Cerner

Strategies to Address Complexities Associated with the Assessment, Storage and Use of Social-Behavioral Determinants of Health in the Electronic Health Record

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Problem

Social and behavioral determinants of health (SBDH) are central to a successful population health management strategy.

SBDH Complexities
- Multiple, conflicting recommendations from national organizations.
- Multiple tools with varying social-behavioral determinant domains that lack scoring and cut points.
- Lack of terminology code sets to store an assessment.

Solution
- Three-tier equivalency scoring strategy was designed to:
  1. Used immediately at point of care by identifying social-behavioral determinant deficits.
  2. Be consumed within analytics, algorithms and for secondary analysis.
  3. Produce a composite score that reflects total social-behavioral determinant burden across settings within a healthcare system.

To excel in population health, an organization must understand how patient characteristics and contextual factors, external to the care delivery process, impact a population's health.

Learning objectives

- Discuss the complexities associated with the assessment, storage and use of social-behavioral determinants of health in the electronic health record (EHR).
- Describe strategies that permit scoring by domain to create equivalency across instruments, settings and populations and propose the use of LOINC for encoding.
- Articulate psychometric and encoding methods to achieve equivalency of meaning across populations, settings and time.

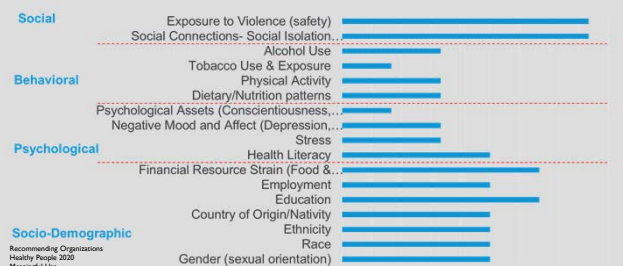## Policy Drivers and Constraints of SBDH Assessment

- Pressures of value-based care on healthcare delivery systems.
- Proliferation of recommendations, both voluntary and mandated, since 2014.
- Domains recommended for inclusion in electronic health record vary.
- Wide range of use cases for SBDH data capture and use.
- Lack of holistic vision of SBDH application within health policy circles, which affects healthcare delivery systems.
- Lack of health professions understanding of meaning and actionable use.


Conflicts of Interest

- None reported

SBDH Domain Recommendations

Social
- Exposure to Violence (safety)
- Social Connections- Social Isolation...

Behavioral
- Alcohol Use
- Tobacco Use & Exposure
- Physical Activity
- Dietary/Nutrition patterns

Psychological
- Psychological Assets (Conscientiousness,...
- Negative Mood and Affect (Depression,...
- Stress
- Health Literacy

Socio-Demographic
- Financial Resource Strain (Food &...
- Employment
- Education
- Country of Origin/Nativity
- Ethnicity
- Race
- Gender (sexual orientation)

Recommending Organizations
Healthy People 2020
Meaningful Use
National Quality Forum
National Academy of Medicine Medicare Social Risk
CMS Accountable Health Communities

0% 10% 20% 30% 40% 50% 60% 70% 80% 90%

Measurement Constraints of SBDH Assessment and Use

- Assessment instruments vary by population and discipline.
- Instruments with undocumented validity and reliability have been adopted.
- Lack of standardization across instruments.
- Scoring scales are dissimilar.
- Lack of terminology to represent SDH concepts in standardized code sets.
- Importance (weighting) of SDH varies across populations.
- Importance (weighting) of SDH varies across outcomes.
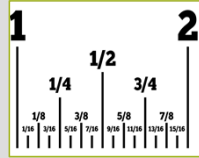
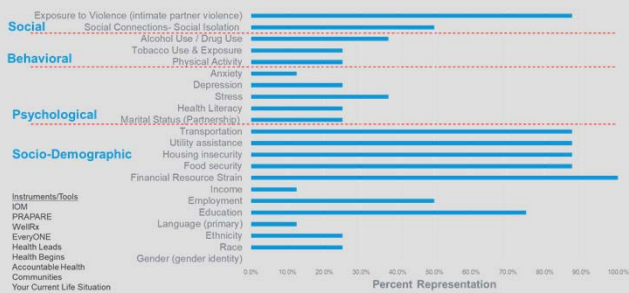## Foundation for SBDH Assessment, Data Capture and Use

Interoperability is key

- SBDH data should be collected once using standardized tools/instruments.
- Encoded to be used for multiple purposes, despite the data source.
- Apply equivalency methods to promote consistent meaning across populations and health systems

SBDH Domains/subdomains assessed in 8 tools

Collect data once for multiple uses
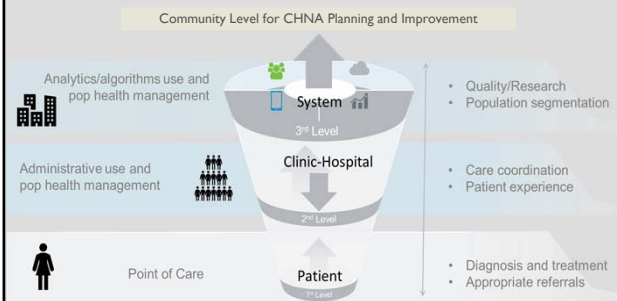
Foundation for Equivalency Scoring Strategy

Achieving Equivalency: Psychometrics versus EHR

	Psychometrics	Electronic Health Record
Standardize	Validity and reliability testing to show that instruments measure consistently across time and populations	Encoding clinical data with standardized vocabularies to enable interoperability.
Normalize	Adjusting to a notionally common scale values measured on different scales.	Associating the encoded data into groups of codes with semantically similar meanings
Harmonize	Recoding of variables so that they are scored with identical values.	Storing and displaying the encoded data from different sources in a meaningful way

SBDH Data and Three-Tier Equivalency Scoring

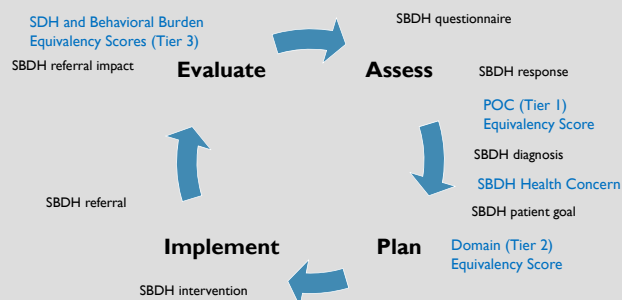| Point of Care		Point of Care and Decision Modeling		Decision Modeling and Analytics	
Diagnosis and Treatment	Referrals	Patient Experience	Care Coordination	Risk Assessment	Research and Quality

- Tier 1: Point of Care scoring makes data actionable for intervention.
- Tier 2 : Scoring to achieve equivalency of domains across instruments, settings and populations to make data usable in analytics and algorithms
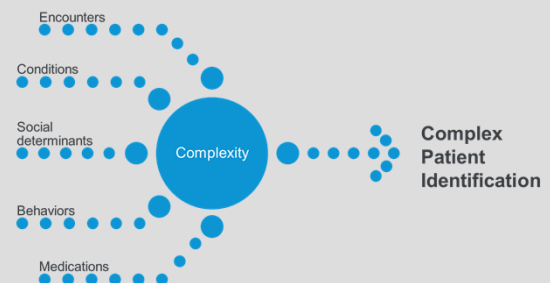- Tier 3 : Composite scoring that reflects total SBDH burden across settings and health systems

Using SBDH to improve health care delivery management

What is the degree of financial strain among older diabetic patients in our health system?

76513-1
How hard is it for you to pay for the very basics like food, housing, medical care and heating?

Data storage
- Age
- Financial strain
- Clinic
- Condition (DM)

Very hard	LA15832-1
Hard	LA14745-6
Somewhat hard	LA22683-9
Not very hard	LA22682-1

LA15832-1 represents that it is very hard for this patient to pay for the very basics *and* has the same meaning at each clinic site

Among diabetic persons, 40 to 65 years of age

Financial Strain	North	South	East	West
Very hard	45	5	40	20
Hard	25	10	30	15
Somewhat hard	20	10	20	20
Not very hard	10	75	10	45

Alignment of Three-Tier Scoring Strategy to Care Delivery

SDH and Behavioral Burden Equivalency Scores (Tier 3)

SBDH referral impact

Evaluate

Assess

SBDH questionnaire

SBDH response

POC (Tier 1) Equivalency Score

SBDH diagnosis

SBDH Health Concern

SBDH patient goal

SBDH referral

Implement

Plan

Domain (Tier 2) Equivalency Score

SBDH intervention

SBDH in complexity identification algorithms

Encounters

Conditions

Social determinants

Complexity

Behaviors

Medications

Complex Patient Identification

Using SBDH to improve POC health care delivery

76513-1
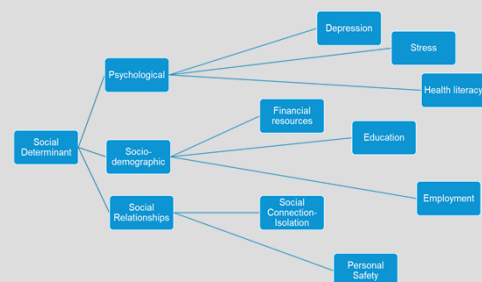How hard is it for you to pay for the very basics like food, housing, medical care and heating?

Very hard	LA15832-1
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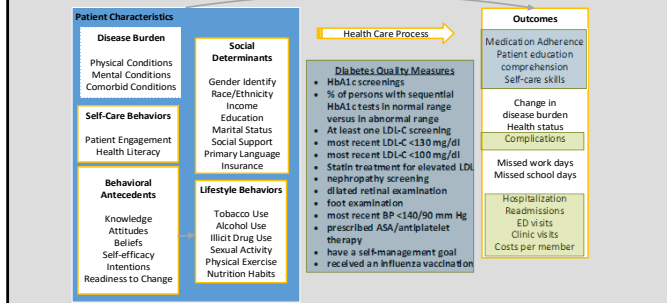
- In what way is it hard?
  - Housing
  - Medications
  - Food, etc.
- Refer to social services
- Refer to community resource

SBDH in complexity identification algorithm

Social Determinant

Psychological
- Depression
- Stress
- Health literacy

Socio-demographic
- Financial resources
- Education
- Employment

Social Relationships
- Social Connection-Isolation
- Personal Safety

Understand how patient factors influence outcomes

Patient Characteristics

Disease Burden
Physical Conditions
Mental Conditions
Comorbid Conditions

Self-Care Behaviors
Patient Engagement
Health Literacy

Behavioral Antecedents
Knowledge
Attitudes
Beliefs
Self-efficacy
Intentions
Readiness to Change

Social Determinants
Gender Identify
Race/Ethnicity
Income
Education
Marital Status
Social Support
Primary Language
Insurance

Lifestyle Behaviors
Tobacco Use
Alcohol Use
Illicit Drug Use
Sexual Activity
Physical Exercise
Nutrition Habits

Health Care Process

Diabetes Quality Measures
- HbA1c screenings
- % of persons with sequential HbA1c tests in normal range versus in abnormal range
- At least one LDL-C screening
- most recent LDL-C <130 mg/dl
- most recent LDL-C <100 mg/dl
- Statin treatment for elevated LDL
- nephropathy screening
- dilated retinal examination
- foot examination
- most recent BP <140/90 mm Hg
- prescribed ASA/antiplatelet therapy
- have a self-management goal
- received an influenza vaccination

Outcomes
Medication Adherence
Patient education comprehension
Self-care skills

Change in disease burden
Health status

Complications

Missed work days
Missed school days

Hospitalization
Readmissions
ED visits
Clinic visits
Costs per member

Comparison of Domain Items for 3 screening tools

IOM	Response	PRAPARE	Response	WellRx	Response
How hard is it for you to pay for the very basics like **food, housing, medical care,** and **heating?**	Very hard (3) Hard (2) Somewhat hard (1) Not very hard (0)	What is your **housing** situation today?	I do not have housing (1) I have housing (0)	Are you **homeless** or worried that you might be in the future?	Yes (1) No (0)
		Are you worried about losing **housing**?	Yes (1) No (0)		
		Has lack of **transportation** kept you from medical appointments, meetings, work, etc.?	Yes, kept me from medical appointments or medications (1) Yes, kept from non-medical meetings, work (1)	Do you have trouble finding or paying for a ride **(transportation)**?	Yes (1) No (0)
		In the past year, have you or any family you live with been unable to get any of the following when it was needed?	**Childcare (1) Clothing (1) Food (1) Medicine or healthcare (1) Phone (1) Utilities (1)**	Do you need daycare, or better **daycare,** for your kids?	Yes (1) No (0)
				In the past 2 months, did you or others you live with eat smaller meals or skip meals because you didn't have money for **food?**	Yes (1) No (0)
				Do you have trouble paying for your **gas or electricity** bills?	Yes (1) No (0)

Understand SBDH Deficits by Age

- Largest group about 40% is age 45-64 while smallest group about 10% is age <18
- 65+ age people more concerned than others with **Transportation**
- 45-64 age people more concerned than others with **Food**, **Utilities**, **Transportation**, and **Homelessness**
- 19-44 age people and 45-64 age people more concerned than others about **income**
- <18 age people more concerned than others with **education,** and **drugs**
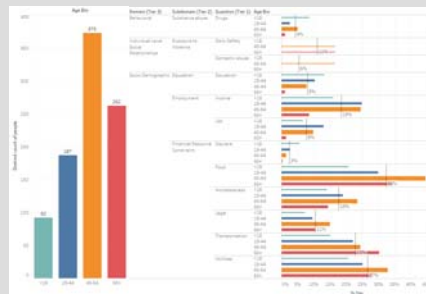
Financial Resource Constraint scoring for 3 screening tools

Subdomain	IOM	PRAPARE	WellRx
Housing		2	1
Transportation		2	1
Childcare		1	1
Food		1	1
Utilities		1	1
Healthcare-Rx		1	
Clothing		1	
Phone		1	
Score Range	1-3	1-9	1-5
Financial Resource Categories	(3) Very hard = high (2) Hard = moderate (1) Somewhat = low	(5-9) Very hard = high (3-4) Hard = moderate (1-2) Somewhat = low	(4-5) Very hard = high (2-3) Hard = moderate (1) Somewhat = low

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Item Assessment of Three SBDH Screening Tools

WellRx Example

Three-tier equivalency scoring application

Person	Domain (Tier 3)	Subdomain (Tier 2)	Health Concern (Tier 1)	Answer	Score
John Doe	Behavioral	Substance Abuse	Drugs	No	0
		Subdomain Total			0
		Domain Total			0
	Socio-Demographic	Education	Education	Yes	1
		Subdomain Total			1
		Employment	Income	No	0
			Job	Yes	1
		Subdomain Total			1
		Financial Resource Constraint	Daycare	Yes	1
			Food	Yes	1
			Homelessness	Yes	1
			Legal	No	0
			Transportation	Yes	1
			Utilities	Yes	1
		Subdomain Total			5
		Domain Total			7
Grand Total					7

Three-tier equivalency scoring-Tier 3

Person	Domain (Tier 3)	Subdomain (Tier 2)	Health Concern (Tier 1)	Answer	Score	Interpretation
John Doe	Behavioral	Substance Abuse	Drugs	No	0	--
		Subdomain Total			0	
		Domain Total			0	
	Socio-Demographic	Education	Education	Yes	1	Socio-Demographic Concern
		Subdomain Total			1	
		Employment	Income	No	0	
			Job	Yes	1	
		Subdomain Total			1	
		Financial Resource Constraint	Daycare	Yes	1	
			Food	Yes	1	
			Homelessness	Yes	1	
			Legal	No	0	
			Transportation	Yes	1	
			Utilities	Yes	1	
		Subdomain Total			5	
		Domain Total			7	
Grand Total					7	

Three-tier equivalency scoring-Tier 1

Person	Domain (Tier 3)	Subdomain (Tier 2)	Health Concern (Tier 1)	Answer	Score	Interpretation
John Doe	Behavioral	Substance Abuse	Drugs	No	0	--
		Subdomain Total			0	
		Domain Total			0	
	Socio-Demographic	Education	Education	Yes	1	Need help getting more edu.
		Subdomain Total			1	
		Employment	Income	No	0	--
			Job	Yes	1	Needs better job
		Subdomain Total			1	
		Financial Resource Constraint	Daycare	Yes	1	At risk for daycare constraint
			Food	Yes	1	At risk for food insecurity
			Housing	Yes	1	At risk for housing insecurity
			Legal	No	0	--
			Transportation	Yes	1	At risk for transp. constraint
			Utilities	Yes	1	At risk for util. constraint
		Subdomain Total			5	
		Domain Total			7	
Grand Total					7	

Three-tier equivalency scoring-Total Burden Score

Person	Domain (Tier 3)	Subdomain (Tier 2)	Health Concern (Tier 1)	Answer	Score	Interpretation
John Doe	Behavioral	Substance Abuse	Drugs	No	0	
		Subdomain Total			0	
		Domain Total			0	
	Socio-Demographic	Education	Education	Yes	1	Total Social Burden Score
		Subdomain Total			1	
		Employment	Income	No	0	
			Job	Yes	1	
		Subdomain Total			1	
		Financial Resource Constraint	Daycare	Yes	1	
			Food	Yes	1	
			Homelessness	Yes	1	
			Legal	No	0	
			Transportation	Yes	1	
			Utilities	Yes	1	
		Subdomain Total			5	
		Domain Total			7	
Grand Total					7	

Three-tier equivalency scoring-Tier 2

Person	Domain (Tier 3)	Subdomain (Tier 2)	Health Concern (Tier 1)	Answer	Score	Interpretation
John Doe	Behavioral	Substance Abuse	Drugs	No	0	--
		Subdomain Total			0	
		Domain Total			0	
	Socio-Demographic	Education	Education	Yes	1	Education Concern
		Subdomain Total			1	
		Employment	Income	No	0	Employment Concern
			Job	Yes	1	
		Subdomain Total			1	
		Financial Resource Constraint	Daycare	Yes	1	Financial Constraint – Very Hard
			Food	Yes	1	
			Homelessness	Yes	1	
			Legal	No	0	
			Transportation	Yes	1	
			Utilities	Yes	1	
		Subdomain Total			5	
		Domain Total			7	
Grand Total					7	

Equivalency scores derived for SBDH screening tools

- Social Determinant Burden *overall score*
- Sociodemographic Factor score
  - Education level
  - Employment status
  - Financial constraint (food, housing, utilities, transportation, childcare, phone)
  - Language
  - Refugee status
- Individual-level Social Relationships score
  - Social isolation
  - Exposure to violence
  - Incarceration history
  - Military service history
- Psychological domain score
  - Depression
  - Stress
- Behavioral Determinant Burden score – *overall score*
  - Alcohol use
  - Physical activity

Summary and Conclusions

- Policies and practices associated with SBDH use are complex.
- Discordant data are not interoperable.
- Applying evidence-based scoring to "scoreless" forms
  - Addresses urgency/demand and variability
  - Resolves lack of methods for achieving equivalency using EHR data
    - Tier 1 scoring promotes clinical decision
    - Tier 2 scoring supports uptake into algorithms and analytics
    - Tier 3 scoring promotes understanding of social determinant burden and behavioral determinant burden
- Outputs of scoring strategy
  - Achieves IOM (2014) recommendations
  - Promotes exchange of data in a meaningful way
  - Paves path for interoperable SBDH data

References: Recommended SBDH Domains

- Billioux, A., K. Verlander, S. Anthony, and D. Alley (2017). Standardized screening for health-related social needs in clinical settings: The accountable health communities screening tool. Discussion Paper, National Academy of Medicine, Washington, DC. https://nam.edu/wp-content/uploads/2017/05/ Standardized-Screening-for-Health-Related-Social-Needs-in-Clinical-Settings.pdf.
- Institute of Medicine (2014). *Capturing Social and Behavioral Domains and Measures in Electronic Health Records: Phase 2.* Washington, D.C.: The Academies Press.
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- National Quality Forum (2017). *A Roadmap for Promoting Health Equity and Eliminating Disparities: The Four I's for Health Equity.* Report funded by Department of Health and Human Services, HHSM-500-2012-00009I, Task Order HHSM-500-T0024. Retrieved from file:///C:/Users/rw042029/Downloads/disparities1_final_report.pdf
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- Office of the National Coordinator (03/17/2017). Meaningful Use 3: 2015 Edition Certification Companion guide. Social, Psychological, and Behavioral Data, Version 1.0. Retrieved from https://www.healthit.gov/sites/default/files/2015Ed_CCG_a15-Social-psych-behavioral-data.pdf

Summary and Conclusions

The IOM's Phase 2 report, Finding 7-1, suggests that EHR suppliers lack harmonized standards to capture SBDH to promote the exchange of data.

- IOM's Recommendation 7-1 (page 16), "*The Office of the National Coordinator for Health Information Technology's electronic health record certification process should be expanded to include appraisal of a vendor or product's ability to acquire, store, transmit, and download self-reported data germane to the social and behavioral determinants of health.*"
- EHR certification recommendation requires data storage to support interoperability.
- Domain scoring achieves both equivalency and interoperability.
- Healthcare systems can select the instrument(s) that best fit the populations they serve and data is usable across the healthcare systems regardless of population or setting.

References: SBDH Assessment Tools

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- Health Leads. Social needs screening toolkit. www. healthleadsusa.org/wp-content/uploads/2016/07/Health-LeadsScreening-Toolkit-July-2016.pdf. Accessed October 3, 2018.
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- Kaiser-Permanente Care Management Institute. Your Current Life Situation Questionnaire (Core.11-10-16, YCLS v.2.0 (shorter form) (11-10-16) KP Natl. Accessed December 12, 2018 from https://sirenetwork.ucsf.edu/sites/sirenetwork.ucsf.edu/files/Your%20Current%20Life%20Situation%20Questionnaire%20v2-0%20%28Core%20and%20supplemental%20items%2C%20annotated%20with%20mappers%20and%20sources%29%28v11-10-16%29.pdf
- Manchanda, R., & Gottlieb, L. (2015). Upstream risks screening tool & guide V2.6. Retrieved February 27, 2017, from https://www.aamc.org/download/442878/data/chahandout1.pdf
- National Association of Community Health Centers. (2016). PRAPARE. Retrieved February 23, 2017, from http://www.nachc.org/research-and-data/prapare
- The Office of the National Coordinator for Health Information Technology. (2015). Office-based physician electronic health record adoption. Retrieved February 25, 2017, from https://dashboard.healthit. gov/quickstats/pages/physician-ehr-adoption-trends. Php
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QUESTIONS?

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