Accounting for Social Risk Factors in Medicare Payment: Data

DETAILS

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Health and Medicine Division

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[1] Resigned in July 2016.

Reviewers

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by **GEORGES C. BENJAMIN,** American Public Health Association, and **CHARLES E. PHELPS,** University of Rochester. They were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

Contents

Summary

The Centers for Medicare & Medicaid Services (CMS) is increasingly paying providers (e.g., hospitals, health plans, provider groups) through value-based payment (VBP) programs.[1] VBP ties quality and cost performance to payment in order to hold providers accountable for the quality and efficiency of the health care they provide and for the health care outcomes they achieve (Burwell, 2015; Rosenthal, 2008). In so doing, VBP schemes shift greater financial risk to providers. Because current VBP programs do not account for social risk factors for poor health outcomes, these programs may underestimate the quality of care provided by providers disproportionally serving socially at-risk populations. Consequently, these providers may be more likely to fare poorly on quality rankings (Berenson and Shih, 2012; Elliott et al., in press; Gilman et al., 2014, 2015; Joynt and Jha, 2013a; Rajaram et al., 2015; Ryan, 2013; Shih et al., 2015; Williams et al., 2014). When payment is tied to quality rankings under VBP, these providers may also be more likely to receive penalties and less likely to receive incentive payments (Chien et al., 2007; Joynt and Jha, 2013a,b; Joynt and Rosenthal, 2012; Ryan, 2013). Moreover, these providers have historically been less well reimbursed than providers serving more advantaged patients and have fewer resources (Bach et al., 2004; Chien et al., 2007). If providers disproportionately serving socially at-risk populations have fewer resources to begin with and are more likely to fare poorly on quality rankings and receive financial penalties under VBP, the limited resources to care for socially at-risk populations and those who care for them may be further reduced. This has led some stakeholders to raise concerns that current VBP programs may increase health disparities (Bhalla and Kalkut, 2010; Casalino et al., 2007; Chien et al., 2007; Friedberg et al., 2010; Ryan, 2013).

A primary method proposed to address these concerns is accounting for social risk factors in VBP. For an extensive discussion of concerns regarding possible effects of these approaches, the committee directs the interested reader to its first three reports (NASEM, 2016a,b,c). As described in the committee's third report (NASEM, 2016b), to the extent that social risk factors influence performance indicators independently of provider actions and those factors are unevenly distributed across providers, it may be appropriate to account for social risk factors in

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[1] As described in the committee's first and third reports (NASEM, 2016a,b), CMS payment models cover a spectrum of approaches from traditional fee-for-service to population-based payment models. The committee uses the term *value-based payment* to describe models that fall into two broad categories, which the committee roughly categorizes as *financial incentives* and *alternative payment models* (APMs). Financial incentives (such as pay-for-performance schemes) link financial bonuses and/or penalties to the quality and efficiency of care, whereas APMs (such as episode- or population-based payments) shift greater financial risk to providers in order to hold them accountable for the quality and efficiency of care delivered as well as for the health care outcomes achieved. For more information on specific Medicare VBP programs, the committee points the interested reader to its first and third reports (NASEM, 2016a,b).

VBP, but any approach requires monitoring for adverse effects on health disparities (NASEM, 2016b). If CMS chooses to account for social risk factors, it must first acquire accurate data on the social risk factors of Medicare beneficiaries.

STATEMENT OF TASK

In response to the Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014, the Department of Health and Human Services (HHS) acting through the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to provide a definition of socioeconomic status for the purposes of application to Medicare quality measurement and payment programs; identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs; identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies; and recommend existing or new sources of data and/or strategies for data collection. The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of health, risk adjustment, and Medicare (see the Appendix for biographical sketches). This report is the fourth in a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated through the IMPACT Act. Details of the statement of task and the sequence of reports can be found in Box 1-1.

COMMITTEE PROCESS

This report builds on the committee's earlier reports. In its third report, the committee expanded the conceptual framework introduced in the first report to include specific indicators across five domains of social risk factors. The committee concluded that there are measurable social risk factors that could be accounted for in Medicare VBP programs in the short term. Indicators include

- income, education, and dual (Medicare and Medicaid) eligibility;
- race, ethnicity, language, and nativity;
- marital/partnership status and living alone; and
- neighborhood deprivation, urbanicity, and housing.

The committee also concluded that some indicators of social risk factors capture the basic underlying constructs and currently present practical challenges, but they are worth attention for potential inclusion in the longer term. These include

- wealth,
- acculturation,
- gender identity and sexual orientation,
- emotional and instrumental social support, and
- environmental measures of residential and community context.

In this report, the committee provides guidance on data sources for and strategies to collect data on these indicators that could be accounted for Medicare quality measurement and payment programs.

DATA SOURCES

The committee considered three broad categories of data sources for these social risk factors: (1) existing or new CMS data; (2) data that providers and plans could report to CMS; and (3) alternative government data. Patients are the underlying source of most social risk factor data. Moreover, for some social risk factors like race, ethnicity, and gender, it is important for patients to self-identify. However, CMS, health care providers and health plans, and government agencies collect and maintain this information and, more importantly, standardize, assess, interpret, and report this information in a valid, consistent, and reliable way. In the future, new, better, and easier methods of data collection could emerge (e.g., methods that are more accurate, less burdensome, or less costly). As these new methods emerge, an ideal system would be responsive to evolving data availability and could adapt to use new data sources. However, at this time and likely in the near term, it is unlikely that technologies and interoperable systems will be available for patients to directly, systematically, and securely submit social risk factor data to CMS for use in Medicare payment. Thus, although patients and enrollees underlie each of the three categories of data sources described above, they are not called out as a separate and unique source.

New and Existing Sources of CMS Data

CMS possesses some data on Medicare beneficiaries' social risk factors. Existing sources include administrative records and beneficiary surveys. Administrative records include enrollment records as well as claims data. These sources have limited social risk factor data, such as beneficiaries' race and ethnicity (ResDAC, n.d.). Enrollment data capture the basis of a beneficiary's entitlement, which plans beneficiaries are enrolled in (Parts A, B, C, D, or alternative payment models), as well as Medicaid enrollment for those who are dually enrolled in Medicare and Medicaid (ResDAC, n.d.). Administrative records also include basic demographic information and vital statistics. Survey data from CMS refer to data derived from one of the surveys of Medicare beneficiaries that CMS routinely conducts.

The primary advantage of using existing sources of data CMS already possesses is precisely that CMS has access to and maintains accurate data it already collects using standardized measures and validated, reliable methods, and which it could apply to performance measurement and payment. If CMS collects new social risk factor data, it could design measures and data collection methodologies to ensure collection of accurate data that meet the needs of the intended method to account for those social risk factors in Medicare quality measurement and payment. New data collection would not be subject to the potentially substantial barriers of collaborating with other federal government agencies, but it would require substantial cost.

Data Sources from Providers and Plans

Data sources from providers and plans include data from electronic health records (EHRs) and administrative data that providers report or submit or could report or submit to CMS. Most EHRs capture some basic information on social risk factors, such as race and ethnicity, and EHRs are beginning to capture more robust social risk factor data. Some more comprehensive EHRs may include data on language, education, housing, and community context (Gottlieb et al., 2015; ONC, n.d.). The Office of the National Coordinator for Health Information Technology (ONC) is the office responsible for supporting and encouraging EHR adoption and health information exchange in HHS. To date, ONC has included some social risk factors in the regulations put forth for the CMS meaningful use incentive programs. Administrative data include data captured through patient enrollment forms and claims, and may also include limited social risk factor data. For example, many health plans collect language data (Lawson et al., 2011; Nerenz et al., 2013a,b), and these data could be reported to CMS for use in performance measurement and payment.

A primary advantage of using data that providers or health plans collect is that some information on social risk factors may be clinically useful to enhance the care or services providers and plans provide. Additionally, CMS already has a reporting infrastructure for claims and performance reporting with standardized reporting requirements, processes, and systems that it could expand. However, collecting social risk factor data through EHRs could increase burdens on individual providers and health care organizations, as well as on patients.

Burdens on patients and enrollees pertain to the ability of patients to recall information about their social risks as well as privacy and security. With respect to the former, patients and enrollees may not know or be willing to share data on certain social risk factors that are sensitive in nature. Concerns about why clinicians or plans are asking about social risk factors and how such data may be used relate to concerns about the privacy and security of patient health information, especially when shared with other providers and with researchers and administrators for nonclinical uses. For a more comprehensive discussion of privacy and security issues as well as mitigation strategies, the committee points the interested reader to the Institute of Medicine's (IOM's) earlier reports on EHRs and health information technology (IOM, 2012, 2014).

Alternative Government Data Sources

Alternative government data sources in this report refer to administrative data and national surveys that federal agencies other than CMS (including other agencies within HHS) and state agencies oversee and maintain and that could be linked to Medicare beneficiary data. This includes data that could be linked to Medicare beneficiary data at the individual level, area-level data that could be used to describe a Medicare beneficiary's residential environment or serve as a proxy for individual effects, and data that could help CMS to determine how to elicit information on social risk factors from Medicare beneficiaries.

The Social Security Administration (SSA) may be the best source of individual-level social risk factor data that could be linked to Medicare data. The SSA maintains data that captures demographics, vital statistics, income, and information related to eligibility for Social Security needs-based benefits, such as disabling conditions and living arrangements (McNabb et al., 2009). The American Community Survey (ACS) may be a useful source of area-level social risk factor data that could be used to assess genuine area-level effects or serve as proxies for individual-level effects. The ACS is a nationwide survey administered by the Census Bureau that gathers demographic, housing, social, and economic data on local communities (U.S. Census Bureau, 2013). Other national surveys include the Health and Retirement Survey, National Health and Aging Trends Study, National Health and Nutrition Examination Survey, National Health Interview Survey, and National Survey of Family Growth. They all capture social risk factor data that could be useful to CMS when determining how best to elicit information from Medicare beneficiaries on their social risk factors.

The primary advantage of using administrative and survey data from other agencies is that these data sources contain substantial information on social risk factors, and data from these sources are collected using standardized and validated measures and methodologies. However, substantial barriers to linking such data to Medicare data include state and federal regulations and laws relating to the privacy and security that may restrict data sharing (IOM, 2014) and the substantial effort and/or cost required to ensure that data can be linked at the appropriate level.

DATA COLLECTION

The committee notes that it has not been asked to recommend whether the CMS *should* include social risk factor adjustments in its public reporting and payment programs. The recommendations in this report indicate things CMS should do *if* it decides to move toward accounting for social risk factors. To assess the advantages and disadvantages of specific data sources for specific social risk factor indicators, the committee identified three characteristics to consider: (1) collection burden, (2) accuracy, and (3) clinical utility. Collection burden describes the resources (e.g., time, cost, and effort) required to collect and store data through any given source, and pertains to respondents, as well as providers collecting data, and CMS. For some social risk factors, there may be substantial barriers to data collection (such as high cost). For others, early pilot testing or modeling of an indicator in a multivariable model may suggest only marginal gains. In these cases, CMS may choose not to include the indicator in quality measurement and payment. Because literature does not indicate whether all social risk factors related to performance indicators used in VBP must be individually accounted for to accurately adjust payment and quality measures, these are questions for ASPE/CMS to test empirically.

> *Conclusion 1: If there are substantial barriers to collecting social risk factor data (such as high cost) and/or if early pilot testing or modeling in a multivariable model suggests only marginal gains from including any given indicator in any method of accounting for social risk factors in Medicare performance measurement and payment, inclusion of that indicator may not be warranted.*

Accuracy refers to the degree that a given measure captures the construct that measure represents. In this report, this characteristic also captures related constructs important for data quality, such as validity, reliability, and completeness. The committee considered the extent to which standardized measures and data collection methods for each social risk factor indicator are available and used. Standardization is important to ensure valid comparisons across reporting units and settings. Clinical utility describes whether providers can use information on a social risk factor in the management and treatment of that patient (IOM, 2014). If intervening on or otherwise addressing a social risk factor is beyond the purview of health care providers or can only be done at substantial cost, clinicians may be reluctant to collect data out of concern that patients would expect them to provide services that they do not have the capacity to offer. The committee notes that its focus is on social risk factors important for use in Medicare quality measurement and payment. The EHR may include information on social and behavioral risk factors important to the clinical encounter, but that would not be relevant or be the best source of data for application to Medicare performance measurement and payment. The committee sees no conflict between the conclusions and recommendations in this report and those in the 2014 IOM report on capturing social and behavioral domains and measures in EHRs (IOM, 2014).

The committee also considered whether an indicator is relatively stable or changes over time. This distinction is not binary, but rather describes a spectrum. Some factors, such as nativity, would not logically change over time, while other factors, such as language, could potentially change over time, but such change is likely to be relatively slow. These factors are relatively stable. Other factors are likely to change more rapidly. For example, a Medicare beneficiary's marital status could change rapidly owing to the loss of a spouse (NASEM, 2016b).

To weigh the trade-offs between, and identify priorities among, the potential data sources for each individual social risk factor indicator, the committee identified several guiding principles.

> **Recommendation 1: The committee recommends the Centers for Medicare & Medicaid Services (CMS) use five guiding principles when choosing data sources for specific indicators of social risk to be used in Medicare performance measurement and payment. These guiding principles are**
>
> - **CMS should first use data it already has.**
> - **CMS should second look for opportunities to use existing data collected by other government agencies (including elsewhere in the Department of Health and Human Services).**
> - **To the extent that a social risk factor is relatively stable, CMS should examine the feasibility of collecting additional data at the time of enrollment in Medicare.**
> - **Where social risk factors change over time and have clinical utility, requiring data collection through electronic health records or other types of provider reporting may be the best approach.**
> - **For social risk factors that reflect a person's context or environment, existing data sources that can be used to develop area-level measures should be considered.**

Once the committee identified potential data sources for each of the social risk factor indicators identified in its third report, the committee assessed each potential data source in terms of the three characteristics (collection burden, accuracy, and clinical utility) and identified the relative advantages and disadvantages of each source. It then weighed the trade-offs for each source to identify preferences and priorities and develop proposed data collection strategies. Based on the committee's review and assessment of potential data sources for each of the social risk factor indicators, the committee identified the following categories of data that CMS could use for inclusion in Medicare quality measurement and payment:

1. Data sources exist that could be used in the short and long term.
2. Data sources with some limitations exist that could be used in the short term, and CMS should conduct research on new or improved data collection strategies in the long term. These include indicators for which:

   a. CMS has some existing data that could be used in the short term, but CMS should research ways to improve accuracy and data collection in the long term;
   b. Area-level measures could be used in the short term, but CMS should research standardized measurement and data collection for the long term.
3. Measures and data collection methods exist, but data sources have considerable limitations and more research is needed to accurately collect data in the long term.
4. Some measures exist, but more research is needed on the effect of the social risk factor indicator on health care outcomes of Medicare beneficiaries and on methods to accurately collect data for the Medicare population.

Recommendation 2: The committee recommends that the Centers for Medicare & Medicaid Services use existing data on dual eligibility, nativity, and urbanicity/rurality in Medicare performance measurement and payment.

For the Medicare population, dual eligibility is an indicator of insurance status that can be used as a proxy measure of socioeconomic position (SEP). Because it captures elements of SEP and health status, dual eligibility can be considered a broader measure of health-related resource availability that captures medical need (NASEM, 2016b). CMS administers both Medicare and Medicaid programs, and therefore already possess existing data on dual eligibility among Medicare beneficiaries.

Nativity refers to country of origin. Measures can capture a specific country of origin or a dichotomous variable comparing foreign-born to U.S.-born individuals (NASEM, 2016b). CMS does not currently collect nativity data, nor is nativity routinely captured in EHRs. However, Medicare beneficiaries' place of birth could be collected either by CMS or via EHRs with relatively little burden to patients, providers and plans, or CMS. Nativity is a stable social risk factor, which supports one-time collection by CMS to reduce burden, but nativity also has clinical utility, which supports collection through EHRs. The SSA collects place of birth including city and state or foreign country. These data could be paired with Medicare beneficiary records.

Urbanicity/rurality describes where a place falls on the spectrum from urban to rural (NASEM, 2016b). Because urbanicity/rurality represents a beneficiary's residential and community context, an area-level measure based on the beneficiary's place of residence is appropriate. The Census Bureau classifies census tracts and/or census blocks as *urban areas*, *urban clusters*, and *rural*, and CMS could use this classification. Medicare beneficiaries' place of residence is available in Medicare administrative records and is also likely to be captured in administrative or EHR data by providers and plans.

Recommendation 3: Data for individual measures of race and ethnicity, language, and marital/partnership status and for area-level measures of income, education, and neighborhood deprivation are currently available, and the committee recommends that the Centers for Medicare & Medicaid Services (CMS) use them for performance measurement and payment applications in the short term. However, owing to limitations in these data, CMS should research ways to improve accuracy and collection of individual-level measures of race and ethnicity, language, marital/partnership status, income, and education, as well as an area-level measure of neighborhood deprivation for use in the future.

Race and ethnicity are conceptually distinct albeit related constructs that are typically identified through self-reported categories. Medicare currently maintains race and ethnicity data in its administrative records. Current Medicare surveys and administrative records capture self-reported race and ethnicity using categories that adhere to federal standards issued by the White House Office of Management and Budget (OMB) (OMB, 1995; Zaslavsky et al., 2012). However, race and ethnicity information for older beneficiaries who enrolled in Medicare prior to when these standards were issued and implemented may reflect outdated racial and ethnic classifications (Zaslavsky et al., 2012). EHRs are also likely to capture race and ethnicity data. CMS should use available self-report and imputed race and ethnicity data in its existing records and methods in the short term. However, the committee acknowledges some limitations with regard to lack of standardization in current measurement and collection, and less accuracy for older age groups. Over the long term, CMS should continue to collect self-reported race and ethnicity following the OMB standards and work on standardizing measures and methods across the various self-report mechanisms it oversees—administrative forms, Medicare sample surveys, and provider and plan reporting requirements.

Language as a social risk factor typically represents language barriers, such as speaking a primary language that is not English, having limited English proficiency, or otherwise needing interpreter services (NASEM, 2016b). CMS currently maintains some data on preferred language, which has high specificity, but poor sensitivity. In the short term, CMS should use its existing data on preferred language while acknowledging their limitations. In the long term, CMS should continue efforts to standardize measures and data collection methods.

Marital/partnership status is a structural element of social relationships and an indicator of social support. CMS maintains data on marital status, because it is important for Social Security benefits, but CMS does not have partnership data. Providers, plans, and other federal government agencies also do not collect data on partnership. However, because partnership changes over time, especially among older adults, and is clinically useful, it could be collected through EHRs. Regardless of the data source CMS chooses, it will be important for CMS to monitor the empirical association between marital/partnership status and health care outcomes and revisit assumptions about marital/partnership status as an indicator of social support over time. In the short term, CMS should use available data on marital status. In the long term, research is needed on measurement and data collection for partnership. In particular, CMS could examine whether including partnership in any method to account for social risk factors that already includes marital status and living alone adds substantial additional precision and explanatory value.

Individual income can affect health and health care outcomes directly or indirectly (Adler and Newman, 2002; Braveman et al., 2005). CMS does not currently collect or maintain income data, nor do providers and plans. In the short term, an area-level measure of income from the ACS such as median household income could be used as a proxy for individual-level income. In the long term, the SSA maintains several sources of individual-level income data (lifetime earnings, Medicare payroll taxes, Supplemental Security Income), which CMS could link to Medicare data. Several government agencies also collect and maintain income data to determine Medicare Part B and Part D premium amounts for individuals and married couples with higher incomes, which CMS could also link to Medicare data. CMS could also develop standardized measures and methods to collect income data.

Education can affect health directly (Cutler and Lleras-Muney, 2006; IOM, 2014) or through other indicators of SEP—employment, occupation, and income (Adler and Newman, 2002; IOM, 2014; NASEM, 2016a,b). Currently, CMS does not collect or maintain data on education, nor do providers and plans routinely collect it. Although some of the more comprehensive EHRs may capture educational attainment, standardized measures and data collection strategies are needed. With respect to other government sources, area-level measures are available through the ACS. Thus, in the short term, CMS should use these available area-level measures as a proxy for individual education. In the long term, CMS should develop standardized measures and methods to collect education data.

Relevant area-level constructs of neighborhood deprivation include compositional characteristics of communities such as dimensions of SEP (e.g., the proportion of racial and ethnic minority residents, single-parent households, households below the federal poverty level, and English language–proficient residents) as well as elements of residential environments including the physical or built environment (e.g., availability of services—including health care services) and social environments (e.g., safety and violence, the presence of social organizations, and social cohesion). Because neighborhood deprivation captures a beneficiary's environment or residential context, an area-level measure based on the beneficiary's residential address is appropriate, and CMS already possesses these data. Neighborhood deprivation can be assessed using a single-item measure such as median household income or using a multi-item composite measure. In the short term, the committee recommends that CMS test a composite measure (such as an existing indicator from the literature) and a simple single-indicator item (such as median household income), contrast their performance at the census tract-level, and also weigh the benefits of simplicity of a single indicator against the increased precision from a composite measure. To increase accuracy in the long term, CMS could conduct research on measurement and data collection such as measures to better capture neighborhood deprivation in rural areas, to identify an improved geospatial unit of analysis for rural settings, and to assess the performance of any given variable (single or composite) across multiple geographic areas.

> **Recommendation 4: Individual measures of wealth, living alone, and social support exist, but they are sufficiently limited to preclude their use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. Therefore, the committee recommends that CMS research ways to accurately collect data on these indicators.**

Wealth represents total accumulated economic resources (assets) that, like income, can affect health directly and indirectly (Braveman et al., 2005; Deaton, 2002; NASEM, 2016a). Wealth may capture more variation than income among older persons, and may therefore be a more sensitive indicator of SEP among Medicare beneficiaries (Allin et al., 2009). Collecting self-reported net worth is difficult because it is sensitive and because many individuals simply do not know the value of their net worth or what assets they have (Braveman et al., 2005; Eggleston and Klee, 2015). Wealth data are not currently available through CMS, providers and plans, or other government agencies. Because no data sources are available for use in the short term, CMS should conduct more research on both measurement and data collection methods by CMS or through EHRs. CMS could consider whether inclusion of wealth data adds sufficient precision above and beyond income data.

Living alone is a structural element of social relationships, which is typically an indicator of social isolation or loneliness, and it is likely to capture elements of social support (Berkman and Glass, 2000; Brummett et al., 2001; Cohen, 2004; Eng et al., 2002; House et al., 1988; Wilson et al., 2007). There are no data sources that could be used in the short term. However, for the long term, because living arrangements can change rapidly for older adults and living alone has clinical utility as an indicator, living alone may best be captured in the clinical setting. CMS should develop standardized measures and methods for data collection through EHRs.

Social support is a crucial function of social relationships that includes instrumental components (e.g., material and other practical supports) and emotional dimensions (e.g., through caring and concern). Currently, no social support data are available within CMS, from providers and plans, or from other government agencies. Thus, there are no data sources that could be used in the short term. However, for the long term, because social support can change rapidly and has clinical utility, it may best be captured in the clinical setting. CMS should develop standardized measures and methods for data collection through EHRs.

> **Recommendation 5: Area-level measures exist for housing, but they have limitations for use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. The committee recommends that CMS research ways to accurately collect housing data, whether at an individual level or an area level.**

Elements of housing that may influence health include housing stability, homelessness, and quality and safety. Currently neither CMS nor providers and plans routinely collect housing information, although some more comprehensive EHRs may collect or link to housing information (Gottlieb et al., 2015; ONC, n.d.). Because housing can change over time and has clinically utility, housing information could be collected through EHRs. Some area-level measures of housing are also available through the ACS and the Department of Housing and Urban Development. Because some dimensions of housing reflect beneficiaries' environment, an area-level measure could be appropriate. In the short term, the committee recommends that CMS test area-level measures based on a beneficiary's residential address in the Medicare record. Because other elements of housing, in particular, physical characteristics, occur at the individual level, and can change over time, individual-level housing data could be collected through EHRs in the long term, but more research is needed on measurement and data collection methods.

> **Recommendation 6: The committee recommends that research be conducted on the effect of acculturation, sexual orientation and gender identity, and environmental measures of residential and community context on health care outcomes of Medicare beneficiaries, and on methods to accurately collect relevant data in the Medicare population.**

Acculturation describes how much an individual adheres to the social norms, values, and practices of his or her own home country or ethnic group or to those of the United States (NASEM, 2016a). Evidence on the effect of acculturation and health care outcomes is not well established (Abraído-Lanza et al., 2006; IOM, 2014; NASEM, 2016a). Because more evidence is needed on the empirical association between acculturation and health care outcomes, CMS should revisit this indicator and its appropriate measurement when more evidence is available.

Sexual orientation captures individuals who identify as lesbian, gay, bisexual, queer, questioning, or otherwise nonconforming, and it is typically defined with respect to three dimensions: attraction, behavior, and identity (IOM, 2011). Gender identity typically refers to individuals who identify as gender minorities, including those who identify as transgender, intersex, or otherwise nonconforming (IOM, 2011). Although some measures and best practices for data collection exist and CMS has included data collection of sexual orientation and gender identity in its Equity Plan for Improving Quality in Medicare, there are currently no standards for measuring and collecting data on sexual orientation and gender identity (CMS Office of Minority Health, 2015). Providers and plans also do not typically collect sexual orientation and gender identity data. However, ONC included sexual orientation and gender identity in its stage 3 meaningful use regulations (CMS, 2015). Because, in part, of a lack of standardized measures, there is currently little evidence on the effect of sexual orientation and gender identity on health care outcomes (NASEM, 2016a,b). Because more empirical evidence of an effect on health care outcomes is needed, CMS should revisit this indicator and its appropriate measurement when more evidence is available.[2]

Environmental measures of residential and community context capture elements of the physical or built environment such as transportation options and proximity to services (including health care and social services), as well as social environments such as safety and violence and the presence of social organizations. There is a conceptual relationship between neighborhood environments and health care outcomes, but evidence is currently limited and environmental measures need to be tested further (NASEM, 2016a). Thus, CMS should revisit such environmental measures and their appropriate measurement when more evidence is available.

> **Recommendation 7: The committee recommends that the Centers for Medicare & Medicaid Services collect information about relevant, relatively stable social risk factors, such as race and ethnicity, language, and education, at the time of enrollment.**

Indicators for which data might best be captured through a revised enrollment form include race and ethnicity, language, and education. Should other methods, such as linking to data from the SSA, prove too difficult or not produce accurate information on other indicators (e.g., income and nativity), these could be considered for inclusion in the revised enrollment form. Should research demonstrate an important explanatory effect of one or more of these indicators and a pilot test shows it is feasible, CMS could supplement the information collected at enrollment with a survey of current beneficiaries, whose information would not have been captured at the time of enrollment.

Table S-1 summarizes the availability of data for social risk factor indicators that could be accounted for in Medicare payment programs.

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[2] As described in the committee's third report (NASEM, 2016b), normative gender categories (men and women) are strongly associated with health and health care outcomes, despite the fact the gender effects are difficult to separate from biological sex effects. Thus, normative gender is a strong candidate for inclusion in methods to account for social risk factors in Medicare quality measurement and payment programs. However, the committee notes that gender is already included as a risk factor in clinical risk adjustments in Medicare.

TABLE S-1 Summary of Data Availability for Social Risk Factor Indicators

SOCIAL RISK FACTOR		DATA AVAILABILITY			
	Indicator	**1**	**2**	**3**	**4**
SEP					
	Income		■		
	Education		■		
	Dual Eligibility	■			
	Wealth			■	
Race, Ethnicity, and Cultural Context					
	Race and Ethnicity		■		
	Language		■		
	Nativity	■			
	Acculturation				■
Gender					
	Gender identity				■
	Sexual orientation				■
Social Relationships					
	Marital/partnership status		■		
	Living alone			■	
	Social Support			■	
Residential and Community context					
	Neighborhood deprivation		■		
	Urbanicity/Rurality	■			
	Housing		■		
	Other environmental measures				■

1. Available for use now

2. Available for use now for some outcomes, but research needed for improved, future use

3. Not sufficiently available now; research needed for improved, future use

4. Research needed to better understand relationship with health care outcomes and on how to best collect data

GENERAL CONCLUSIONS

The committee identified several general conclusions for CMS in its overall approach to collecting data on social risk factors for use in Medicare payment. Any given indicator may require different data collection strategies depending on its intended use. For example, risk-adjusting health plan quality measures may require data from different sources compared to risk-adjusting hospital quality measures, because social risk factors that affect the outcome or cost of a hospitalization likely differ from those that affect quality or total cost of care measures. This may be particularly relevant for data collected through EHRs, because providers vary in their stage of EHR adoption and capacity for health information exchange. However, this may also be true for other sources of data, where there are limitations to data from existing sources, where data would be collected in different settings (e.g., hospitals, clinical practices, in the home), and when data are collected by different types of individuals (e.g., clinicians and nonclinical staff). Moreover, the specific modes of data collection needed may change over time. For EHR data, needs for complementary modes may diminish with advances in EHR adoption and interoperability. An example of an existing multimodal approach is CMS's strategy for collecting race and ethnicity data. Data from beneficiaries enrolled since the 1990s are collected via self-report, but for older beneficiaries for whom current categories collected through self-reported data are unavailable, CMS imputes race and ethnicity and also updates older data with newer self-reported data collected through surveys. Additionally, when CMS revised its race and ethnicity measures, it conducted a survey of certain Medicare beneficiaries to improve the accuracy of its data (Zaslavsky et al., 2012).

> *Conclusion 2: Different data collection strategies for the same social risk factor indicator may be warranted depending on the purpose or methods used to account for social risk factors in Medicare performance measurement and payment. Additionally, the advantages and disadvantages of any specific source should be considered in reference to the intended use.*
>
> *Conclusion 3: Any specific social risk factor indicator may require a multimodal approach to data collection.*
>
> *Conclusion 4: Regardless of the source, research on how to accurately and reliably collect social risk factor data across different modes and in different settings will be needed.*

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1

Introduction

The Centers for Medicare & Medicaid Services (CMS) is increasingly paying providers (e.g., hospitals, health plans, provider groups) through value-based payment (VBP) programs.[1] VBP ties quality and cost performance to payment in order to hold providers accountable for the quality and efficiency of the health care they provide and for the health care outcomes they achieve (Burwell, 2015; Rosenthal, 2008). In so doing, VBP schemes shift greater financial risk to providers. Because current VBP programs do not account for social risk factors for poor health outcomes, these programs may underestimate the quality of care provided by providers disproportionally serving socially at-risk populations. Consequently, these providers may be more likely to fare poorly on quality rankings (Berenson and Shih, 2012; Elliott et al., in press; Gilman et al., 2014, 2015; Joynt and Jha, 2013a; Rajaram et al., 2015; Shih et al., 2015; Williams et al., 2014). When payment is tied to quality rankings under VBP, these providers may also be more likely to receive penalties and less likely to receive incentive payments (Chien et al., 2007; Joynt and Jha, 2013a,b; Joynt and Rosenthal, 2012; Ryan, 2013). Moreover, these providers have historically been less well reimbursed than providers serving more advantaged patients and have fewer resources (Bach et al., 2004; Chien et al., 2007). If providers disproportionately serving socially at-risk populations have fewer resources to begin with and are more likely to fare poorly on quality rankings and receive financial penalties under VBP, the limited resources to care for socially at-risk populations and those who care for them may be further reduced. This has led some stakeholders to raise concerns that current VBP programs may increase health disparities (Bhalla and Kalkut, 2010; Casalino et al., 2007; Chien et al., 2007; Friedberg et al., 2010; Ryan, 2013).

A primary method proposed to address these concerns has been to account for social risk factors in quality measurement and payment programs, including VBP. Proponents of such methods view social risk factors as difficult to address through provider actions and may also

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[1] As described in the committee's first and third reports (NASEM, 2016a,b), CMS payment models cover a spectrum of approaches from traditional fee-for-service to population-based payment models. The committee uses the term *value-based payment* to describe models that fall into two broad categories, which the committee roughly categorizes as *financial incentives* and *alternative payment models* (APMs). Financial incentives (such as pay-for-performance schemes) link financial bonuses and/or penalties to the quality and efficiency of care, whereas APMs (such as episode- or population-based payments) shift greater financial risk to providers in order to hold them accountable for the quality and efficiency of care delivered as well as for the health care outcomes achieved. For more information on specific Medicare VBP programs, the committee points the interested reader to its first and third reports (NASEM, 2016a,b).

believe that the costs of addressing social risk factors are high. Thus, they suggest that social risk factors must be accounted for in VBP even if it is appropriate to expect providers to address social risk factors. Opponents are concerned that methods like risk adjustment could obscure real disparities and thereby reduce incentives to improve care and reduce health disparities. Thus, they might argue that providers disproportionately serving socially at-risk populations should be held responsible for providing services in a manner that compensates for social risk factors. For a more extensive discussion of these concerns, the committee directs the interested reader to its first three reports (NASEM, 2016a,b,c). As described in the committee's third report (NASEM, 2016b), to the extent that social risk factors influence performance indicators independently of provider actions and those factors are unevenly distributed across providers, it may be appropriate to account for social risk factors in VBP (NASEM, 2016b). However, any specific approach to accounting for social risk factors in Medicare quality and payment programs requires continuous monitoring to ensure the absence of any unanticipated adverse effects on health disparities (NASEM, 2016b). If CMS proceeds with accounting for social risk factors, doing so first requires accurate data on the social risk factors of Medicare beneficiaries.

STATEMENT OF TASK

In response to the Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014, the Department of Health and Human Services acting through the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to provide a definition of socioeconomic status for the purposes of application to Medicare quality measurement and payment programs; identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs; identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies; and recommend existing or new sources of data and/or strategies for data collection. The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of health, risk adjustment, and Medicare programs (see the Appendix A for biographical sketches). This report is the fourth in a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated through the IMPACT Act. In the first report, the committee presented a conceptual framework and described the results of a literature search linking five social risk factors and health literacy to health-related measures of importance to Medicare quality measurement and payment programs. In the second report, the committee reviewed the performance of providers disproportionately serving socially at-risk populations, discussed drivers of variations in performance, and identified six community-informed and patient-centered systems practices that show promise to improve care for socially at-risk populations. The committee's third report identified social risk factors that could be considered for inclusion in Medicare quality measurement and payment, criteria to identify these factors, and methods to account for them in ways that can promote health equity and improve care for all patients. Details of the statement of task and the sequence of reports can be found in Box 1-1. The committee will release reports every 3 months, addressing each item in the statement of task in turn.

BOX 1-1
Statement of Task

An ad hoc committee will provide a definition of socioeconomic status (SES) for the purposes of application to Medicare quality measurement and payment programs; to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs. Furthermore, the committee will identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies. Finally, the committee will recommend existing or new sources of data and/or strategies for data collection. The committee's work will be conducted in phases and produce five brief reports, which build on the Institute of Medicine of the National Academies of Sciences, Engineering, and Medicine's previous studies relevant to this study.

The first report will:

- Define SES for the purpose of application to quality, resource use, or other measures used for Medicare payment programs.
- Identify SES factors and other social factors (such as race, health literacy, limited English proficiency) that have been shown to affect health outcomes of Medicare beneficiaries.

The second report will:

- Identify best practices of high-performing hospitals, health plans, and other providers that serve disproportionately higher shares of socioeconomically disadvantaged populations and compare those best practices to practices of low-performing providers serving similar patient populations.

The third report will:

- Specify criteria (along with their strengths and weaknesses) that could potentially be used to determine whether an SES factor or other social factor should be accounted for in Medicare quality, resource use, or other measures used in Medicare payment programs.
- Identify SES factors or other social factors that could be incorporated into quality, resource use, or other measures used in Medicare payment programs.
- Identify methods that could be used in the application of SES factors and other social factors to quality, resource use, or other measures used in Medicare payment programs.

The fourth report will:

- For each of the SES factors or other social factors described above, recommend existing or new sources of data on these factors and/or strategies for data collection, while also identifying challenges to obtaining appropriate data and strategies for overcoming these challenges.

In the fifth report:

- The committee will synthesize and interpret the four brief reports issued as described above into one report that will include comprehensive project findings, conclusions, and recommendations based on the four previous reports.

COMMITTEE PROCESS

This report builds on the committee's earlier reports. In particular, the committee presented a conceptual framework by which five social risk factors (socioeconomic position [SEP]; race, ethnicity, and cultural context; gender; social relationships; and neighborhood and residential context) and health literacy may influence performance indicators used in VBP in its first report (NASEM, 2016a). In the committee's third report, the committee expanded the conceptual framework to include specific indicators across the five domains of social risk factors. Indicators are ways to measure the underlying constructs of the social risk factors and are distinct from individual measures. For example, education is an indicator of SEP that can be measured in different ways (e.g., years of schooling, highest degree attained). The committee also identified criteria that could be used to select social risk factors that should be included in Medicare quality measurement and payment programs, and then applied these criteria to indicators of the social risk factors and health literacy. Based on this activity, the committee concluded that there are measurable social risk factors that could be accounted for in Medicare VBP programs in the short term, for which indicators include

- income, education, and dual eligibility;
- race, ethnicity, language, and nativity;
- marital/partnership status and living alone; and
- neighborhood deprivation, urbanicity, and housing.

The committee also concluded that some indicators of social risk factors capture the underlying constructs and currently present practical challenges, but they are worth attention for potential inclusion in accounting methods in Medicare VBP programs in the longer term. These include

- wealth,
- acculturation,
- gender identity and sexual orientation,
- emotional and instrumental social support, and
- environmental measures of residential and community context.

In this report, the committee provides guidance on data sources for and strategies to collect data on the indicators that could be included in Medicare quality measurement and payment programs that the committee identified in its third report. Chapter 2 describes three general categories of data sources the committee considered—existing and new sources of CMS data, data sources from providers, and alternative government data sources. Chapter 2 also describes general advantages of and barriers to using each data source. Chapter 3 then presents guiding principles the committee used to assess each potential data source for each social risk factor indicator as well as the specific potential data sources that could be used for each indicator along with their advantages and disadvantages. Chapter 3 closes with general conclusions for CMS in its approach to collecting social risk factor data for use in Medicare quality measurement and payment.

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Potential Data Sources

In its third report, *Accounting for Social Risk Factors in Medicare Payment: Criteria, Factors, and Methods* (NASEM, 2016), the committee identified social risk factors that the Centers for Medicare & Medicaid Services (CMS) could include in quality measurement and payment, criteria to identify these factors, and methods to do so. For CMS to account for social risk factors in Medicare quality measurement and payment programs using these approaches, it is logical that it must first have accurate data on the social risk factors of Medicare beneficiaries. This chapter describes three broad categories of data sources for these social risk factors: (1) data CMS already possesses or could collect; (2) data that providers (including hospitals, health plans, provider groups, and others) could report to CMS; and (3) alternative government data sources. The chapter also presents general advantages of each potential source as well as barriers to collecting accurate data through, and using data from, these sources.

Patients are the underlying source of most social risk factor data. This is also true of most clinical data. Clinicians make assessments and diagnoses based on how patients present—e.g., their complaints, symptoms, and test results. Providers then systematically maintain and report clinical data in the form of diagnostic and clinical assessments. Most social risk factors are collected directly from patients who report their income, race, ethnicity, preferred language, etc. to CMS, health care providers, and other government agencies. Moreover, for some social risk factors like race, ethnicity, and gender, it is important for patients to self-identify. However, CMS, health care providers and health plans, and government agencies collect and maintain this information and, more importantly, standardize, assess, interpret, and report this information in a valid, consistent, and reliable way.

In the future, new, better, and easier methods of data collection could emerge (e.g., methods that are more accurate, less burdensome, or less costly). For example, health technologies such as smartphone applications and wearable devices that could collect health and social risk factor data are rapidly developing and it is feasible that Medicare beneficiaries could directly report social risk factor data to CMS in the future. Indeed, as these new methods emerge, an ideal system would be responsive to evolving data availability and could adapt to use new data sources. However, at this time and likely in the near term over which the committee expects the Office of the Assistant Secretary of Planning and Evaluation to begin preliminary analyses and CMS to begin accounting for social risk factors in Medicare payment, it is unlikely that technologies and interoperable systems will be available for patients to directly, systematically, and securely submit social risk factor data to CMS for use in Medicare payment. Thus, although patients and enrollees underlie each of the three categories of data sources described above, they are not called out as a separate and unique source.

Finally, although social risk factor data could also be obtained from private data sources, because these sources and their data collection methods are not fully transparent and because CMS would have to purchase these data at unknown cost, the committee deemed use of such private data as out of scope.

NEW AND EXISTING SOURCES OF CMS DATA

CMS possesses a variety of data sources, some of which include data on social risk factors of Medicare beneficiaries. Existing sources of social risk factor data include administrative records and surveys of enrollees and patients. Administrative records include Medicare beneficiary enrollment records as well as claims data. These sources include limited information on social risk factors, such as beneficiaries' race and ethnicity (ResDAC, 2016a). Enrollment information on Medicare beneficiaries includes the basis of a beneficiary's entitlement, which plans beneficiaries are enrolled in (Parts A, B, C, D, or alternative payment models), as well as Medicaid enrollment for those who are dually enrolled in Medicare and Medicaid (ResDAC, 2016a). Administrative records also include basic demographic information and vital statistics, as well as clinical information and data on beneficiaries' health care use and expenditures based on claims data that providers submit to CMS for payment (ResDAC, 2016a).

Survey data from CMS refer to data derived from one of the surveys of Medicare beneficiaries that CMS routinely conducts. These include the Consumer Assessment of Healthcare Providers and Systems (CAHPS) family of surveys, the Health Outcomes Survey (HOS), and the Medicare Current Beneficiary Survey (MCBS) (ResDAC, 2016b). CAHPS surveys aim to assess patient experiences of care from a variety of care settings—hospital, health plan, clinicians and groups, home health, hospice, and so on (AHRQ, 2016; CMS, 2016a). The Medicare HOS assesses patient-reported health outcomes, including physical functioning and mental health outcomes (Haffer and Bowen, 2004; Medicare Health Outcomes Survey, 2016). The MCBS aims to assess beneficiaries' access to, satisfaction with, and usual sources of care, as well as their expenditures and sources of payment for all health care services used, including those not covered by Medicare (CMS, 2016c,d). These surveys, especially the CAHPS surveys, include limited data on social risk factors, such as information on race and ethnicity, language, and education.

CMS could also collect new data on social risk factors. It could do so by adding items to existing sources, such as enrollment forms or survey questionnaires. In addition, CMS could collect social risk factor data through new methods or sources, such as through a new survey or administrative form. CMS could implement this for all new beneficiaries going forward, for example, at enrollment as a condition of receiving benefits. However, this would not capture social risk factor data for existing beneficiaries. Thus, to ensure accurate data on all beneficiaries, CMS could also conduct a one-time, universal survey of all currently enrolled Medicare beneficiaries.

Using CMS data has several advantages. The primary advantage of using existing sources of data that CMS already possesses is precisely that CMS has access to and maintains accurate data it already collects using standardized measures and validated, reliable methods, and which it could apply to performance measurement and payment programs. Additionally, if CMS were to collect new social risk factor data for inclusion in Medicare quality measurement and payment programs, it could design measures and data collection methodologies to ensure collection of accurate data that meet the needs of the intended method to account for those social risk factors in Medicare quality measurement and payment programs. At the same time, such new data collection on the social risk factors also need not be restricted to Medicare quality measurement and payment applications. CMS could also use these data for other purposes, including research and quality improvement. Finally, if CMS were to collect new data themselves, it also would not be subject to the potentially substantial barriers of collaborating with other federal government agencies. (These barriers are discussed in more detail in the section on other government data sources.)

At the same time, using CMS data on social risk factors in quality measurement and payment programs is not without challenges. In particular, although CMS may currently collect and maintain some existing sources of data on social risk factors, because these data are designed and used for purposes that are not quality or performance measurement and payment, these data may not be immediately usable for such application. In particular, data on the same social risk factor across different data sets may require measurement standardization in order to be useful for inclusion in performance measurement and payment. For example, although CMS may have data on the race and ethnicity or preferred language of Medicare beneficiaries from several sources, how such data are measured and/or collected for administrative purposes may differ from how they are measured and/or collected through surveys. Additionally, some data, especially those derived from sample surveys, may not be sufficient for certain methods of accounting for social risk factors. A particular concern is small sample size. For example, CMS would need relatively large sample sizes for some methods of accounting for social risk factors, and this may be larger than what is currently collected through any existing survey. Relatedly, even if sufficient samples are available to account for social risk factors in measuring some outcomes, data on social risk factors from one source may not generalize or be able to be applied to other outcome measures from another source. In regards to new data collection, doing so would require clearance of new items to survey questionnaires or administrative form from the White House Office of Management and Budget, which is especially concerned about collection burden, and such clearance processes could be a barrier to collecting new data. Additionally, any new collection of data from all new or existing Medicare beneficiaries would require substantial cost for which there are likely to be limited resources.

DATA SOURCES FROM PROVIDERS AND PLANS

Data sources from providers include data from electronic health records (EHRs) and administrative data that providers report or could report to CMS. EHRs comprise the software providers use to collect, store, and manage patient health records as well as the databases that hold this information (IOM, 2014). EHR *data* sometimes (and henceforth in this report) refer to the information rather than the entire information technology system (IOM, 2014). Most EHRs capture some basic information on social risk factors, such as race and ethnicity, and EHRs are beginning to capture more robust social risk factor data. Some more comprehensive EHR systems may include or link to more data on social risk factors, such as language preferences or capabilities, education, housing, and community context (Gottlieb et al., 2015; ONC, n.d.).

The Office of the National Coordinator for Health Information Technology (ONC) is the office responsible for supporting and encouraging EHR adoption and health information exchange in the Department of Health and Human Services (HHS). To date, ONC has included some social risk factors in the regulations it puts forth for the CMS meaningful use incentive programs. *Meaningful use* in health information technology refers to the use of EHR data for specific objectives, such as quality improvement, care coordination, and improving public and population health (CMS, 2016b; IOM, 2014; ONC, 2014b). CMS meaningful use incentive programs provide bonus payments to providers who demonstrate that their EHRs achieve certain meaningful use objectives. These programs have been implemented in stages since 2011. The Stage 2 Meaningful Use regulations published in 2012 for the incentive program beginning in 2014 require EHRs to have the capacity to include race and ethnicity and preferred language in the objective to record demographics (CMS, 2012). In the Stage 3 Final Rule published in 2015 for programs beginning in 2017, ONC added collection of sexual orientation and gender identity (CMS, 2015). Importantly, achieving meaningful use under these standards does not require providers to collect this information, only that a provider's EHR system has the capacity to do so (CMS, 2015). Nonetheless, meaningful use regulations and related incentive payments are powerful tools to encourage adoption of social risk factor data in EHRs.

In 2014, the Institute of Medicine (IOM) published a report recommending social and behavioral domains and measures for ONC to consider including in its meaningful use regulations. Although the purpose of that report was to identify social and behavioral domains that should be captured in EHRs to enhance patient care by capturing information important to providers in providing health care, there is some overlap between the social risk factors listed in this earlier IOM report and those identified in the committee's third report. Moreover, although the tasks for the two committees and the resulting two reports diverge, application of EHR data in Medicare performance measurement and payment can be considered another form of meaningful use and such application provides additional rationale for incentivizing widespread adoption of standardized collection and reporting of data from EHRs to CMS, including social risk factor data.

Administrative data include data captured through patient enrollment forms and claims data and may also include limited social risk factor data. For example, many health plans collect language data in order to provide appropriately tailored health care information and services to enrollees (Lawson et al., 2011; Nerenz et al., 2013a,b), and these data could be reported to CMS for use in performance measurement and payment. Such data could be attached to claims data that providers already submit to CMS using standardized reporting processes and systems for payment.

A primary advantage of using data on Medicare beneficiaries' social risk factors that providers or health plans collect is that some information on social risk factors may be clinically useful to enhance the care or services the providers and plans provide. In addition, CMS already has a reporting infrastructure for claims and performance reporting with standardized reporting requirements, processes, and systems that it could build on.

Despite these advantages, a principal barrier to using data from providers is the need for standardized measurement and reporting to CMS, regardless of whether the data come from EHRs or other electronic systems. Although CMS has infrastructure for both performance and claims reporting that it could enhance to include reporting of social risk factors, because only limited social risk factor data are currently collected through EHRs, CMS would still need to identify or develop and validate measurement standards for collection of new social risk factors. In addition, data can be added to EHR and other electronic systems through different modes of collection. Clinicians and nonclinicians can collect data through clinical discussions and interviews during an office visit, patients can enter information directly through patient portals or electronic surveys, and data can be collected through paper forms and entered into electronic systems manually (IOM, 2014). Because these different modes of collection may affect the accuracy and consistency of the data collected, validated data collection methods are needed.

With respect to EHRs in particular, even if measurement and data collection standards are met where they exist, EHR systems lack interoperability, which in turn restricts health information exchange (HIE). HIE is the ability of health care professionals and patients to share patient health records securely and appropriately (ONC, 2014a); whereas, interoperability refers to the architecture and standards that enable HIE across different EHR systems (ONC, 2013). CMS promotes standardized data measurement and collection to promote interoperability and facilitates HIE for EHRs through such programs as the CMS meaningful use incentive programs and regional extension centers that provide technical advice on EHR implementation. However, there are hundreds of vendors of ONC-certified EHRs whose products differ (ONC, 2016e).

Several additional barriers to meaningful use more broadly present additional challenges for the use of EHRs as a source of social risk factor data for use in Medicare quality measurement and payment. Although the number of providers with basic and comprehensive EHRs has risen substantially since 2009 when the ONC was established, in 2015, while nearly all non-federal acute care hospitals used certified EHRs (ONC, 2016b), nearly one-quarter of primary and specialty physician practices did not demonstrate meaningful use of a certified EHR (ONC, 2016c,d). Moreover, evidence suggests that providers disproportionately serving socially at-risk populations such as safety-net hospitals, critical access hospitals, and community health centers are less likely to have either basic or comprehensive EHRs (Adler-Milstein et al., 2014, 2015; DesRoches et al., 2012, 2013a,b; ONC, 2016a,b; Shields et al., 2007). This may be especially challenging for using social risk factor data derived from EHRs in Medicare quality measurement and payment programs because the providers whose performance scores and financial incentives are likely to be most affected by accounting for social risk factors in Medicare quality measurement and payment are precisely those who are less likely to have EHR systems with high functionality.

Second, collecting social risk factor data through EHRs could increase burdens on individual providers and health care organizations, as well as on patients. Adding social risk factors to EHRs may require software upgrades or additional programming; modifying workflows of the clinical team to collect, enter, and manage social risk factor data in the EHR; educating providers on data collection methods to ensure accurate data; ensuring data storage systems and methods to share social risk factor data with other providers and administrators or researchers are secure; and, in some cases, intervening on or otherwise addressing social risk factors through tailored care approaches or referring patients to social service or public health agencies or community organizations that can address unmet social needs (IOM, 2014). Each of these tasks is costly and time consuming.

Burdens on patients and enrollees pertain to the ability of patients to recall information about their social risks as well as privacy and security. With respect to the former, patients and enrollees may not know or be willing to share data on certain social risk factors that are sensitive in nature. Concerns about why clinicians or plans are asking about social risk factors like education, income, or nativity and how such data may be used relate to concerns about the privacy and security of patient health information, especially when shared with other providers and with researchers and administrators for nonclinical uses. The Privacy and Security Rules of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) establishes standards for the use and disclosure of identifiable health information as well as security safeguards to protect electronic identifiable health information.[1] In addition to federal regulations, states and localities also have privacy and security regulations governing the use of health information, which may include social risk factor data (IOM, 2014). Although such privacy laws are important for protecting patient privacy and security, they can nevertheless be barriers to using patient health information for research or administrative purposes. The burden of collecting data on social risk factors in EHRs on patients, providers, and health care organizations, including the concerns described and extensive discussions of privacy and security issues as well as mitigation strategies are discussed in detail in the IOM's 2014 report as well as the 2012 report on health information technology and patient safety, and the committee points the interested reader to these reports for a more comprehensive discussion (IOM, 2012, 2014).

ALTERNATE GOVERNMENT DATA SOURCES

Alternative government data sources in this report refer to administrative data and national surveys that federal agencies other than CMS and state agencies oversee and maintain and that could be linked to Medicare beneficiary data or that CMS could otherwise use. (Note this includes other agencies within HHS.) These data include data that could be linked to Medicare beneficiary data at the individual level, area-level data that could be used to describe a Medicare beneficiary's residential environment or serve as a proxy for individual effects, and data that could help CMS to determine how to elicit information on social risk factors from Medicare beneficiaries. The primary advantage of using administrative and survey data from other agencies is that these data sources contain substantial information on social risk factors, and data from these sources are collected using standardized and validated measures and methodologies. However, barriers to linking such data to Medicare data can be substantial. First and foremost, laws and regulations relating to the privacy and security of such data, particularly federally funded data, may restrict data sharing (IOM, 2014). Additionally, as described above, even if data can be shared, it may require substantial effort and/or cost to ensure that data can be linked at the appropriate level. Small sample sizes in surveys may be of particular concern. For example, sample sizes for small geographic areas are small, and data may need to be pooled across years. Furthermore, because data from alternative government sources are not intended for use in Medicare quality measurement and payment applications, the social risk factor variables available from these sources may not best capture the relevant latent constructs. For example, the National Health and Nutrition Examination Study (NHANES) captures sexual orientation data, but focuses on sexual behavior; whereas, the aspect most relevant to Medicare performance indicators may be sexual identity. Barriers specific to particular data sources are discussed in more detail in the following sections.

Data from the Social Security Administration

The Social Security Administration (SSA) may be the most useful source of administrative data on social risk factors outside of CMS that could be linked to Medicare beneficiary data at the individual level. The SSA maintains many different data sets, but the four most commonly used are the Master Beneficiary Record, Master Earnings File, Numident file, and Supplemental Security Record (McNabb et al., 2009). These records include data on

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[1] 45 CFR Part 160 and Subparts A, C, and E of Part 164.

demographics, vital statistics, lifetime earnings (i.e., income), and information related to eligibility for social security needs-based benefits, such as disabling conditions and living arrangements (McNabb et al., 2009). Although these data are available and could be linked to Medicare beneficiary data, doing so will likely require substantial effort and cost.

Data from the American Community Survey

The American Community Survey (ACS) may be a particularly useful source of area-level social risk factor data that could be used to assess genuine area-level effects or serve as proxies for individual-level effects (U.S. Census Bureau, 2016). The ACS is a continuous nationwide survey administered by the Census Bureau that provides a wide range of social risk factor data including demographic, housing, social, and economic data on local communities (U.S. Census Bureau, 2013). It replaced the Census long form beginning in 2000, with full implementation in 2005. The sample size has increased from 2.9 million housing units in 2005 to 3.3 million housing units in 2014 (U.S. Census Bureau, 2013, 2015). Data from the ACS may be particularly useful for Medicare quality measurement and payment applications, because it provides area-level data at relatively small geographies—census tracts and block groups. However, because samples sizes are small, only 5-year estimates are available for these small geographies (U.S. Census Bureau, 2016). Moreover, these estimates are derived from all persons residing in the households sampled, not only the population of older adults. Therefore, they may be appropriate measures of genuine area-level effects but less precise as proxies for individual-level effects. However, deriving census-tract level variables from the ACS exclusively from the population of older adults, under the assumption that these would serve as better proxies for individual-level effects, is likely to be unwise. The small sample sizes of older adults in most census tracts would result in considerable imprecision.

Data from Other National Surveys

Other national surveys could be useful to CMS to determine how best to elicit information from Medicare beneficiaries on their social risk factors, because they capture substantial information on social risk factors and may offer guidance on the potential measurement strategies—both new or alternative ways—for many of the social risk factors that CMS could include in Medicare quality measurement and payment. For example, the design of these surveys includes standardized and validated measures and data collection methods to which CMS could refer when developing and refining its own measures and strategies to collect social risk factor data. However, because sample sizes of older adults in these national surveys are small, data from these surveys is unlikely to be useful to link to Medicare beneficiary data at the individual-level for use in Medicare quality measurement and payment. At the same time, where social risk factor data from national surveys can be linked to individual-level Medicare beneficiary data in some limited capacity, in some cases, these national surveys could serve as test beds for CMS to assess the value-added quality of more complex measures. For example, CMS could assess how much additional explanatory power wealth might have above and beyond other measures of SEP, such as education and income, with regard to performance indicators used in value-based payment.

National surveys that collect data on social risk factors and which may be useful to CMS are the Health and Retirement Survey (HRS), National Health & Aging Trends Study (NHATS), NHANES, National Health Interview Survey (NHIS), and the National Survey of Family Growth

(NSFG). HRS, sponsored by the National Institute on Aging (NIA) and the SSA and administered by the University of Michigan, assesses health and economic well-being among more than 37,000 adults age 50 living in 23,000 households (NIA et al., 2007; Sonnega et al., 2014). NHATS, sponsored by NIA and conducted by the Johns Hopkins Bloomberg School of Public Health with data collection by Westat, assesses late life functioning among more than 8,0000 adults age 65 and older (NHATS, 2016). Because both HRS and NHATS are surveys of older adults including Medicare beneficiaries, some Medicare data are already linked to data from the HRS and NHATS (ResDAC, n.d.-a, n.d.-b). NHIS, NHANES, and NSFG are health-related surveys overseen by the National Center for Health Statistics of the Centers for Disease Control and Prevention. NHIS is a continuous household survey of adults that assesses physical and mental health status, chronic disease, health insurance and access to health care services, health behaviors (e.g., smoking, alcohol use, physical activity, immunizations), and limitations on activity or functioning (CDC, 2015b). The NHIS sample size for surveys beginning in 2011 is expected to be 87,500 persons from 35,000 households (CDC, 2015a). NHANES assesses the health status of approximately 300,000 U.S. adults and children and includes demographic, socioeconomic, dietary, and health-related questions, as well as an examination that includes medical, dental, and physiological measurements and laboratory tests (CDC, 2014, 2015c). NSFG is a continuous survey of men and women age 15 to 49 that assesses family life, marriage and divorce, reproductive health (including pregnancy, infertility, use of contraception), and general health (CDC, 2016). The NSFG sample has ranged from 10,000 to 20,000 (CDC, 2016).

These specific data sources for individual social risk factor indicators and the committee's recommendations are described in the next chapter.

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3

Data Sources and Data Collection for Social Risk Factors

In its first report, *Accounting for Social Risk Factors in Medicare Payment: Identifying Social Risk Factors* (NASEM, 2016a), the committee presented a conceptual framework illustrating the primary hypothesized pathways by which five social risk factors—socioeconomic position (SEP); race, ethnicity, and cultural context; gender; social relationships; and residential and community context—and health literacy may influence health outcomes of Medicare beneficiaries (NASEM, 2016a). In its third report, *Accounting for Social Risk Factors in Medicare Payment: Criteria, Factors, and Methods* (NASEM, 2016b), the committee expanded the framework to include specific indicators, or ways to measure, the social risk factors. The committee also developed five criteria for selecting social risk factors that could be accounted for in Medicare quality measurement and payment programs and applied them to the social risk factor indicators. Based on this activity, the committee concluded that the following indicators could be included in Medicare quality measurement and payment programs in either the short or long term:

- income,
- wealth,
- education,
- dual eligibility,
- race and ethnicity,
- language,
- nativity,
- acculturation,
- sexual orientation and gender identity,
- marital/partnership status,
- living alone,
- social support,
- neighborhood deprivation,
- housing stability and quality,
- urbanicity, and
- other environmental measures of residential and community context.

For each social risk factor, the committee identified data sources in the categories described in Chapter 2—new and existing sources of Centers for Medicare & Medicaid Services (CMS) data, data sources from providers and health plans, and alternative government data sources—with the aim to be more inclusive. The committee's review of data sources considered sources that CMS could use in the short and long term. The committee notes that it has not been asked to recommend whether the CMS *should* include social risk factor adjustments in its public reporting and payment programs. The recommendations in this report indicate things CMS should do *if* it decides to move toward accounting for social risk factors.

To assess the advantages and disadvantages of specific data sources for specific social risk factor indicators, the committee identified three characteristics to consider: (1) collection burden, (2) accuracy, and (3) clinical utility. Collection burden describes the resources including clinician and administrative time, financial costs, and other effort required to collect and store data through any given source. This burden can be carried by individual patients or enrollees responding to questions about their social risk, as well as providers (including organizations, individual providers, and nonclinical staff) who collect data, and CMS itself. When considering collection burden, particularly where there are substantial barriers to data collection (such as high cost), CMS may weigh an important tradeoff to further guide its selection of any given indicator or social risk factor. In some cases, data collection may be burdensome, but the indicator has high predictive value with respect to the performance indicator(s) of interest. In these instances, it may be important to include the indicator despite the burden of data collection. However, in other cases, early pilot testing or modeling of a social risk factor indicator in a multivariable model may suggest only marginal gains. Where there is high burden and only marginal gains, CMS may choose not to include the indicator in quality measurement and payment. For example, if collecting accurate data on wealth is highly burdensome to CMS, providers, and Medicare beneficiaries, and it does not substantively contribute to adjustments to performance scores when other measures of socioeconomic position like income and education are already accounted for, CMS could choose not to also include wealth. Because literature does not (and cannot) indicate whether all social risk factors related to performance indicators used in value-based payment (VBP) must be individually accounted for to accurately adjust payment and quality measures, these are questions for the Office of the Assistant Secretary of Planning and Evaluation and CMS to test empirically.

> *Conclusion 1: If there are substantial barriers to collecting social risk factor data (such as high cost) and/or if early pilot testing or modeling in a multivariable model suggests only marginal gains from including any given indicator in any method of accounting for social risk factors in Medicare performance measurement and payment, inclusion of that social risk factor may not be warranted.*

Accuracy refers to the degree that a given measure captures the construct that measure represents. In this report, this characteristic also captures related constructs important for data quality, such as validity, reliability, and completeness. In particular, the committee considered the extent to which standardized, validated, and reliable measures and data collection methods for a given social risk factor indicator are available and consistently used. Standardization is important to ensure valid comparisons across reporting units and settings. Accuracy should be assessed with respect to the specific purpose of accounting for social risk factors in Medicare quality measurement and payment. In other words, the level of accuracy needed should be assessed with reference to the level of accuracy required for a specific method of accounting for social risk factors.

Clinical utility describes whether providers can use information on a social risk factor in the management and treatment of that patient (IOM, 2014). Thus, this characteristic pertains specifically to data that plans and providers could collect such as through an electronic health record (EHR) or at enrollment in a health plan. If intervening on or otherwise addressing a social risk factor is beyond the purview of health care providers or can only be done at substantial cost, clinicians may be reluctant to collect data out of concern that patients would expect them to provide services they do not have the capacity to offer. The committee notes that its focus is on social risk factors important for use in Medicare quality measurement and payment. The EHR will include information on social and behavioral risk factors important to the clinical encounter but that would not be relevant for application to Medicare performance measurement and payment. The committee sees no conflict between the conclusions and recommendations in this report and those in the 2014 Institute of Medicine (IOM) report on capturing social and behavioral domains and measures in EHRs (IOM, 2014).

The committee also considered whether an indicator is relatively stable or changes over time. The distinction between relatively stable or changes over time is not binary, but rather describes a spectrum. Some factors, such as race, ethnicity, and nativity, would not logically change over time, while other factors, such as income (especially when measured using lifetime earnings), wealth, and language, could potentially change over time, but such change is likely to be relatively slow. These factors are relatively stable. Other factors are likely to change more rapidly. For example, a Medicare beneficiary's marital status could change rapidly owing to the loss of a spouse.[1]

To weigh the trade-offs between, and identify priorities among, the potential data sources for each individual social risk factor indicator, the committee identified several guiding principles.

> **Recommendation 1: The committee recommends the Centers for Medicare & Medicaid Services (CMS) use five guiding principles when choosing data sources for specific indicators of social risk to be used in Medicare performance measurement and payment. These guiding principles are:**
>
> - **CMS should first use data it already has.**
> - **CMS should second look for opportunities to use existing data collected by other government agencies (including elsewhere in the Department of Health and Human Services).**
> - **To the extent that a social risk factor is relatively stable, CMS should examine the feasibility of collecting additional data at the time of enrollment in Medicare.**
> - **Where social risk factors change over time and have clinical utility, requiring data collection through electronic health records or other types of provider reporting may be the best approach.**

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[1] The committee distinguishes this characteristic of change over time from modifiability as described in its third report. Because all of the indicators included in this report met all of the selection criteria, including the criterion that a social risk factor not be modifiable through provider actions, they are all considered unmodifiable. Although modifiable factors are also subject to change over time, modifiability is defined in terms of provider actions whereas change over time can occur regardless of provider action (NASEM, 2016b).

- **For social risk factors that reflect a person's context or environment, existing data sources that can be used to develop area-level measures should be considered.**

Once the committee identified potential data sources for each of the social risk factor indicators, the committee assessed each potential data source in terms of the three characteristics (collection burden, accuracy, and clinical utility) and identified the relative advantages and disadvantages of each source. It then weighed the trade-offs for each source to identify preferences and priorities and develop proposed data collection strategies. Based on the committee's review and assessment of potential data sources for each of the social risk factor indicators, the committee identified the following categories of data that CMS could use for inclusion in Medicare quality measurement and payment:

1. Data sources exist that could be used in the short and long term.
2. Data sources with some limitations exist that could be used in the short term, and CMS should conduct research on new or improved data collection strategies in the long term. These include indicators for which:
    a. CMS has some existing data that could be used in the short term, but CMS should research ways to improve accuracy and data collection in the long term.
    b. Area-level measures could be used in the short term, but CMS should research standardized measurement and data collection for the long term.
3. Measures and data collection methods exist, but data sources have considerable limitations and more research is needed to accurately collect data in the long term.
4. Some measures exist, but more research is needed on the effect of the social risk factor indicator on health care outcomes of Medicare beneficiary and on methods to accurately collect data for the Medicare population.

The subsequent sections describe the data sources for individual social risk factor indicators, organized by these categories of data availability. Each section begins with a committee recommendation; supporting text follows immediately. Table 3-1, near the end of this chapter, summarizes the information. The chapter closes with general considerations for any approach to collecting social risk factor data for use in Medicare quality measurement and payment programs.

DATA SOURCES FOR SOCIAL RISK FACTORS

Recommendation 2: The committee recommends that the Centers for Medicare & Medicaid Services use existing data on dual eligibility, nativity, and urbanicity/rurality in Medicare performance measurement and payment.

Dual Eligibility

For the Medicare population, Medicaid eligibility—also referred to as dual (Medicare and Medicaid) eligibility—is an indicator of insurance status that can be used as a proxy measure of SEP. Because it captures elements of SEP such as income and wealth and also health insurance, and thus elements of health status, dual eligibility is an imperfect proxy of SEP that can be considered a broader measure of health-related resource availability that captures medical need

(NASEM, 2016b). CMS administers both Medicare and Medicaid programs, and therefore already possess existing data on dual eligibility among Medicare beneficiaries. This includes graded data on full or partial eligibility and is the most reliable source of available data. Thus, following the committee's guiding principle for CMS to first use data it already has, CMS should use its existing data on dual eligibility.

Nativity

Nativity refers to country of origin and measures can capture a specific country of origin or a dichotomous variable comparing foreign-born to U.S.-born individuals (NASEM, 2016b). CMS does not currently collect nativity data, nor is nativity routinely captured in EHRs. However, Medicare beneficiaries' place of birth could be collected either by CMS or via EHRs with relatively little burden to patients, providers and plans, or CMS. Nativity is a stable social risk factor, which supports one-time collection by CMS to reduce burden, but nativity also has clinical utility, which supports collection through EHRs. Indeed, the 2014 IOM report on capturing social and behavioral domains and measures advocated including country of birth in EHRs because of its clinical utility and the relatively low collection burden (IOM, 2014). The Social Security Administration (SSA) collects place of birth including city and state or foreign country, such as on applications for a Social Security card (SSA, 2011) or at enrollment for Social Security benefits (SSA, n.d.), and it maintains place-of-birth data in its Numident file (McNabb et al., 2009). These data could be paired with Medicare beneficiary records. Because data exist in SSA records that could be linked to Medicare beneficiary records, CMS should use this available source of data.

Urbanicity/Rurality

Urbanicity/rurality describes where a place falls on the spectrum from urban to rural (NASEM, 2016b). Urbanicity/rurality can be a patient/enrollee or provider characteristic, and a patient's urbanicity/rurality may differ importantly from his or her provider's urbanicity/rurality—for example, when rural patients receive care from urban hospitals. For the purpose of inclusion in Medicare performance measurement and payment, urbanicity/rurality of a beneficiary's place of residence is likely to be a more salient indicator of his or her social risk factors. Although urbanicity/rurality is conceptually continuous, it can be measured dichotomously (i.e., urban or rural), trichotomously (i.e., urban, suburban, rural), or on a graded spectrum (e.g., percent urban) (NASEM, 2016b). Because urbanicity/rurality represents a beneficiary's residential and community context, an area-level measure based on the beneficiary's place of residence is appropriate.

A Medicare beneficiary's place of residence is available in Medicare administrative records and is also likely to be captured in administrative or EHR data by providers and plans. Following the principle for CMS to first use its existing data, CMS should use beneficiaries' residential address in its administrative records. The committee notes that although Medicare beneficiaries are required to select a single primary place of residence (CMS, 2016), some beneficiaries may have more than one residence (such as those who move seasonally), and methods that account for patient urbanicity/rurality in performance measures and payment may misclassify some patients receiving care near their secondary residences.

Beginning with the 2010 Census, the U.S. Census Bureau used a trichotomous measure to classify census tracts and/or census blocks (U.S. Census Bureau, 2015). *Urban areas* are defined as regions with 50,000 or more people, *urban clusters* are regions with at least 2,500 and fewer than 50,000 people, and *rural* characterizes all areas not included in either urban classification (U.S. Census Bureau, 2015). For both urban classifications, at least 1,500 persons must live outside of an institutional setting (U.S. Census Bureau, 2015). Because an area-level measure of urbanicity/rurality is appropriate and a trichotomous classification of census tract-/block-level urbanicity/rurality is available through the Census Bureau, this available measure should be used based on a Medicare beneficiary's residential address in the Medicare record.

> **Recommendation 3: Data for individual measures of race and ethnicity, language, and marital/partnership status and for area-level measures of income, education, and neighborhood deprivation are currently available and the committee recommends that the Centers for Medicare & Medicaid Services (CMS) use them for performance measurement and payment applications in the short term. However, owing to limitations in these data, CMS should research ways to improve accuracy and collection of individual-level measures of race and ethnicity, language, marital/partnership status, income, and education, as well as an area-level measure of neighborhood deprivation for use in the future.**

Race and Ethnicity

Race and ethnicity are social categories that represent dimensions of a society's stratification system by which resources, risks, and rewards are distributed (NASEM, 2016b). Race and ethnicity are conceptually distinct, albeit related, constructs that are typically identified through self-reported categories. Medicare currently maintains race and ethnicity data in its administrative records (Filice and Joynt, 2016). Current Medicare surveys and administrative records capture self-reported race and ethnicity using categories that adhere to federal standards issued by the White House Office of Management and Budget (OMB) (Filice and Joynt, 2016; OMB, 1995). However, race and ethnicity information for older beneficiaries who enrolled in Medicare prior to when these standards were issued and implemented may reflect outdated racial and ethnic classifications (Filice and Joynt, 2016; Zaslavsky et al., 2012). Some of these records were updated to improve accuracy using a survey of select beneficiaries in the 1990s (Zaslavsky et al., 2012), and methods also exist to impute race and ethnicity to improve accuracy where self-report is unavailable (Bonito et al., 2008; Elliott et al., 2009; Filice and Joynt, 2016; Grundmeier et al., 2015). EHRs are also likely to capture race and ethnicity data. To that end, Stage 2 meaningful use standards included capturing race and ethnicity using categories that adhere to OMB standards as a part of its measure of recording demographics (CMS, 2012). Race and ethnicity also have clinical utility social risk factors and were included in the 2014 IOM report on capturing social and behavioral domains and measures. Because race and ethnicity are relatively stable factors for which Medicare already has data, CMS should use available self-report and imputed race and ethnicity data in its existing records and existing methods in the short term. However, the committee acknowledges some limitations with regard to lack of standardization in current measurement and collection, and less accuracy for older age groups. Thus, over the long term, CMS should also continue to collect self-reported race and ethnicity data following the OMB standards and to work on standardizing measures and methods across the various self-report mechanisms it oversees—including administrative forms, Medicare sample surveys, and provider and plan reporting requirements.

Language

Language as a social risk factor typically represents language barriers, such as speaking a primary language that is not English, having limited English proficiency, or otherwise needing interpreter services (NASEM, 2016b). CMS currently maintains some data on preferred language, which has high specificity, but poor sensitivity. Additionally, in its Strategic Language Access Plan, CMS included having the CMS Civil Rights Agency Liaison examine the feasibility of including collection of language preferences to existing CMS surveys as well as ways to standardize data collection on existing and future surveys (CMS, 2014). Providers and plans could also collect language data, because it is clinically useful for providers and plans to provide tailored care, such as providing health information in languages other than English or providing language interpreter services. Indeed, to provide such services, many health plans collect and maintain language data (Lawson et al., 2011; Nerenz et al., 2013a,b). Similarly, providers may voluntarily collect and maintain language data in adherence to national standards, such as those put forth by the CMS Office of Minority Health (CMS Office of Minority Health, 2016) and the HHS Office for Civil Rights (HHS, 2016). Capturing preferred language using the Library of Congress language codes was also included in the Stage 2 meaningful use regulations as part of the measure of recording demographics (CMS, 2012). Area-level measures, such as those from the American Community Survey (ACS) and some imputation methods, are also available as individual-level proxies where individual-level data do not exist. Although much research on language and health care outcomes has focused on limited English proficiency rather than preferred language (NASEM, 2016a), following the principle that CMS should first use its existing data, in the short term, CMS should use its existing data on preferred language while acknowledging their limitations. In the long term, CMS should continue efforts to standardize measures and data collection methods. A 2009 IOM report provides guidance on standardization of race, ethnicity, and language data (IOM, 2009).

Marital/Partnership Status

Marital/partnership status is a foundational structural element of social relationships and an indicator of social support. Marital or partnership status can be assessed using dichotomous measures (i.e., whether someone is married or not, whether someone is partnered or lacks a partner) or using measures with more categories (e.g., also including single, widowed, and divorced) (NASEM, 2016b). CMS maintains data on marital status, because it is important for Social Security benefits, but CMS does not collect or maintain data on partnership. Providers, plans, and other federal government agencies also do not collect data on partnership. However, because partnership can change over time, especially among older adults, and has clinical utility, it could be collected through EHRs. If so, validated measures of partnership exist in the literature, but CMS would need to develop standardized measures and data collection methods for its own collection or provider/plan reporting requirements. An important consideration for the longer term are ongoing demographic shifts in family structure, including the decline in marriage rates and increases in cohabiting individuals and persons who never marry (Aughinbaugh et al., 2013; Liu and Umberson, 2008; Tamborini, 2007; Wang and Parker, 2014), as well as the federal Supreme Court ruling making same-sex marriage legal nationally.[2] These are likely to change the relationship between marital/partnership status and health. Thus,

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[2] Obergefell et al. v. Hodges, Director, Ohio Department of Health, et al. 576 US (2015).

regardless of the data source CMS chooses, it will be important for CMS to monitor the empirical association between marital/partnership status and health care outcomes and revisit assumptions about marital/partnership status as an indicator of social support over time. In the short term, CMS should use available data on marital status. In the long term, research is needed on measurement and data collection for partnership. In particular, CMS may want to examine whether including partnership in any method to account for social risk factors in Medicare quality measurement and/or payment that already includes marital status and living alone adds substantial additional precision and explanatory value. As described in Chapter 2, national surveys that can be linked to individual-level health care outcomes of Medicare beneficiaries could serve as a test bed for such an assessment.

Income

Individual income can affect health and health care outcomes directly as a means of purchasing health care and indirectly as a means of acquiring health promoting resources, such as better education, housing, and nutrition (Adler and Newman, 2002; Braveman et al., 2005). Measuring income is burdensome on respondents if self-reported because income can be sensitive to collect, which leads to high nonresponse rates. However, reliable methods exist to accurately collect income data (Moore and Welniak, 2000). Partly because of such available measures and data collection methods, income is the most commonly used measure of economic resources (Braveman et al., 2005).

CMS does not currently collect or maintain income data (Samson et al., 2016), nor do providers and plans collect income data through EHRs or otherwise. The SSA maintains several sources of individual-level income data, including lifetime earnings data and information on Medicare payroll taxes, as well as data on Supplemental Security Income (SSI) for those who are eligible (i.e., adults and children with disabilities who have limited income and assets, and adults age 65 and older without disabilities and who meet financial limits) (Olsen and Hudson, 2009; SSA, 2015). Lifetime earnings and SSI may be less precise measures of income. Lifetime earnings are capped at $118,500 annually, which effectively censors high incomes (SSA, 2016), and SSI may be only part of an individual's income (SSA, 2015). By contrast, the maximum earnings cap for Medicare payroll taxes was eliminated in 1994, and thus income data based on Medicare taxable wages would capture more variation, especially among higher-income individuals (Olsen and Hudson, 2009).

Government agencies that collect premiums for Medicare Parts B and D (e.g., SSA, Railroad Retirement Board, and Office of Personnel Management) also have income data used for determining premium amounts. Specifically, the SSA makes an Income Related Monthly Adjustment Amounts (IRMAA) determination for Medicare beneficiaries enrolled in Medicare Part B and/or Part D, which are used to determine monthly premium amounts for beneficiaries with higher incomes (CMS, n.d.-b). For 2016, adjustments are made to incomes greater than $85,000 for individuals and $170,000 for married couples in increasing categories (CMS, n.d.-b). Although CMS currently receives monthly data on the number of beneficiaries who have different IRMAAs, it does not have individual income information.[3] Were these government agencies to provide individual income data to CMS for use in Medicare quality measurement and payment, data that are more granular than the available income categories (all of which apply to

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[3] Personal communication, John D. Shatto (Centers for Medicare & Medicaid Services, Office of the Actuary) to Kathleen Stratton (National Academies of Sciences, Engineering, and Medicine staff), September 8, 2016.

higher incomes) would be most useful. Relatedly, eligibility for the Medicare Part D Low Income Subsidy requires having an income below 150 percent of the federal poverty level, and could be used as to measure of low and high income (CMS, 2009). However, as a dichotomous measure, it would capture less variation in and be a less precise measure of income. Moreover, it only applies to beneficiaries enrolled in a Part D plan, and thus would not capture incomes for many beneficiaries.

An area-level measure of income from the ACS such as median household income could also be used as a proxy for individual-level income. However, because individual income is the construct of interest and an area-level measure may capture genuine area- or group-level effects, an area-level proxy measure is therefore an imperfect proxy for the individual-level measure and may therefore be less preferable than a true individual-level measure. In the short term, CMS should use available area-level income data from the ACS as a proxy for individual income. In the longer term, CMS should explore the feasibility of linking to SSA income data from the uncapped Medicare payroll tax and/or develop standardized measurements and methods for new data collection.

Education

Education can affect health and health care outcomes directly by enabling individuals to access and understand health information and health care, to make decisions that promote health and reduce health risks, and to advocate for him- or herself in health care (Cutler and Lleras-Muney, 2006; IOM, 2014). Education also shapes future occupational and economic resources and therefore indirectly shapes health and health care outcomes through other indicators of SEP—employment, occupation, and income (Adler and Newman, 2002; IOM, 2014; NASEM, 2016a,b). Education can be measured using continuous or categorical years of schooling completed or credentials of formal schooling (e.g., high school diploma, college degree) to assess educational attainment (Braveman et al., 2005; IOM, 2014). Currently, CMS does not collect or maintain data on education, nor do providers and plans routinely collect it. Although some of the more comprehensive EHRs may capture educational attainment, standardized measures and data collection strategies are needed. To that end, the earlier IOM report on social and behavioral domains and measures for EHRs identified education as a clinically useful social risk factor and recommended its inclusion in EHR meaningful use standards. With respect to other government sources, area-level measures are available through the ACS. Thus, in the short term, CMS should use these available area-level measures as a proxy for individual education. In the long term, because education is relatively stable for Medicare beneficiaries, CMS should develop standardized measures and methods to collect education data.

Neighborhood Deprivation

In its third report, the committee concluded that a measure of neighborhood deprivation (i.e., a composite measure of neighborhood compositional characteristics) at the census tract level is likely to be a good proxy for a range of both individual and true area-level constructs relevant to performance indicators used in VBP (NASEM, 2016b). Relevant area-level constructs include compositional characteristics of communities such as dimensions of SEP (e.g., the proportion of racial and ethnic minority residents, foreign-born residents, single-parent households, households below the federal poverty level, and English language–proficient residents) as well as elements of residential environments including the physical or built environment (e.g., housing, walkability, transportation options, and availability of services—including health care services) and social environments (e.g., safety and violence, social disorder, the presence of social organizations, and social cohesion).

Because neighborhood deprivation captures a patient or beneficiary's environment or residential context, an area-level measure based on the beneficiary's residential address is appropriate. As described in the section on urbanicity/rurality, although residential addresses are available from providers, plans, and Medicare records, the latter is preferable, because these are the data CMS already possesses. Neighborhood deprivation can be assessed using a single-item measure such as median household income or using a multi-item composite measure. Numerous neighborhood deprivation indexes comprising multiple items (e.g., median household income, percent of residents with a high school degree, percent of unemployed residents, percent of households with an income below the federal poverty level) have been developed (Oka, 2015), and data on these area-level measures are available through the ACS. As described in the previous chapter, because of small sample sizes, ACS data will need to be pooled across years. Because neighborhoods can change rapidly, where this occurs, data that are just a few years old may not accurately reflect the neighborhood at present. Another important limitation of existing neighborhood deprivation measures and indexes is that they have been developed, tested, and applied primarily to urban contexts. It is possible that area-level factors most relevant to health care outcomes differ for urban and rural areas. For example, concentrated disadvantage may be most salient in urban contexts; whereas, availability of and distance to health care resources may be more relevant constructs in rural settings (NASEM, 2016a).

Defining the appropriate geospatial unit across urban and rural settings presents an additional challenge. Because population density and the density of available resources varies substantially between urban and rural areas, the spatial scale that is relevant for various health-related processes may differ for urban areas and rural areas. For example, census tracts may be the most relevant area for measuring urban neighborhoods (as they are used to define urban areas in the Census Bureau's 2010 classification, as described in the earlier section on urbanicity/rurality). Although most rural research is conducted at the county level (Isserman, 2005), most counties are likely to be too heterogeneous for county-level measures of neighborhood deprivation to be useful. To be meaningful for certain methods of accounting for social risk factors in Medicare quality measurement and payment, the geographic area should have sufficient variability with respect to provider and plan performance.

Despite the challenges described above (which pertain primarily to research on area effects) even imperfect area-level measures can be useful for the purposes of accounting for social risk factors in Medicare quality measurement and payment. This is because crude (and geographically mis-specified) area-level measures will still capture some variability in health-relevant, area-level constructs (social and physical environments) and may also serve as imperfect proxies for unavailable individual-level socioeconomic data (because of strong residential segregation by class). For these reasons, the committee recommends that CMS test a composite measure (such as an existing indicator from the literature) and a simple single-indicator item (such as median household income), contrast their performance at the census tract level, and also weigh the benefits of the simplicity of a single indicator against the increased precision from a composite measure for use in the short term. To increase accuracy in the long term, CMS could conduct research on measurement and data collection such as measures to better capture neighborhood deprivation in rural areas, to identify an improved geospatial unit of analysis for rural settings, and to assess the performance of any given variable (single or composite) across multiple geographic areas.

> **Recommendation 4: Individual measures of wealth, living alone, and social support exist, but they are sufficiently limited to preclude use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. Therefore, the committee recommends that CMS research ways to accurately collect data on these indicators.**

Wealth

Wealth represents total accumulated economic resources (assets) that, like income, can affect health and health care outcomes directly as a means of purchasing health care and indirectly as a means of acquiring health-promoting resources (Braveman et al., 2005; Deaton, 2002; NASEM, 2016a). Because wealth accumulates over time, it can also buffer the effects of rapid changes in income, such as those caused by unemployment or illness (Cubbin et al., 2011). Thus, wealth may capture more variation than income among older persons, and may therefore be a more sensitive indicator of SEP among Medicare beneficiaries (Allin et al., 2009). Collecting self-reported net worth is difficult because it is sensitive and because many individuals simply do not know the value of their net worth or what assets they have (Braveman et al., 2005; Eggleston and Klee, 2015). Nevertheless, some reliable and validated measures and data collection methods do exist. In particular, the Health and Retirement Survey (HRS) has designed measures and methods to collect data on wealth that overcome traditional barriers to collecting wealth data such as concerns about privacy and imprecise knowledge (NIA et al., 2007). More specifically, the HRS captures both the amount and composition of assets as well as current and future benefits including government benefits (such as Social Security, Medicare, and Medicaid) and employer-based benefits (like pensions and health insurance), as well as the movement of assets (such as housing within families, gifts and bequests, and savings and spendings) over time from retirement until death (NIA et al., 2007). Some HRS data are linked to Medicare records (ResDAC, n.d.), and therefore are useful for examining the effect of wealth on health care outcomes. However, as described in Chapter 2, because samples for the HRS are small, these data are unlikely to be useful for application in Medicare quality measurement or payment. Some studies have also used simplified or proxy measures of wealth, such as home or car ownership. Because of these types of measurement challenges, there is less empirical evidence on the association between wealth and health care outcomes compared to other indicators of SEP (Braveman et al., 2005).

Wealth data are not currently available through CMS, providers and plans, or other government agencies. Medicaid programs do require assets below a certain threshold for eligibility, and this asset threshold could be used to measure wealth dichotomously (i.e., high wealth above the threshold, and low wealth at or below the threshold). However, because Medicaid is administered at the state level, eligibility criteria, including this asset threshold, vary by state. Moreover, this measure of wealth would be at least partly captured through dual eligibility status, for which there is better and available existing data (as described in the earlier section on dual eligibility).

Because no data sources are available for use in the short term, CMS should conduct more research on both measurement and data collection methods by CMS or through EHRs.

Because collecting accurate wealth data is known to be difficult and burdensome and because data collected through EHRs could be done via multiple modes, which could augment potential accuracy issues, EHRs may be less preferable to centralized collection by CMS. In particular, CMS may want to consider the empirical question of whether the addition of wealth data adds sufficient precision above and beyond income data, for which some data are already available and for which methods and measures exist to collect data with less burden to warrant additional data collection for inclusion in any method to account for social risk factors in Medicare quality measurement and payment. As described in Chapter 2, national surveys such as the HRS that can be linked to individual-level health care outcomes of Medicare beneficiaries could serve as a test bed for CMS to assess this question.

Living Alone

Living alone is a structural element of social relationships, which is typically an indicator of social isolation or loneliness in health research, and which is also likely to capture elements of social support (Berkman and Glass, 2000; Brummett et al., 2001; Cohen, 2004; Eng et al., 2002) (House et al., 1988; Wilson et al., 2007). Living alone can be assessed with little burden using a dichotomous measure (living alone or with others) or more finely graded measures of household composition (i.e., living alone, with one other person, two other persons, and so on). CMS currently collects data on living arrangements for some patients in postacute settings, such as through the Home Health Outcome Assessment Information Set (AHRQ, 2014; CMS, n.d.-a), and in the Medicare Current Beneficiary Survey (CMS, 2015a). Providers and plans do not currently collect data on living arrangements, nor is national data available through other government agencies. Thus, there are no data sources that could be used in the short term. However, for the long term, because living arrangements can change rapidly especially for older adults and because living alone has clinical utility, living alone may best be captured in the clinical setting, and CMS should develop standardized measures and methods for data collection through EHRs.

Social Support

Social support is a crucial function of social relationships and includes instrumental components (such as material and other practical supports) and emotional dimensions (such as through caring and concern). Instrumental social support can facilitate access to health-promoting resources (e.g., delivery of nutritious meals) and health care services (e.g., providing transportation to a doctor’s appointment) (Berkman and Glass, 2000). Emotional social support can positively affect health through psychosocial mechanisms such as by boosting self-efficacy to practice health-promoting behaviors like quitting smoking, and social support may also buffer negative effects of health risks (Berkman and Glass, 2000; IOM, 2014). Social support can also negatively affect health such as by causing distress through negative social interactions or because negative social influences promote risky health behaviors (Uchino, 2006).

Currently, no social support data are available within CMS, from providers and plans, or from other national data via other government agencies. Thus, there are no data sources that could be used in the short term. However, for the long term, because social support can change rapidly especially among older adults and because it has clinical utility, it may best be captured in the clinical setting, and CMS should develop standardized measures and methods for data collection through EHRs. In its 2014 report on capturing social and behavioral domains and measures through EHRs, the IOM recommended inclusion of social support and recommended measures (IOM, 2014). Such measurement and data collection methods could be refined, standardized, and added to the Office of the National Coordinator for Health Information Technology's (ONC's) meaningful use regulations or mandated through reporting requirements to CMS to ensure accurate data. Thus, CMS should develop standardized measures and methods for data collection through EHRs for the long term.

> **Recommendation 5: Area-level measures exist for housing, but they have limitations for use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. The committee recommends that CMS research ways to accurately collect housing data, whether at an individual level or an area level.**

Housing

Elements of housing that may influence health and health care outcomes include housing stability, homelessness, and quality and safety. Homelessness and housing instability, defined as a lack of access or threats to reasonable quality housing (Frederick et al., 2014), can be barriers to accessing health care and are associated with poorer physical and mental health and increased mortality (NASEM, 2016a). Poor quality or unsafe housing can expose individuals to such environmental hazards as lead, poor air quality, infectious disease, and poor sanitation, and can lead to injury (IOM, 2003a; NASEM, 2016a). Currently neither CMS nor providers and plans routinely collect housing information. Some more comprehensive EHRs may collect or link to data on housing (e.g., Gottlieb et al., 2015; ONC, n.d.). However, because housing can change over time and has clinical utility, housing information could be collected through EHRs. Some area-level measures of housing are available through the ACS and the Department of Housing and Urban Development (HUD). For example, ACS housing data capture physical characteristics (e.g., rooms, age, access to utilities) as well as housing costs, age, and value (U.S. Census Bureau, 2013) and the HUD Healthy Communities Index captures vacancy rates, housing costs, blood lead levels in children as an indicator of environmental hazards, and age of housing (San Diego Council of Governments, n.d.). Because some dimensions of housing reflect beneficiaries' environment, an area-level measure could be appropriate. This measure would be based on a beneficiary's residential address, which is collected by CMS, through EHRs, and by plans. However, following the principle to first use available existing data it possesses, the residential address in the Medicare record is preferred. Thus, in the short term, the committee recommends that CMS test area-level measures based on a beneficiary's residential address in the Medicare record and contrast their performance. Because other elements of housing, in particular, physical characteristics, occur at the individual level, and these are likely to change over time, individual-level housing data could be collected through EHRs in the long term, but more research is needed on measurement and data collection methods.

> **Recommendation 6: The committee recommends that research be conducted on the effect of acculturation, sexual orientation and gender identity, and environmental measures of residential and community context on health care outcomes of Medicare beneficiaries and on methods to accurately collect relevant data in the Medicare population.**

Acculturation

Acculturation describes how much an individual adheres to the social norms, values, and practices of his or her own home country or ethnic group or to those of the United States (NASEM, 2016a). Acculturation is frequently assessed with language use. Additionally, because there is a strong interaction between acculturation and race and ethnicity, measures of acculturation frequently assess acculturation among specific subgroups (e.g., Hispanic immigrants) (HHS, 2014). For example, the Brief Acculturation Scale for Hispanics is a reliable, validated measure to assess acculturation among Hispanic Americans using four self-reported language use items (Mills et al., 2014). Duration in the United States is also used as a proxy for acculturation, because acculturation is expected to increase with the amount of time spent in the United States. Although there is evidence on the relationship between acculturation and health, evidence on the effect of acculturation and health care outcomes is not well established (Abraído-Lanza et al., 2006; IOM, 2014; NASEM, 2016a). Because more evidence is needed on the empirical association between acculturation and health care outcomes, CMS should revisit this indicator and its appropriate measurement when more evidence is available. However, because acculturation is often measured using preferred language, which is available to CMS in the short term, language data could capture elements of acculturation in addition to language itself.

Sexual Orientation and Gender Identity[4]

Sexual orientation captures individuals who identify as lesbian, gay, bisexual, queer, questioning, or otherwise nonconforming, and is typically defined with respect to three dimensions: attraction, behavior, and identity (IOM, 2011). Gender identity typically refers to individuals who identify as gender minorities, including those who identify as transgender, intersex, or otherwise nonconforming (IOM, 2011). Although some measures and best practices for data collection exist and CMS has included data collection of sexual orientation and gender identity in its Equity Plan for Improving Quality in Medicare, there are currently no standards for measuring and collecting data on sexual orientation and gender identity (CMS Office of Minority Health, 2015). One limitation of existing measures of sexual orientation is that they frequently only capture one dimension of sexual orientation, and some individuals do not present consistently across the three dimensions (e.g., men who have sex with men but do not identify as gay) (IOM, 2011). Outside of CMS, some national health surveys, including the National Health and Nutrition Examination Survey (NHANES), National Health Interview Survey (NHIS), and Behavioral Risk Factor Surveillance System (BRFSS) do collect data on sexual orientation and gender identity. NHANES includes sexual behavior questions, while NHIS and BRFSS include items capturing sexual identity and gender identity (CDC, 2013, 2015, 2016). Providers and plans also do not typically collect sexual orientation and gender identity data. However, ONC added collection of sexual orientation and gender identity to its measure of recording demographics in its Stage 3 meaningful use regulations (CMS, 2015b). Importantly, this does not require providers to collect sexual orientation and gender identity data, but rather that their EHRs

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[4] As described in the committee's third report (NASEM, 2016b), normative gender categories (men and women) are strongly associated with health and health care outcomes, despite the fact the gender effects are difficult to separate from biological sex effects. Thus, normative gender is a strong candidate for inclusion in methods to account for social risk factors in Medicare quality measurement and payment programs. However, the committee notes that gender is already included as a risk factor in clinical risk adjustments in Medicare.

have the capacity to do so. Partly because of a lack of standardized measures, there is currently little evidence on the effect of sexual orientation and gender identity on health care outcomes (NASEM, 2016a,b). Because more evidence is needed on the empirical association between sexual orientation and gender identity and health care outcomes, CMS should revisit this indicator and its appropriate measurement when more evidence is available. In particular, for sexual orientation, CMS should take notice of which dimension or dimensions are most relevant for health care outcomes. At the same time, CMS should continue efforts to develop standardized measures and data collection strategies and to collect data.

Other Environmental Measures of Residential and Community Context

Other environmental measures of residential and community context capture elements of the physical or built environment such as housing, walkability, transportation options, and proximity to services (including health care and social services) as well as social environments such as safety and violence, social disorder or cohesion, economic and educational opportunities, and the presence of social organizations. Neighborhood environments can affect health through the distribution of health-relevant resources (e.g., access to recreational spaces, healthy foods, or health care services), by exposing residents to environmental hazards like air pollution, and by exposing residents to physical and social hazards such as discrimination and physical decay that negatively affect health through stress and other psychosocial processes (Diez Roux and Mair, 2010; IOM, 2003b). Thus, there is a conceptual relationship between neighborhood environments and health care outcomes, but evidence is currently limited and environmental measures need to be tested further (NASEM, 2016a). Therefore, CMS should revisit such environmental measures and their appropriate measurement when more evidence is available.

> **Recommendation 7: The committee recommends that the Centers for Medicare & Medicaid Services collect information about relevant, relatively stable social risk factors, such as race and ethnicity, language, and at the time of enrollment.**

Indicators for which data might best be captured through a revised enrollment form include race and ethnicity, language, and education. Should other methods, such as linking to data from the SSA or the Internal Revenue Service, prove too difficult or not produce accurate information on other indicators (e.g., income, race and ethnicity, and nativity), these could be considered for inclusion in the revised enrollment form.

Should research demonstrate an important explanatory effect of one or more of these indicators and a pilot test shows it is feasible, CMS could supplement the information collected at enrollment with a survey of current beneficiaries, whose information would not have been captured at the time of enrollment.

TABLE 3-1 Potential Data Sources for Each Social Risk Factor Indicator, Their Advantages and Disadvantages, and the Committee's Proposed Data Collection Strategy

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
1. Data sources exist that could be used in the short and long term					
Dual eligibility	Centers for Medicare & Medicaid (CMS) has existing data Most reliable; graded (full or partial)				Use existing CMS data
Nativity	No existing data; need further research to pilot for new Medicare intake survey	Could be accurately collected with little burden (see IOM, 2014, report for country of origin measure), but is not currently collected Could have clinical utility	The Social Security Administration (SSA) maintains administrative records with place of birth (city and state/foreign country)	Country of origin is highly correlated with language for many groups, although exceptions exist (e.g., native-born Hispanic groups often speak Spanish at home) Using documentation status rather than country of origin is sensitive; a potential cost of using documentation status may be the burden of handling information on undocumented persons on CMS, providers, and plans	Use available data on country of origin from the SSA
Urbanicity/ Rurality	Based on residential address, which is in the Medicare record	Based on residential address, which is currently collected in electronic health	Area-level measures at census tract level from the American Community Survey		Use available area-level measure at census tract level from the ACS. Preference to use residential address in

<table>
<tr><th>Social Risk Factor Indicator</th><th>Existing or New Sources of CMS Data</th><th>Data Sources from Providers and Plans</th><th>Alternative Government Data Sources</th><th>Other Considerations</th><th>Proposed Data Collection Strategy</th></tr>
<tr><td></td><td></td><td>records (EHRs)</td><td>(ACS)</td><td></td><td>Medicare record, but with the caveat that there will be some slippage for adjustments to providers in destination areas for people who have more than one primary address (e.g., “snow birds”)</td></tr>
<tr><td colspan="6">2. Data sources with some limitations exist that could be used in the short term, and CMS should conduct research on new or improved data collection strategies in the long term. These include indicators for which:</td></tr>
<tr><td colspan="6">a. CMS has some existing data that could be used in the short term, but CMS could research ways to improve accuracy and data collection in the long term</td></tr>
<tr><td>Race and ethnicity</td><td>Included in Medicare record, but standardization/ accuracy issues exist (better data for enrollees since 1990s)
Currently, often collected according to White House Office of Management and Budget (OMB) standards (such as for new enrollees and on sample surveys), but categories are collapsed in analysis</td><td>Collection of race and ethnicity adhering to OMB standards included in Stage 2 EHR meaningful use regulation</td><td>Area-level measures available (see imputation methods used by Medicare in the Medicare column)</td><td>Direct self-report is the gold standard and should be used for new enrollees/new race and ethnicity collection, but methods exist where unavailable</td><td>Short term: Use available Medicare/SSA data (comprising individual-level self-report data and available imputation methods where self-reported race and ethnicity is lacking)
Long term: Standardize methods across various self-report mechanisms (EHRs, administrative forms, Medicare sample surveys like Consumer Assessment of Healthcare Providers and Systems [CAHPS])</td></tr>
</table>

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
	and reporting Current methods exist to impute where direct self-report not available; methods also being continually refined				
Language	Available with high specificity, but lower sensitivity	Collection of preferred language using Library of Congress language codes included in Stage 2 EHR meaningful use regulation Health plans have good data, and if standardized, could submit to CMS	Area-level measure from ACS available Imputation methods available for some languages	Medicare has a limited English proficiency plan, which requires providing language-appropriate materials to beneficiaries who ask for materials in languages other than English, but currently includes no proactive data collection	Short term: Use existing CMS data despite their limitations Long term: CMS should collect at the time of enrollment and standardize collection across different methods (EHRs and administratively)
Marital/ partnership status	Marital status part of the Medicare record (collected and maintained because they are important for Social Security benefits)	Partnership data could be collected because it can change over time and has clinical utility, but would require standardized data collection	No other existing sources of partnership status	Data sources and data needs for marital status and partnership status may need to be considered separately Need to consider potential demographic shifts in marriage and partnership (including same-sex marriage and never married, which may change the meanings of	Short term: Use marital status data that Medicare already has Long term: Partnership could be collected through EHRs, but needs standardization. In particular, CMS could research about whether partnership adds

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
				both partnership and marriage) and, correspondingly, changes in the relationship between marital/partnership status and health outcomes	precision and discrimination in addition to marital status and living alone
b. Area-level measures could be used in the short term, but CMS should research standardized measurement and data collection for the long term					
Income	No existing data; need further research on standardized data collection	Possible, but may be burdensome to collect Potential accuracy issues May not be clinically useful because providers can address but not intervene. Whether costs are a barrier to care may be more salient than income	Individual-level data from the SSA (lifetime earnings, Medicare payroll tax, Supplemental Security Income [SSI]), Internal Revenue Service The ACS area-level measure of median household income available as a proxy for individual-level income	SSI is also available, but represents only part of total income for more affluent beneficiaries, but may be a large part for less advantaged beneficiaries (and therefore more useful as a measure of overall income for them) Area-level income is an imperfect proxy for individual-level income, so even if it partly captures an individual-level effect, it can be problematic as an individual-level proxy	Short term: Use area-level ACS measure as an imperfect proxy Long term: Assess possibility of linking to and using the SSA income data from uncapped Medicare payroll taxes or need research on measurement and data collection by CMS
Education	Included in CAHPS family of surveys for only a sample of beneficiaries	Some may currently include it, but it requires standardized measurement and data collection	Area-level measure as a proxy for individual-level education available from the ACS		Short term: Use ACS areal measure as a proxy Long term: CMS could conduct research on data

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
		Clinically useful			collection either by CMS or through EHRs
Neighbor-hood deprivation index (based on place of residence)	Based on residential address, which is in the Medicare record	Based on residential address, which is currently collected through EHRs	Indicators are available from the ACS	Could use a single indicator (such as median household income) for simplicity or a composite measure/index using multiple indicators if a composite has better measurement properties Need to identify geographic areas that both meaningfully capture the neighborhood and also have sufficient variability regarding plan/provider performance (possibly census tracts for urban; counties for rural effect, but few rural studies) Most existing neighborhood deprivation indices are designed to apply to and are tested for use in urban areas; conceptually, what constitutes "deprivation" in a rural setting may differ Thus, traditional indicators included in neighborhood deprivation indices may not	Short term: To assess the explanatory value of the composite measure compared to the single-indicator item, CMS should construct alternative measures and see how they perform when included in methods to account for social risk factors in quality measurement/ payment Long term: Monitor the performance of the selected measure across rural and urban areas To improve accuracy, CMS could conduct additional research to identify the appropriate geographic area to capture the "neighborhood" effect that applies to rural settings CMS could also conduct

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
				be applicable to rural areas Other indicators may be better measures of neighborhood deprivation in rural areas	research to identify salient constructs comprising "neighborhood deprivation" for rural areas and correspondingly, need to identify appropriate measures
3. Measures and data collection methods exist, but data sources have limitations and more research is needed to accurately collect data in the long term					
Wealth	No existing data; needs further research on standardized data collection	Burdensome to ask Potential accuracy issues May not be clinically useful because providers can address but not intervene	State Medicaid asset threshold data could capture low income, but varies by state eligibility requirement and would be partly captured through dual eligibility status	Subject to change over time	Short term: Some methodologies available in other surveys (e.g., Health and Retirement Study [HRS]), but no good measure for EHRs or collection by CMS Long term: More research is needed on whether wealth adds additional precision/discrimination above and beyond income to warrant inclusion of wealth as well
Living alone	Some limited data exist for beneficiaries in	Could be collected because it can change over time, especially for older adults, and	Area data from the ACS may be useful for certain geographic regions with	May change rapidly among Medicare beneficiaries; therefore, it may best be collected periodically in the	Long term: Develop measures and methods for collection through

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
	postacute settings	has clinical utility	particular density (may be more useful for plans than providers) Measures on living arrangements are available (e.g., HRS, National Survey of Families and Households [NSFH])	clinical context	EHRs
Social support	No existing data	Could be collected because it can change over time, especially for older adults, and has clinical utility, but would require further research on standardized data collection Some measures exist in the literature that could be used	No existing data sources	May change rapidly among Medicare beneficiaries; therefore, it may best be collected periodically in the clinical context	Long term: Develop measures and methods for collection through EHRs
Housing stability and quality	No existing data	Could be collected because it can change over time and has clinical utility, but would require further research on standardized data	Area-level measures of housing quality (e.g., type, age, amenities and utilities available, cost/value, taxes) and mobility available through the		Short-term: CMS should test area-level measures and compare their performance Preference to use residential address in

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
		collection	ACS The Department of Housing and Urban Development collects data on housing quality, such as those included in its Healthy Communities Index (vacancy rates, age of housing, excessive housing cost burden, blood lead levels in children)		Medicare record, but with the caveat that there will be some slippage for adjustments to providers in destination areas for beneficiaries with more than one primary address. Longer term: Further research is needed on measurement to collect through EHRs
4. Some measures exist, but more research is needed on the effect of the social risk factor indicator on health care outcomes of Medicare beneficiary and on methods to accurately collect data for the Medicare population					
Acculturation	No existing data; need further research on standardized data collection Language use could also be used as a proxy (see row on language)	Could be accurately collected with little burden, but is not currently collected Could have clinical utility	No existing data sources	Validated measures are available in the literature	Long term: Needs more research on the effect of acculturation on performance indicators used in value-based payment (VBP) (rather than health status generally or access). If there is evidence of an effect, language, which is often used to measure acculturation, could be considered as a proxy (see row on language)

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
					Duration in the United States (measured in years) could also be added to a new Medicare intake survey
Sexual orientation/ Gender identity	No existing data, although there is general interest throughout the Department of Health and Human Services to collect data more broadly, and collecting more data and refining measures are included in the CMS Equity Plan (CMS Office of Minority Health, 2015)	In Stage 3, but standardized measures and data collection methods are needed	Sexual identity and gender identity are included in some national surveys (e.g., National Health Interview Survey [NHIS], National Health and Nutrition Examination Survey [NHANES], National Survey of Family Growth [NSFG]) Area-level measures may be inaccurate due to low sample sizes (e.g., low prevalence outside of some urban environments)	Sexual identity (rather than behavior or attraction) is the relevant construct to assess	Long term: Needs more research on the effect of sexual orientation and gender identity on health care outcomes of interest and standardized measurement. Could be revisited when more evidence is available, but standardized data collection is needed Preference to collect through EHRs rather than the Medicare intake survey because of the sensitive nature of the information Mode of collection matters for accuracy and this question may be best assessed through a clinical discussion between a patient and a provider

Social Risk Factor Indicator	Existing or New Sources of CMS Data	Data Sources from Providers and Plans	Alternative Government Data Sources	Other Considerations	Proposed Data Collection Strategy
Other environmental measures	No existing data	No existing data	Area-level measure, needs to be thought about much more as evidence develops; need to wait for more evidence of association with health care outcomes of interest and indicators used in VBP	Examples of indicators include transportation availability and exposure to environmental hazards	Long term: Needs further research on the effect on health care outcomes of interest Could be revisited when more evidence is available, but standardized data collection is needed

Table 3-2 summarizes the availability of data for social risk factor indicators that could be accounted for in Medicare payment programs.

TABLE 3-2 Summary of Data Availability for Social Risk Factor Indicators

SOCIAL RISK FACTOR		DATA AVAILABILITY			
	Indicator	**1**	**2**	**3**	**4**
SEP					
	Income		🟩		
	Education		🟩		
	Dual Eligibility	🟩			
	Wealth			🟧	
Race, Ethnicity, and Cultural Context					
	Race and Ethnicity		🟩		
	Language		🟩		
	Nativity	🟩			
	Acculturation				🟥
Gender					
	Gender identity				🟥
	Sexual orientation				🟥
Social Relationships					
	Marital/partnership status		🟩		
	Living alone			🟧	
	Social Support			🟧	
Residential and Community context					
	Neighborhood deprivation		🟩		
	Urbanicity/Rurality	🟩			
	Housing		🟩		
	Other environmental measures				🟥

1. Available for use now

2. Available for use now for some outcomes, but research needed for improved, future use

3. Not sufficiently available now; research needed for improved, future use

4. Research needed to better understand relationship with health care outcomes and on how to best collect data

GENERAL CONCLUSIONS

In addition to the specific guidance the committee proposed for collecting data for specific social risk factor indicators, the committee also identified several general conclusions for CMS in its overall approach to collecting data on social risk factors for use in Medicare quality measurement and payment.

Different data collection strategies for the same indicator may be warranted depending on the purpose or methods it is used for. Additionally, the advantages and disadvantages of any specific source should be considered in reference to the intended use. For example, risk adjusting health plan quality measures may require data from different sources compared to risk adjusting hospital quality measures, because, for example, social risk factors that affect the outcome or cost of a hospitalization likely differ from those that affect quality or total cost of care measures. Similarly, CMS may need data on social risk factors regardless of whether care is sought or not when accounting for social risk factors in health plan or accountable care organization performance scores; whereas, for adjustment related to performance measures that are associated with a health care episode, it may make sense to have providers report. Thus, any indicator may require a multimodal approach to data collection. This may be particularly relevant for data collected through an EHR, because there is substantial variation in providers' stage of EHR adoption, as well as in their capacities for health information exchange. However, this may also be true for other sources of data, where there are limitations to data from existing sources, where data would be collected in different settings (e.g., hospitals, clinical practices, in the home), and when data are collected by different types of individuals (e.g., clinicians and non-clinical staff). Moreover, the specific modes of data collection needed may change over time. Specifically for EHR data, needs for complementary modes may diminish with advances in EHR adoption and interoperability. An example of an existing multimodal approach is CMS's strategy for collecting race and ethnicity data. Data from beneficiaries enrolled since the 1990s are collected via self-report, but for older beneficiaries for whom current categories collected through self-reported data are unavailable, CMS imputes race and ethnicity and also updates older data with newer self-reported data collected through surveys. Additionally, when CMS revised its race and ethnicity measures, it conducted a survey of certain Medicare beneficiaries to improve the accuracy of its data (Zaslavsky et al., 2012). In short, regardless of the source, research on how to accurately and reliably collect data across different modes and in different settings will be needed.

> *Conclusion 2: Different data collection strategies for the same social risk factor indicator may be warranted depending on the purpose or methods used to account for social risk factors in Medicare performance measurement and payment. Additionally, the advantages and disadvantages of any specific source should be considered in reference to the intended use.*
>
> *Conclusion 3: Any specific social risk factor indicator may require a multi-modal approach to data collection.*
>
> *Conclusion 4: Regardless of the source, research on how to accurately and reliably collect social risk factor data across different modes and in different settings will be needed.*

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Appendix

Committee Biosketches

Donald M. Steinwachs, Ph.D. (*Chair*), is a professor in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. He is active in the Center for Health Services and Outcomes Research, previously named the Health Services Research and Development Center, where he served as director for many years. His research spans the design and application of health information systems for evaluation and management, development of classification systems and modeling tools, and research on the impact of organization, financing, and quality of care on outcomes for persons with chronic diseases. Dr. Steinwachs was a co-developer of the widely used ACG (Adjusted Clinical Groups) case-mix adjustment and co-developer of the Johns Hopkins HaH (Hospital at Home). He developed methods for measuring provider continuity, needs and unmet needs for care, and measures of the timeliness of care. He was president of the Association for Health Services Research (now AcademyHealth) and received the 2013 Distinguished Research Award from AcademyHealth. He currently serves on the National Research Advisory Council of the Department of Veterans Affairs. He served on numerous committees of the National Academies of Sciences, Engineering, and Medicine, including the Board on Health Care Services and the Institute of Medicine Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. He holds a Ph.D. from Johns Hopkins University and is an elected member of the National Academy of Medicine.

John Z. Ayanian, M.D., M.P.P., is director of the Institute for Healthcare Policy and Innovation, the Alice Hamilton Professor of Medicine at the School of Medicine, professor of health management and policy at the School of Public Health, and professor of public policy at the Ford School of Public Policy, all at the University of Michigan. From 2014 to 2016 he also served as associate editor of the *New England Journal of Medicine*. Dr. Ayanian has focused his career on health policy and health services research related to access to care, quality of care, and health care disparities, and has served in key health policy advisory roles to state and federal government. Prior to joining the University of Michigan, Dr. Ayanian was a professor at the Harvard Medical School and at the Harvard School of Public Health, and a practicing primary care physician at Brigham and Women's Hospital in Boston. At Harvard, Dr. Ayanian also directed the Health Disparities Research Program of Harvard Catalyst, Harvard's Clinical and Translational Sciences Center; the Outcomes Research Program of the Dana-Farber/Harvard Cancer Center; and the Harvard Medical School Fellowship in General Medicine and Primary

Care. In addition to his medical degree from Harvard Medical School, he holds an M.P.P. from Harvard's John F. Kennedy School of Government. He is an elected member of the National Academy of Medicine.

Charles Baumgart, M.D.,[1] is senior medical director at xG Health Solutions, an organization that was spun out of Geisinger Health System, designed to partner with health care organizations nationally to bring Geisinger population health management expertise to local health care improvement efforts. He has worked with numerous health care systems, both academic and community-based, as well as with managed care organizations. He has most recently been the xG Health clinical/physician lead for support of a New York Delivery System Reform Incentive Payment program site, the Suffolk County Care Collaborative (Stony Brook University Hospital). Before joining xG Health Solutions, Dr. Baumgart was the Geisinger Health Plan senior medical director for government programs. His responsibilities included the development of the clinical management program for a new Managed Medicaid program in northeast Pennsylvania, leveraging Geisinger's existing Advanced Medical Home model. In his role, he worked with all aspects of population and quality management, including support of medical home development, analytics, and provider pay-for-performance programs. Dr. Baumgart previously served as a senior medical director and then the vice president and chief medical officer for Presbyterian Health Plan in Albuquerque, New Mexico. Dr. Baumgart graduated with an M.D. from the University of Iowa. Dr. Baumgart is board certified in internal medicine and quality assurance and utilization review. He has participated in the advanced training program in health care delivery improvement with Intermountain Healthcare, is a certified managed care executive through America's Health Insurance Plans, and served as a senior examiner with the Malcolm Baldrige National Quality Award Program.

Melinda Buntin, Ph.D., is professor and the chair of the Department of Health Policy at Vanderbilt University's School of Medicine. She previously served as deputy assistant director for health at the Congressional Budget Office (CBO), where she was responsible for managing and directing studies of health care and health care financing issues in the Health, Retirement, and Long-term Analysis Division. Prior to joining CBO, Dr. Buntin worked at the Office of the National Coordinator for Health Information Technology, where she established and directed the economic analysis, evaluation, and modeling group, while on leave from RAND Corporation. At RAND, Dr. Buntin served as deputy director of RAND Health's Economics, Financing, and Organization Program, director of Public Sector Initiatives for RAND Health, and co-director of the Bing Center for Health Economics. Her research at RAND focused on insurance benefit design, health insurance markets, provider payment, and the care use and needs of the elderly. She has a Ph.D. in health policy with a concentration in economics from Harvard University. Dr. Buntin is a member of the National Academies of Sciences, Engineering, and Medicine's Board on Health Care Services.

Ana V. Diez Roux, M.D., Ph.D., M.P.H., is Distinguished University Professor of Epidemiology and dean of the Drexel University Dornsife School of Public Health. Before joining Drexel University, she served on the faculties of Columbia University and the University of Michigan, where she was chair of the Department of Epidemiology and director of the Center for Social Epidemiology and Population Health at the University of Michigan School of Public Health. Dr. Diez Roux is internationally known for her research on the social determinants of

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[1] Resigned in July 2016.

population health and the study of how neighborhoods affect health. She has been a member of the MacArthur Network on Socioeconomic Factors and Health and was co-director of the Network on Inequality, Complexity and Health. Dr. Diez Roux received an M.D. from the University of Buenos Aires and a master's degree in public health and doctorate in health policy and management from the Johns Hopkins Bloomberg School of Public Health. She is an elected member of the National Academy of Medicine and has served on numerous committees of the National Research Council and the Institute of Medicine, most recently on the Committee on Recommended Social and Behavioral Domains and Measures for Electronic Health Records.

Marc N. Elliott, Ph.D., is a senior principal researcher and holds the Distinguished Chair in Statistics at the RAND Corporation. His areas of interest include health disparities, Medicare, vulnerable populations, experiences with health care, profiling of health care institutions, survey sampling, experimental design, causal inference, and case-mix adjustment. He has developed Bayesian methods of estimating race/ethnicity and associated disparities using surname and address information. Dr. Elliott led an Office of Minority Health project, developing novel, cost-effective sampling and analytic methods to improve national health estimates for small racial/ethnic subgroups. Since 2006, he has led the Centers for Medicare & Medicaid Services Medicare CAHPS (Consumer Assessment of Health Providers and Systems) Analysis project. Since 1996, he has been RAND's lead statistician on the Agency for Healthcare Research and Quality (AHRQ) CAHPS I-III projects and currently co-leads the AHRQ CAHPS IV project. Dr. Elliott was recognized by Thomas Reuters as being one of the Top 1 percent of Cited Scientists 2002-2012. Dr. Elliott is a fellow of the American Statistical Association. He earned his Ph.D. in statistics from Rice University.

José J. Escarce, M.D., Ph.D., is a professor of medicine in the David Geffen School of Medicine at the University of California, Los Angeles (UCLA), and a professor of health policy and management in the UCLA Fielding School of Public Health. His research interests and expertise include health economics, managed care, physician behavior, racial/ethnic and socioeconomic disparities in health care, technological change in medicine, and access, costs, and quality of care. Dr. Escarce is currently working on projects that address sociodemographic barriers to access, vertical integration between acute and postacute care, bundled payments, and the effects of financial and non-financial incentives on costs and quality in provider groups and health systems. He holds an M.D. from the University of Pennsylvania School of Medicine and a Ph.D. from the Wharton School. Dr. Escarce is an elected member of the National Academy of Medicine and was a member of the Institute of Medicine Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care and of the National Academies of Sciences, Engineering, and Medicine's Board on Population Health and Public Health Practice.

Robert Ferrer, M.D., M.P.H., is John M. Smith, Jr. Professor and vice chair for research in the Department of Family and Community Medicine at the University of Texas Health Science Center at San Antonio (UTHSCSA). Dr. Ferrer is a practicing family physician with research interests at the interface of primary care and public health, including primary care transformation and quality improvement, social determinants of health, and applications of complexity science to health and health care. Currently, he also serves as director of community engagement for UTHSCSA's Clinical Translational Science Award. Dr. Ferrer is active in community health initiatives, having served as chair of the leadership team for San Antonio's Communities Putting Prevention to Work grant from the Centers for Disease Control and Prevention and is now vice-chair of the Bexar County Health Collaborative. He has also been a member of the Expert Panel for the Agency for Healthcare Research and Quality Innovations Exchange. Dr. Ferrer holds an M.D. from Hahnemann University School of Medicine and an M.P.H. from the University of Washington.

Darrell J. Gaskin, Ph.D., is William C. and Nancy F. Richardson Professor of Health Policy and director of the Johns Hopkins Center for Health Disparities Solutions, Johns Hopkins Bloomberg School of Public Health. His research aims to improve access to care for poor, minority, and other vulnuerable populations and to eliminate racial/ethnic and socioeconomic disparities in health care. His current research explores the relationship between "place" and health care disparities and examines racial/ethnic and socioeconomic disparities in hospital care. He is vice chair of the Board of Directors of AcademyHealth and a member of the Center for Health Policy Development Board and the board of directors for the National Academy of State Health Policy. He has served as a member of the Congressional Black Caucus Commission on the Budget Deficit, Economic Crisis, and Wealth Creation and of the Board of Directors of the Maryland Health Insurance Plan, the state's high-risk pool, and was vice chair of the Board of Directors of the Maryland Health Benefits Exchange Commission. He has also served as a member of several Institute of Medicine committees, including the Committee on Valuing Community-Based, Non-Clinical Prevention Policies and Wellness Strategies and the Committee on the Future of Emergency Care in the United States Health System. He received an M.S. from the Massachusetts Institute of Technology and a Ph.D. from the Johns Hopkins Bloomberg School of Public Health.

Mark D. Hayward, Ph.D., is Centennial Commission Professor in the Liberal Arts and professor of sociology at The University of Texas at Austin. From 2005 to 2015, he was director of the university's Population Research Center. His primary research addresses how life course exposures and events influence the morbidity and mortality experiences of the adult population. Recent studies have clarified how early life conditions and especially educational experience influence socioeconomic, race, and gender disparities in adult morbidity and mortality; the demography of race/ethnic and gender disparities in healthy life expectancy; social inequality in the biomarkers of aging; and the health consequences of marriage, divorce, and widowhood. He recently served as the president of the Southern Demographic Association and chair of the Aging and Life Course section of the American Sociological Association. He has served on the boards of the Population Association of America and the Society of Biodemography and Social Biology, and he was a member and then chair of the Inter-University Consortium for Political and Social Research Council. Currently, he is a member of the National Advisory Committee for the Robert Wood Johnson Foundation's Health and Society Scholars Program. He served on the National Research Council (NRC) Committee on Population and the NRC Panel on New Directions in Social Demography, Social Epidemiology, and the Sociology of Aging. Dr. Hayward received his Ph.D. in sociology from Indiana University.

James S. Jackson, Ph.D., is the past director of the Institute for Social Research and the Daniel Katz Distinguished University Professor of Psychology at the University of Michigan. He has previously held positions as chair of the Social Psychology Training Program and director of the Research Center for Group Dynamics, the Program for Research on Black Americans, and the Center for Afroamerican and African Studies, all at the University of Michigan. His research focuses on issues of racial and ethnic influences on life course development, attitude change, reciprocity, social support, and coping and health among African Americans. His research efforts include carrying out a number of national and international surveys of black populations. Dr.

Jackson is a fellow of the American Academy of Arts and Sciences and the American Academy of Political and Social Science, and was appointed to the National Science Board of the United States by President Obama in 2014. He has served on several committees of the National Academies of Sciences, Engineering, and Medicine, including currently on the Board on the Health of Select Populations, Board on Behavioral, Cognitive, and Sensory Sciences, Standing Committee on Integrating New Behavioral Health Measures into the Substance Abuse and Mental Health Services Administration's Data Collection Programs (as chair), and Roundtable on the Application of Social and Behavioral Science Research of the Division of Behavioral and Social Sciences and Education. Dr. Jackson holds a Ph.D. in social psychology from Wayne State University and is an elected member of the National Academy of Medicine.

Daniel Polsky, Ph.D., is the executive director of the Leonard Davis Institute of Health Economics, Professor of Medicine in the Perelman School of Medicine, and the Robert D. Eilers Professor of Health Care Management in the Wharton School at the University of Pennsylvania. His research areas include access to health care, provider payment, disparities, and economic evaluation of medical and behavioral health interventions. He serves on the Congressional Budget Office's Panel of Health Advisers and the National Academies of Sciences, Engineering, and Medicine's Board on Population Health and Public Health Practice. He was the senior economist on health issues at the President's Council of Economic Advisers in 2007-2008. He received a Ph.D. in Economics from the University of Pennsylvania and a master of public policy from the University of Michigan.

Meredith Rosenthal, Ph.D., is professor of health economics and policy and the associate dean of diversity at the Harvard T.H. Chan School of Public Health. She is a member of the Massachusetts Public Health Council and an elected board chair of the Massachusetts Health Quality Partners. Dr. Rosenthal's research focuses primarily on policies that will help slow the growth in health care spending. These efforts include changes in payment incentives, benefit design, and the provision of information and behavioral "nudges" to both patients and providers. Her research has influenced the design of provider payment systems in both the public and private sectors. She has advised federal and state policy makers in health care payment policy and implementation, and has also testified in congressional hearings on pay-for-performance and in legislative hearings in California and Massachusetts concerning health care provider payment and benefit design policies. Dr. Rosenthal earned her Ph.D. in health policy (economics track) at Harvard. She is an elected member of the National Academy of Medicine.

Anthony Shih, M.D., M.P.H., is executive vice president of The New York Academy of Medicine (NYAM). Established in 1847, NYAM advances solutions that promote the health and well-being of people in cities worldwide. Dr. Shih's expertise is in health care policy, urban health, health system performance measurement, health care quality improvement, and health care philanthropy. Prior to joining NYAM, Dr. Shih served as The Commonwealth Fund's executive vice president for programs, overseeing all of the fund's program and research activities, which were focused on improving the U.S. health care system. Previously, Dr. Shih held several senior management roles, including chief quality officer and vice president of strategy at IPRO, a leading independent, not-for-profit health care quality improvement organization. At IPRO, he developed and managed large-scale quality assessment and improvement projects for Medicare and Medicaid populations, as well as led IPRO's Health Care Transparency Group. Earlier in his career, Dr. Shih was assistant medical director for a community-based mental health organization serving immigrant and refugee populations in

Oakland, California. Board-certified in preventive medicine, Dr. Shih received his M.D. from the New York University School of Medicine and his M.P.H. from the Columbia University Mailman School of Public Health.