is on identifying each person's health-related social needs in which clinician screening is important.

In 2019, prior to the coronavirus disease 2019 (COVID-19) pandemic, a study found that 24% of hospitals and 16% of physician practices were screening patients for SDOH. Just 3 years later in 2022, a survey completed by the nonpartisan and objective research organization (NORC) at the University of Chicago and the American Health Information Management Association (AHIMA) found higher rates of collection of SDOH information. Seventy-eight percent of the professional coding respondents reported that their organization was collecting SDOH data on its patients. Lack of screening was the primary reason given by the remaining 22% of respondents for why SDOH data were not collected.

Currently, there are several widely available SDOH screening tools. A critical step toward this larger goal of facilitating SDOH data alignment and comparison is to establish a standardized SDOH screening tool or a set of metrics that could be used to meaningfully compare SDOH data across the health care ecosystem. At present, priorities include continuing to raise awareness of the value of screening for SDOH, reducing clinician and patient burden by using administrative data and automating data collection, and developing formula-driven approaches for screening at-risk individuals at a more detailed level. Following screening, the information should be captured in the patient's medical record and used in the development of their individualized plan of care. SDOH screenings and identified risks and needs should also be shared, either de-identified or with proper patient consent, with community-based organizations, payers, and other health care providers. Likewise, SDOH screening information collected by others than the physician or QHP should be shared with them if the patient has given consent. The next step would be to have onsite enrollment, referral staff, resource directories, and overall referral systems to respond meaningfully to identified needs.

Codify by AAPC

Using SDOH Data Effectively

To date, the majority of SDOH screening and data collection efforts have been focused on the individual system level. There has been less of a focus on standardizing and sharing the SDOH data across communities and settings, but that is changing. In order to understand SDOH at the community and population level and to champion the effective use of SDOH data, the following steps are necessary:

- Standardize data capture (eg, questions and coding)
- Incorporate captured data into an individual's plan of care
- Obtain consent from the individual for sharing appropriate data
- Seamlessly exchange appropriate patient data (eg, between clinicians, community-based organizations, payers)
- Improve the ability to aggregate and analyze de-identified data

Examples of Standardization Efforts

Many SDOH assessment instruments are coded for data exchange using Logical Observation Identifiers Names and Codes (LOINC®), the international standard for identifying health measurements, observations, and documents. LOINC® provides a standard that facilitates the exchange and pooling of results. See Table 1 for a few notable examples.

Table 1. Assessment Instruments and LOINC® Code

Assessment Instrument	LOINC Code
Protocol for Responding to & Assessing Patients' Assets, Risks, & Experiences (PRAPARE)	93025-5

Accountable Health Communities (AHC) Health-Related Social Needs Screening (HRSN) Tool	96777-8
American Academy of Family Physicians (AAFP) Social Needs Screening Tool	99593-6

Coding SDOH

Chapter 21 of the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) code set includes a block of Z codes that are used to report SDOH information. In 2019, the American Medical Association (AMA) collaborated with United Healthcare® on its request to the ICD-10-CM Coordination and Maintenance Committee to create 23 new codes for capturing SDOH factors.

See Table 2 for a list of the ICD-10-CM Z-code categories for persons with potential health hazards or factors related to socioeconomic and psychosocial circumstances, which are the SDOH.

Table 2. ICD-10-CM Z-Code Categories and Influencing Factors

Z-Code SDOH Categories	Examples of Influencing Factors
Z55: Problems related to education and literacy	Illiteracy and low-level literacy, lack of schooling, underachievement in school, less than a high school diploma or general equivalence degree (GED).
Z56: Problems related to employment and unemployment	Unemployment, threat of job loss, stressful work schedule, difficult relationships with boss or co-workers, difficult working conditions, sexual harassment.

Z57: Occupational exposure to risk factors	Exposure to noise, radiation, dust, tobacco smoke, toxic agents, extreme temperatures.
Z58: Problems related to physical environment	Lack of or inadequate safe drinking water.
Z59: Problems related to housing and economic circumstances	Homelessness, inadequate housing, housing instability, difficulties with neighbors or property owner, lack of food, extreme poverty, low income, financial insecurity, transportation insecurity, material hardship including inability to obtain childcare.
Z60: Problems related to social environment	Life-cycle transitions, difficulties due to migration, social rejection, discrimination.
Z62: Problems related to upbringing	Lack of parental supervision, overprotective parenting, welfare custody, physical abuse, psychological abuse, neglect, parent-child estrangement.
Z63: Other problems related to primary support group, including family circumstances	Problems with spouse/partner, family separation or divorce, military deployment of a family member, alcoholism or drug dependency in the family.
Z64: Problems related to certain psychosocial circumstances	Unwanted pregnancy, multiple birth children, discord with counselors (eg, probation officer, social worker).
Z65: Problems related to other psychosocial circumstances	Civil or criminal proceedings, incarceration, child custody proceedings, victim of a crime, exposure to a disaster or war, etc.

When coding the patient’s medical record, the coder identifies in the documentation any appropriate social factors and includes them in the claim with the

other diagnosis codes related to the services provided. Including Z codes in the claim enables the health plan to capture information about the patient's social needs and health factors. These codes are also included in claims-based public health reporting efforts.

The Centers for Medicare & Medicaid Services (CMS) created an infographic (see Figure 3), which is also available at https://www.cms.gov/files/document/zcodes-infographic.pdf, to demonstrate how Z codes can be used throughout the health care system to improve patient outcomes.

Figure 3. CMS: How to Use Z Codes

The CMS has been tracking the reporting of Z codes on Medicare fee-for-service (FFS) and Medicare Advantage claims. In 2019, more than 1.2 million FFS claims included Z codes, representing 0.11% of all FFS claims that year. The top five Z codes reported were homelessness (Z59.0); disappearance and death of a family member (Z63.4); problems related to living alone (Z60.2); problems related to living in a residential institution (Z59.3); and problems in relationship with spouse or partner (Z63.0). For Medicare Advantage claims, a sample of claims from 2019 showed 1.07% included at least one Z code. The top five codes reported, from most to least reported, were problems related to living alone (Z60.2); disappearance and death of a family member (Z63.4); homelessness (Z59.0); problems in relationship with spouse or partner (Z63.0); and other specified problems related to upbringing (Z62.8).

The Current Procedural Terminology (CPT®) code set also plays a role in the data-driven efforts to address SDOH. The CPT code set is a well-established nomenclature for coding medical procedures and services with a code-development process that can respond rapidly to health care demands. The CPT codes capture the services provided by physicians and other QHPs; however, they also can provide a broader picture of care received by patients when paired with Z codes. Therefore, the potential effect of SDOH on treatment was formally added to the list of elements for medical decision making (MDM) for evaluation and management (E/M) codes for office and other outpatient settings in 2021. Those same SDOH elements were added in the CPT 2023 code set for inpatient observation care, emergency departments, nursing facilities, and home or residence services.

Clinical Example with Different Reporting Scenarios

An established patient presents with acute bronchitis, which is addressed by the physician during the visit, in addition to other persistent conditions. Previously performed laboratory tests for creatinine and urinalysis were reviewed, and new laboratory tests for hemoglobin A1C, glomerular filtration rate (GFR), and creatinine were ordered. A referral was made to a nurse care coordinator to discuss type 2 diabetic education with the patient due to abnormal laboratory results.

See the following reporting scenarios for this clinical example.

Reporting Scenario 1

Without recognition of SDOH, the following information would be reported:

The ICD-10-CM code(s) selected for the diagnosis:

- J20.9, Acute bronchitis, unspecified
- E11.65, Type 2 diabetes mellitus with hyperglycemia
- E11.22, Type 2 diabetes mellitus with diabetic chronic kidney disease
- N18.31, Chronic kidney disease, stage 3a
- I10, Essential (primary) hypertension

The CPT code(s) selected for the services using MDM:

- 99213 Office or other outpatient visit for the evaluation and management of an established patient, which requires a medically appropriate history and/or examination and low level of medical decision making.

The MDM elements considered:

- Problem: Moderate (one or more chronic illnesses with exacerbation, progression, or side effects of treatment)
- Data: Low (two previous laboratory test results reviewed)

- Risk: Low

Reporting Scenario 2

With the recognition of SDOH, more comprehensive information is considered:

> Diabetic education was completed, and ICD-10-CM Z codes were reported on subsequent claims, when applicable. The patient is unemployed and has no health insurance and has recently applied for Social Security Disability Insurance (SSDI), which lead the patient to administer their insulin prescription below the prescribed dosage due to the high cost of the insulin and an inability to pay for it.

Additional ICD-10-CM diagnosis codes that reflect the effect of SDOH:

- Z59.7, Insufficient social insurance and welfare support
- Z56.0, Unemployment, unspecified
- Z91.120, Patient's intentional underdosing of medication regimen due to financial hardship

The CPT code selection that reflects the effect of SDOH increased to:

- 99214, Office or other outpatient visit for the evaluation and management of an established patient, which requires a medically appropriate history and/or examination and moderate level of medical decision making.

MDM elements considered:

- Risk: Moderate (increased with diagnosis or treatment significantly limited by SDOH)

As part of these efforts, the Health Level Seven (HL7®) Gravity Project has developed extensive sets of SDOH codes that can be accessed at https://confluence.hl7.org/display/GRAV/Social+Risk+Terminology+Value+Sets. These Gravity Project SDOH code sets include codes from the CPT code set, ICD-10-CM code set, LOINC®, Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT), and Healthcare Common Procedure Coding System

(HCPCS) code set and currently address the SDOH domains of food insecurity, housing instability, homelessness, inadequate housing, transportation insecurity, financial insecurity, material hardship, employment status, educational attainment, veteran status, stress, social connection, intimate partner violence, elder abuse, health literacy, medical cost burden, and health insurance coverage status. The HL7® Gravity Project has also developed an HL7® Fast Healthcare Interoperability Resources (FHIR) Implementation Guide (IG), known as the SDOH Clinical Care FHIR® IG, for the exchange of SDOH information across various health information technology (IT) vendors and health systems.

Organizations Driving Change

Effectively addressing SDOH and their effect on health will require a collaborative effort. Change will happen through the collective programs, initiatives, research, financial support, and other work of community-based organizations, academic research centers, state and local health and human services agencies, and philanthropic organizations. The following is an overview of federal agency and industry-led efforts to bring stakeholders together on various aspects of collecting, sharing, and using SDOH information to improve patient care.

The HHS

The HHS is using a broad, multiagency approach in its SDOH and health-equity efforts. Its priority is to tackle the underlying systemic and environmental factors that affect an individual's health status. The focus is on coordination across various government entities, community organizations, physicians and other QHPs, health plans, and other private sector organizations. Its goals are as follows:

1. Develop an interconnected data infrastructure to support coordinated care.
2. Build partnerships between health care and social services professionals to improve access to equitable care.
3. Support community engagement and public-private partnerships to pool resources.

To learn more about HHS' work, visit https://aspe.hhs.gov/topics/health-health-care/social-drivers-health/addressing-social-determinants-health-federal-programs.

The CDC

The CDC's work on SDOH is part of their overall goal to address health equity. In 2021, the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) developed a framework to identify where to invest in SDOH resources. The framework consists of the following six pillars:

1. **Data and surveillance:** Embed a consistent SDOH approach to the standardization, collection, analysis, and dissemination of data across the agency.
2. **Evaluation and evidence building:** Advance evaluation and build evidence for strategies that address the SDOH to reduce disparities and promote health equity.
3. **Partnerships and collaboration:** Establish criteria, actionable steps, and strategies for partnerships, collaborations, and relationships that result in improved health outcomes over the long term.
4. **Community engagement:** Foster meaningful, sustained community engagement across all phases of CDC intervention planning and implementation.
5. **Infrastructure and capacity:** Strengthen and sustain infrastructure such as workforce, training, and access to financial resources required to address SDOH and reduce health disparities.
6. **Policy and law:** Identify evidence, tools, and resources to enhance communication about policies that affect SDOH with policymakers and other stakeholders.

The Office of the National Coordinator for Health Information Technology (ONC)

The ONC operates within the HHS and is the principal federal entity charged with the coordination of nationwide efforts to implement and use the most advanced health IT and the electronic exchange of health information. It has additional activities and goals intended to address SDOH needs, which are included in the following four focus areas:

1. **Standards and data:** Advance standards development and adoption for the exchange of SDOH information.

2. **Policy:** Address policy challenges and opportunities.
3. **Infrastructure:** Develop an infrastructure to support the exchange of SDOH data with Health Information Exchanges (HIE) and state and local government entities.
4. **Implementation:** Deploy and integrate health IT tools to support SDOH data.

The ONC recently published a "Social Determinants of Health Information Exchange Toolkit," which is available at https://www.healthit.gov/sites/default/files/2023-02/Social Determinants of Health Information Exchange Toolkit 2023_508.pdf. The toolkit is a guide for those looking to exchange and use standardized SDOH data. The ONC also includes the CPT code set in its interoperability standards advisory (ISA) as a recognized standard to represent SDOH interventions across health systems.

To learn more about the ONC's work and educational events, visit https://www.healthit.gov/health-equity/social-determinants-health.

The CMS

Work by the CMS on SDOH is part of its broader effort to address health equity. It recently released the "CMS Framework for Health Equity 2022-2023," which is available at https://www.cms.gov/files/document/cms-framework-health-equity-2022.pdf. There are five priorities in the CMS Framework for Health Equity 2022-2023, which are as follows:

1. Expand the collection, reporting, and analysis of standardized data.
2. Assess causes of health disparities within CMS programs and address inequities in policies and operations to close gaps.
3. Build capacity of health care organizations and their workforce to reduce health and care disparities.
4. Advance language access, health literacy, and the provision of culturally tailored services.
5. Increase all forms of accessibility to health care services and coverage.

To learn more about the CMS' work on health equity, visit https://www.cms.gov/about-cms/agency-information/omh/health-equity-programs/cms-framework-for-health-equity.

The AMA

The AMA is addressing SDOH in health care on several fronts (eg, Integrated Health Model Initiative (IHMI), collaboration on the HL7® Gravity Project, and Center for Health Equity). The AMA's IHMI focuses on data standards and is collaborating with the HL7® Gravity Project on the capture and exchange of SDOH data. Within medical education, the AMA is working to integrate SDOH into medical students' curriculum and faculty development. The AMA's advocacy efforts are focused on supporting payment reforms that will encourage SDOH screenings and referrals for community services, as well as urging health IT vendors to provide innovative resources and templates to better capture and exchange SDOH data. In addition, the AMA is also encouraging health IT vendors to build robust privacy and security functionality into their products. Furthermore, the AMA's Center for Health Equity is working to embed health equity throughout the health care system (eg, the Rise to Health Coalition), which critically requires the collection and use of SDOH data.

To learn more about the AMA's work on SDOH, visit https://www.ama-assn.org/topics/social-determinants-health.

The HL7® Gravity Project

The HL7® Gravity Project initiative is a public-private collaboration of organizations dedicated to developing consensus-driven data standards to support the collection, use, and exchange of data to address the domains of SDOH. They see the importance of this work for the following reasons:

- To develop a shared understanding of the concepts surrounding SDOH.
- To improve access to SDOH data.
- To implement a standardized process for the exchange of SDOH information.
- To foster the development of solutions to address structural barriers within communities.

To learn more about the HL7® Gravity Project, visit https://thegravityproject.net/ and https://confluence.hl7.org/display/GRAV/The+Gravity+Project.

HealthBegins

HealthBegins' overarching work is on the effects of social drivers and equity of care on health. The organization focuses on partnering with and training leaders to move upstream and to address a combination of individual, community-level, and structural needs.

To learn more about HealthBegins, visit https://healthbegins.org/.

The National Association of Community Health Centers (NACHC)

The NACHC is working to expand access for uninsured and underserved populations to health care services. Their work includes the following:

- Research to demonstrate lowered costs and improved health outcomes
- Leadership programs and technical support for staff
- Collaboration with other organizations to improve operations of health centers and access to them by the communities

To learn more about the NACHC, visit https://www.nachc.org.

The Oregon Community Health Information Network (OCHIN)

OCHIN is a health information network that began in Oregon more than 20 years ago with the goal of connecting several community health centers. Today, they work with 2,000 locations across more than 40 states to improve the lives of the individuals they serve. Their focus is on the use of technology to correct systemic factors and structural inequities to improve the health of the communities.

To learn more about OCHIN, visit https://ochin.org/.

The WHO

In 2010, the WHO published “A Conceptual Framework for Action on the Social Determinants of Health,” which focused on defining and understanding SDOH, identifying a framework for SDOH, and identifying policy actions to close inequality gaps. The WHO is set to publish another report this year with an updated operational framework on SDOH that will focus on work to monitor and track progress with SDOH.

To learn more about the WHO’s work on SDOH, visit https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1.

What Is Next for SDOH

Now that there is a broader understanding of how SDOH affects individuals’ health, health care, and health outcomes, more work is needed to incorporate the collection, reporting, analysis, and use of the data. The following actions are needed to create a health care system that treats an individual in context of their associated SDOH:

- Raise awareness and educate clinicians and medical coders on the importance of collecting, reporting, and exchanging SDOH information.
- Include individuals’ social needs in their care planning.
- Participate in the testing of screening tools or technology solutions that focus on standardizing the collection, reporting, and exchange of SDOH information.
- Develop and implement secure technology solutions that support the capture, exchange, and protection of SDOH information.
- Include and refer to social-needs and community-based organizations in the health care network for treatment.
- Address the root causes of structural barriers at the societal and community levels.

Pairing SDOH data with health care data will provide a better picture of an individual’s health status and lead to better, more comprehensive care. Meanwhile, analyzing the combined data sets at a system or community level will result in the identification of populations that are not receiving complete and equitable care to allow policymakers and stakeholders to design targeted interventions and wraparound services necessary to eliminate structural barriers to care. Ultimately, working to ensure that all individuals regardless of income, race, or other SDOH background receive optimal care will help to eradicate systemic health inequities, save limited health care resources, and improve the health of our communities.