Published in final edited form as:

J Health Care Poor Underserved. 2014 February ; 25(1): 1–16. doi:10.1353/hpu.2014.0040.

Incorporation of Socio-economic Status Indicators into Policies for the Meaningful Use of Electronic Health Records

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Abstract

Socio-economic status (SES) has an important effect on health. Individuals with lower SES experience more chronic disease, are less likely to receive preventive care, and have shorter life expectancies. As the Affordable Care Act is implemented and increasing numbers of previously uninsured people gain access to health care, the imperative to recognize patients' SES and develop health initiatives that account for the social determinants of health increases. Health care providers across the nation are adopting electronic health records (EHRs). Policies such as Meaningful Use offer opportunities to systematically incorporate the collection of standardized SES indicators into EHRs in ways that improve health, increase the understanding of the relationship between SES and health, and inform future policies. This paper examines the use of SES indicators in research, national surveys, and federal programs and finds adding an income question is the most feasible and optimal SES indicator for the inclusion in EHRs.

Introduction

Socio-economic status (SES) has an important effect on health. A large body of research shows individuals with lower SES experience more chronic disease, are less likely to receive preventive care, are admitted into hospitals at later stages of illness, and have shorter life expectancies (1–13). Further research demonstrates SES is important to health at all levels, not only for those in poverty - the more advantaged a group is, the better their health outcomes (14).

As the Affordable Care Act (ACA) goes into effect, millions of previously uninsured US residents will enter the health care system, and a substantial proportion of them will be

disadvantaged socio-economically (16). The need to recognize the SES of patients and address the social determinants of health is becoming increasingly relevant, and ignoring SES is unwise as medical care alone cannot hope to eliminate ongoing health disparities.

The Health Information Technology for Economic and Clinical Health (HITECH) provisions of the American Recovery and Reinvestment Act of 2009 (ARRA) established the Medicare and Medicaid Electronic Health Records Incentive Programs, providing incentive payments to providers that adopt and meaningfully use electronic health records (17). Often referred to as Meaningful Use, these policies create a road map for providers to use health information technology (HIT) to improve the quality, safety, and efficiency of health care. Meaningful Use includes guidelines for health information collection and utilization, including the collection of patient demographic information, quality measures, and public health results.

Meaningful Use is undergoing implementation in three stages. The Office of the National Coordinator for Health Information Technology (ONC) and the Centers for Medicare and Medicaid Services (CMS) have issued final rules for Stage 1 and Stage 2 Meaningful Use. Stage 2 Meaningful Use requires the collection of preferred language and race and ethnicity information (18–21). In November 2012, the ONC HIT Policy Committee published its recommendations for Stage 3 Meaningful Use and requested public comment on the draft recommendations (22). These recommendations did not include measures of incorporating an SES indicator into Meaningful Use Stage 3. Currently, the Health IT Policy Committee is analyzing comments to the recommendations and continues to meet regarding the draft recommendations (23). As health care providers across the nation are adopting electronic health records (24), policies, such as Meaningful Use, offer opportunities to systematically incorporate standardized SES indicators into EHRs in a way that improves health, increases the understanding of the relationship between SES and health, and informs future policies.

This paper explores the most commonly used SES indicators in research, national surveys, and federal programs, as well as the evidence on which SES indicators are the most closely correlated to health outcomes and which are the most likely candidates for use in a clinical setting. Interviews with experts were also conducted to understand current initiatives around the collection of SES data. Experts included individuals from the Office of the National Coordinator, Centers for Medicare & Medicaid, Agency for Health Care Research & Quality, Health Resources and Services Administration, Department of Housing & Urban Development, Census Bureau, and Kaiser Permanente. The findings of this paper can inform current and future policies on the implementation of electronic health records.

An optimal SES indicator

In the last decade, research has begun to focus on which SES measures are most strongly associated with health status. Health research has examined the relative strength of education, income, wealth, occupation, social class, and self-perceived social status in predicting health outcomes, and compared the collection and use of these measures at the individual and the area level (see Table 1).

Comparisons of area and individual level SES indicators suggest that individual level indicators are equivalent or stronger indicators of health outcomes than area level indicators (25–27). The individual level SES indicators most commonly used in these studies have been education or wealth. While education has been noted to be one of the most commonly used measure of SES (28), research comparing education to other SES indicators suggests it may not be the best predictor of outcomes (29).

A number of studies have suggested that income and economic measures are the strongest predictors of health. A 2002 study by Duncan et al., found that while low levels of education and occupation were associated with increased mortality, family income and wealth had the strongest association with mortality (30). A 2012 study, by Sabanayagam and Shankar, found that income is a stronger predictor of mortality than education level (31).

Research has begun to examine the role of subjective SES as a predictor of health outcomes (32,33). Subjective SES is defined as “the individual’s perception of his own position in the social hierarchy” (34). A 2005 study, by Singh-Manoux et al., examined self-reported social status in comparison to civil service employment grade in the U.K. and the relationship of these indicators to self-reported measures of health (35). Subjective social status was a better predictor of health status and decline in health status over time in middle-aged adults. A 2012 study, by Dennis et al., analyzed the relationship between self-perceived social status and the more objective indicators of income and education with specific health outcomes for mothers with low income. While income and education were found to have significant associations with health outcomes, self-perceived social status appeared to have a stronger and more consistent correlation with health outcomes for mothers with low income (36). However, research in this area is rather exploratory.

Current research in the area of an optimal SES indicator suggests income as the leading candidate. Further research may suggest additional indicators in the future, and it should be recognized that SES is contextual, dynamic over time, and requires interpretation to be meaningful (28).

SES indicators in national surveys and databases

Information on the U.S. population is collected in order to inform a range of activities, from allocating Congressional seats to monitoring trends in illness, disability and employment. National surveys range from the broad surveys such as the Census and the Current Population Survey (CPS) to focused surveys such as the National Health Interview Survey (NHIS). The 2005 study by Arispe et al. examined the use of SES indicators across federal and nonfederal databases. The researchers found that no single indicator was used to assess SES. However, income was the most common SES indicator used in surveys of individuals, while education was the more common SES indicator collected within the Vital Statistics System (37).

While national surveys capture a variety of different SES measures, surveys and programs often have different questions and vary in the number of questions, formatting of questions, and analysis techniques to assess the SES of a population. The National Committee on Vital and Health Statistics examined the potential for standardization of SES in HHS surveys. The

Committee identified income, education, occupation, family size and household composition as the most critical for the measurement of SES. However, they found significant variation in the number of questions, wording, and responses for these measures. The Committee also suggested practical realities for collecting SES information - such as including the minimum set of questions required to produce reasonable estimates, recognizing the implications for respondent and administrator burden, and considering supplementing information from other data sources to provide additional context (38).

A report conducted by Mathematica in 2008, reviewed the design and approaches for capturing income and poverty related data across eight national surveys. The investigators found significant differences in poverty measures, definition of family, income details, income for persons, timing and reference period (39). Surveys vary from asking only one income question (CPS) to asking hundreds income related questions (Health and Retirement Survey).

Research has examined the data collection issues around SES indicators. The 1994 study, by Entwisle and Astone, provided recommendations regarding the wording of SES questions. The investigators suggest asking income questions late in the interview and providing set income categories for the respondent to choose from are the best methods for capturing income data (40). The 2001 study, by Duncan and Peterson, suggested both brief and comprehensive versions of questions for income and wealth when capturing SES. Regarding income, the short version included only one question on the family's entire income; the more detailed set of recommendations include questions on each household member's individual income (41).

SES indicator used by federal programs

The Catalog of Federal Domestic Assistance documents the existence of over 2,000 Federal assistance programs. These programs provide assistance, such as grants, loans and technical assistance, to public and private institutions and individuals. These domestic assistance programs capture a variety of SES indicators, including labor force participation, income, health insurance coverage, housing, transportation, and educational attainment at the individual, family, and household level (42). A majority of these programs use SES indicators to determine eligibility and a 2008 study by Reckor show most of these programs use a measure of income or wealth to determine eligibility (43). Table 2 summarizes domestic assistance programs that use income level as an eligibility requirement.

A proposed SES indicator

The current movement for meaningful use of electronic health records presents an opportunity to advance standardized collection of SES information to improve health. Wide-spread standardized collection of SES information in medical records could inform clinical care and advance research on the linkages between SES and health and the effects of policies aimed at improving quality of care and health outcomes.

In 2012, National Committee on Vital and Health Statistics identified the most important and feasible SES measures to standardize and include in HHS surveys (38). The Committee

identified the following as the most critical for the measurement of SES: income, education, occupation, family size and household composition. A current review of the literature supports this finding and suggests income is the optimal SES indicator for inclusion in electronic health records.

An important feature of including income in EHRs is the relevance of this information to clinicians working with individual patient. A review of Federal programs – including public health insurance, public benefits, and student aid – revealed income as the most common eligibility criterion amongst these programs. The use of income information to help patients identify programs for which they may be eligible increases the acceptability of collecting this information both for patients and for providers.

The National Committee on Vital and Health Statistics also suggested practical realities should be taken into account in choosing what SES information should be required for the meaningful use of electronic health records. The opportunity to incorporate the collection of SES information through federal policies, such as Meaningful Use, requires a balance between needed data and overburdening health care providers and patients. Therefore, the number of required questions and the complexity of those questions should be minimized. An SES indicator that requires many questions to be meaningful would be a poor candidate for inclusion.

A review of federal survey questions revealed a wide variation in how income questions are asked, and in some cases, hundreds of questions are included to fully clarify income status. However, the CPS has a single family income question with multiple response categories (see Figure 1), consistent with the research on how best to ask individuals about income (40,41).

If the opportunity exists for additional SES data requirements within future policies, top candidates would be: a) education as indicated by the literature as a common SES indicator collected in research and through national data systems; and b) family size to inform eligibility for public programs.

Meaningful use of an SES indicator

The goal of including an SES indicator in electronic health records is to improve health outcomes and reduce health disparities. Literature suggests there are areas in which clinicians can act to improve health care for their low-income patients, see Table 3. A patient response indicating low income can trigger a number of clinical responses such as a conversation about a person's financial insecurity or other social risk factors. Knowledge about a patient's SES will allow providers to tailor care to meet the specific needs of individuals, consistent with true patient centered care. Patients and providers can discuss barriers to care and options for addressing those barriers, such as prescribing a less-expensive medication, referral to a social worker or care manager, or referral directly to available community resource, including housing, employment, or education programs. Providers may also choose to make practice level changes to accommodate patients, such as trying to accomplish more in a single visit, hiring translators or care managers, or adjusting clinical hours to increase access for patients (44).

Community providers are also implementing programs to address the unmet social needs of patients and communities. Community Health Centers have developed a wide range of activities focused on the social determinants of health. These activities range from education programs to promote early childhood development to adult education; job skills and employment programs, economic development programs such as providing access to loans and providing farmers with opportunities to sell their products; housing programs from providing tenant services to assisting first-time home buyers and establishing low-income housing; and advocacy such as supporting community action for system changes in health, education and social policies (<http://www.altfutures.org/pubs/leveragingSDH/IAF-CHCsLeveragingSDH.pdf>). A better understanding of patient SES and resources in the community can identify gaps that can then guide these practice level changes, community outreach, and patient advocacy and policies.

It should be recognized that no single question can guide all interventions. Rather inclusion of an income question provides a practical screening question that will alert clinicians to the SES of their patients, guide further questioning, advance interventions at the individual, community, and policy level, and be useful for researchers examining the relationships between policies, SES and health outcomes.

Providers have long sought to address health through community initiatives and health care systems will increasingly seek to address health at the community/population level as policies such as the Affordable Care Act's new non-profit hospital community benefit requirement and payment reforms make health systems more broadly responsible for the health of populations. The new community benefit rules explicitly require non-profit hospitals to conduct community needs assessments and develop interventions to address identified needs. New payment models, such as accountable care organizations and value based purchasing, will require health systems to examine community factors affecting health in order to meet quality requirements to maximize payments. The success of these activities will require an understanding of the SES of patient populations and the effect of SES on desired health outcomes.

Future opportunities

The incorporation of an SES indicator in standardized clinical practice through electronic health records has the potential to accelerate current efforts to fully understand the relationship between SES and health. The majority of SES data is currently collected through sample surveys or at relatively wide time intervals. While the health care system doesn't make contact with every person every year, it likely contacts the largest and widest swathe of the American people in any time period. The data collected could not only add to the understanding of the mechanisms by which SES affect health, it could inform policies aimed at improving health or other socio-economic sensitive conditions.

Including an SES indicator into policies around the meaningful use of EHRs would accelerate the development of applications that potentiate the ability of clinicians and health systems to use SES information in a meaningful way without significantly disrupting workflow. As HIT is increasingly incorporated into clinical care, areas of opportunity

include electronic health record chart logic applications where a “positive” screen on an income question would trigger automated follow up questions to determine specific SES areas of need, all of which could be implemented through electronic patient check in. Responses could then generate tailored, electronic provider reminders, patient information sheets or referrals to other health care team members such as care managers, social workers, or community health workers. Practices and health systems in an environment of increasing emphasis on community and population health may also choose to direct additional resources to programs to address the unmet social needs of patients and communities. This might mean hiring additional care managers or community health workers or developing any number of programs to support the social needs of patients and communities. These kinds of investments would ultimately facilitate the ability of clinicians to provide the best care while minimizing the additional work requirements on any individual provider.

It should be recognized that there is sensitivity in collecting patient’s income information, and not all patients will feel comfortable providing this information. Thought should be given to the best methods for gathering this information – this may relate to the actual question asked or how or who asks it. Again, requiring the collection of an SES indicator in policies such as Meaningful Use would likely advance research in this area. HIT could also be used to access community-level income data that can be used to inform patient care. Literature suggests understanding neighborhood and community level SES is an important component of understanding any individual’s SES. Geographic information system software exists that would allow patient addresses to be geocoded and located within census neighborhoods. Neighborhood level data could then be imported directly into the patient’s chart HIT could automate this process, making the information available for all patients. Inclusion of a SES indicator requirement in electronic health records would act as a catalyst for the development of these kinds of capabilities within electronic health records. In the case of Meaningful Use, community level income data imported directly into a patient’s chart could be counted as an entry for the purpose of meeting this measure when patients decline to report their income. Note for the race and ethnicity measure, another potentially sensitive area, Stage 2 Meaningful Use indicates if a patient declines to provide this information then duly noting this as structured data in the EHR will still count for the purpose of meeting this measure (21).

Conclusion

SES affects health. As the ACA is implemented and increasing numbers of previously uninsured people gain access to health care, the imperative to recognize the SES of patients and develop health initiatives that account for the social determinants of health increases. Current initiatives around the Meaningful Use of electronic health records provide a timely opportunity to incorporate a standardized SES indicator that can inform patient care, facilitate research, and inform wider policies to improve health. Research indicates an income question is the optimal SES indicator, and a review of national surveys and eligibility requirements for Federal programs reinforces this finding.

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Which category represents the total combined income of all members of your family during the past 12 months?

This includes money from jobs, net income from business, farm or rent, pensions, dividends, interest, social security payments and any other money income received by members of your family who are 15 years of age or older.

- ☐ Less than \$5,000
- ☐ 5,000 to 7,499
- ☐ 7,500 to 9,999
- ☐ 10,000 to 12,499
- ☐ 12,500 to 14,999
- ☐ 15,000 to 19,999
- ☐ 20,000 to 24,999
- ☐ 25,000 to 29,999
- ☐ 30,000 to 34,999
- ☐ 35,000 to 39,999
- ☐ 40,000 to 49,999
- ☐ 50,000 to 59,999
- ☐ 60,000 to 74,999
- ☐ 75,000 to 99,999
- ☐ 10,000 to 149,999
- ☐ 150,000 or more

Figure 1.
Current Population Survey: Family Income Question

Table 1

Literature Evaluating an Optimal SES Indicator

Title Author (Year)	SES Indicators Compared	Findings
Education and occupational social class: which is the more important indicator of mortality risk? (22) Smith et al. (1998)	<ol style="list-style-type: none"> 1 Education 2 Social Class 	Death from cardiovascular disease was most strongly associated with individual education level, while overall mortality and smoking behavior were more strongly associated with adulthood social class.
Optimal Indicators of Socioeconomic Status for Health Research. (23) Duncan et al. (2002)	<ol style="list-style-type: none"> 1 Years of completed schooling 2 Occupation 3 Income 4 Wealth 	Income and wealth SES indicators were more strongly associated with mortality than schooling and occupation.
What Difference Does the Choice of SES Make in Health Inequality Measurement? (39) Wagstaff A, Watanabe N (2003)	<ol style="list-style-type: none"> 1 Equivalent household consumption 2 Asset-based wealth index 	No significant difference in the magnitude of SES-related inequalities in health when using consumption or wealth as the SES indicator.
Individual- and area-level socioeconomic status variables as predictors of mortality in a cohort of 179,383 persons. (18) Steenlan, et al. (2004)	<ol style="list-style-type: none"> 1 Area level SES measures: <ol style="list-style-type: none"> a. Average of home value b. Income c. Education d. Occupation 2 Individual level SES measures <ol style="list-style-type: none"> a. Education 	Individual-level SES variables were stronger predictors of health outcomes than area-level SES variables.
Does Subjective Social Status Predict Health and Change in Health Status Better Than Objective Status? (28) Singh-Manoux A, Marmot M, Adler N (2005)	<ol style="list-style-type: none"> 1 Income 2 Social status 3 Level of responsibility 4 Subjective socioeconomic status 	Subjective SES was a better predictor of health status and decline in health status over time in middle-aged adults.
Influence of individual- and area- level measures of socioeconomic status on obesity, unhealthy eating, and physical inactivity in Canadian adolescents. (19) Jannsen et al. (2006)	<ol style="list-style-type: none"> 1 Individual-level SES: <ol style="list-style-type: none"> a. Material wealth b. Perceived family wealth 2 Area-level SES <ol style="list-style-type: none"> a. Unemployment rate b. Percentage of adult residents with less than a high school education c. Average employment income from head of household 	Individual and area level SES measures were both associated with obesity.
Monitoring Socioeconomic Disparities in Death: Comparing Individual-Level Education and Area-Based Socioeconomic Measures. (20) Rehkopf et al. (2006)	<ol style="list-style-type: none"> 1 Individual-level SES <ol style="list-style-type: none"> a. Education 2 Area-level SES <ol style="list-style-type: none"> a. Percentage of persons below poverty b. Percentage of adults aged 25 and older with less than a high- school education 	For individuals between ages 45 and 64 living in Massachusetts, area-level SES measures and individual-level SES measures (education) identified similar degrees of SES inequality for all causes of mortality.

Title Author (Year)	SES Indicators Compared	Findings
	c. Percentage of adults aged 25 and older with a 4-year college education	
Income Is a Stronger Predictor of Mortality than Education in a National Sample of US Adults. (24) Sabanayagam C, Shankar A (2012)	1 Income 2 Education	Income was a stronger predictor of mortality than education level.
Subjective Social Status and Maternal Health in a Low Income Urban Population. (29) Dennis et al. (2012)	1 Income 2 Education 3 Occupation 4 Self-perceived social status	Self-perceived social status had a stronger correlation with self-reported health status and depression than income and education for mothers with low income.

Table 2**Means-Tested Federal Programs**

Corporation for National and Community Service
Foster Grandparent Program
Senior Companion Program
Department of Agriculture
Child and Adult Care Food Program
Expanded Food and Nutrition Education Program
National School Lunch Program
School Breakfast Program
Senior Farmers Market Nutrition Program
Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)
Supplemental Nutrition Assistance Program (SNAP)
Department of Education
Advanced Placement Program (Advanced Placement Test Fee; Advanced Placement Incentive Program Grants)
Child Care Access Means Parents in School
Federal Supplemental Educational Opportunity Grants
Federal Work Study Program
Gaining Early Awareness and Readiness for Undergraduate Programs
Graduate Assistance in Areas of National Need
TRIO McNair Post-Baccalaureate Achievement
TRIO Student Support Services
Department of Energy
Weatherization Assistance for Low-Income Persons
Department of Labor
Job Corps
National Farmworker Jobs Program
Senior Community Service Employment Program
Workforce Investment Act Youth Activities
Department of Health and Human Services
AIDS Drug Assistance Program
Assets for Independence Demonstration Program
Child Care Mandatory and Matching Funds of the Child Care and Development Fund
Children's Health Insurance Program
Community Health Centers
Community Services Block Grant
Family Planning Services
Family Support Payments to States Assistance Payments
Head Start
Health Careers Opportunity Program
Health Professions Student Loans — Loans for Disadvantaged Students

Hill-Burton Uncompensated Services Program
Job Opportunities for Low-Income Individuals
Low-Income Home Energy Assistance Program (LIHEAP)
Medical Assistance Program
Medicare – Prescription Drug Coverage
Migrant Health Centers
Medicaid
Scholarships for Health Professions Students from Disadvantaged Backgrounds
Special Programs for the Aging Title VII, Chapter 3 Programs for Prevention of Elder Abuse, Neglect, and Exploitation
Temporary Assistance for Needy Families (TANF)
Department of Housing and Urban Development
Family Unification Program
Interest Reduction Payments Rental and Cooperative Housing for Lower Income Families
Low-rent public housing
Section 8 low-income housing assistance
Department of the Treasury
Low-Income Taxpayer Clinics
Department of Veterans Affairs
VA Homeless Providers Grant and Per Diem Program
VA Supportive Services for Veteran Families Program
Internal Revenue Service
Earned Income Tax Credit
Legal Services Corporation
Legal Services for the Poor

* Table was created from review of the Catalog of Federal Domestic Assistance programs³³, and The Office of the Assistant Secretary for Planning Evaluation's Frequently Asked Questions Related to Federal Poverty Guidelines.³⁵