CAPTURING SOCIAL & BEHAVIORAL DOMAINS & MEASURES IN ELECTRONIC HEALTH RECORDS

Patricia Flatley Brennan & William Stead

Committee on Recommended Social & Behavioral Domains & Measures for Electronic Health Records (EHRs)
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COMMITTEE CHARGE

THE COMMITTEE WAS ASKED TO:

• Identify domains for consideration by ONC for Stage 3 meaningful use;

• Determine criteria for selection;

• Identify domains and measures for inclusion in all EHRs;

• Consider implications of incorporating recommended measures into all EHRs; and

• Identify Issues in linking other data systems.
Conceptual Frameworks

- Selected 3 frameworks, Ansari et al., Kaplan et al., and MacArthur Research Network on SES Health Model
  - Frameworks looked at downstream and upstream determinants of health
- Models distinguish between characteristics that influence health that reside at 5 levels:
  - Socio-demographic
  - Psychological
  - Behavioral
  - Social relationships and living conditions
  - Physical and social environment
Multilevel Model by Kaplan, et al. (2000)

FIGURE 2-1 Multilevel approach to epidemiology, 2000. The approach of Kaplan et al. (2000) attempts to bridge various levels of explanation and intervention, bringing together theory and empirical work that link observations of causal influence and mechanism at multiple levels.
CANDIDATE DOMAINS

**SOCIODEMOGRAPHIC DOMAINS**
- Sexual orientation
- Race/ethnicity
- Country of origin/U.S. born or non-U.S. born
- Education
- Employment
- Financial resource strain
  - (Food and housing insecurity)

**PSYCHOLOGICAL DOMAINS**
- Health literacy
- Stress
- Negative mood and affect
  - (Depression, anxiety)
- Psychological assets
  - (Conscientiousness, patient engagement/activation, optimism, self-efficacy)

**BEHAVIORAL DOMAINS**
- Dietary patterns
- Physical activity
- Tobacco use and exposure
- Alcohol use

**INDIVIDUAL-LEVEL SOCIAL RELATIONSHIPS & LIVING CONDITIONS**
- Social connections and social isolation
- Exposure to violence

**NEIGHBORHOODS & COMMUNITIES**
- Compositional characteristics
MEASUREMENT TERMS

- Concept – domains/constructs
- Operational definition – subdomain/variable
- Observational tool – instrument/question(s)
- Data structure/scale - metric
### CONVERTING MEASURE TO METRIC

**Example: Physical activity**

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>METRIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Vital Sign</td>
<td>Metabolic equivalent task minutes (METs)</td>
</tr>
</tbody>
</table>
| 1. On average, how many days per week do you engage in moderate to strenuous exercise? (0-7) | • Light intensity 1.1-2.9  
| 1. On average, how many minutes do you engage in exercise at this level (blocks of 10 min) | • Moderate intensity 3.0-5.9  
| | • Vigorous intensity >=6 |
### CONVERTING STANDARD MEASURE TO CODE SET

#### Example: Tobacco Use

<table>
<thead>
<tr>
<th>STANDARD MEASURE</th>
<th>STAGE 2 CODE SET</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHIS Questions</td>
<td>SNOMED Codes</td>
</tr>
</tbody>
</table>
| 1. Have you smoked at least 100 cigarettes in your entire life? (Y/N/refused/do not know) | •Current every day smoker  
•Current some day smoker  
•Former smoker  
•Never smoker  
•Smoker, current status unknown  
•Unknown if ever smoked  
•Heavy tobacco smoker  
•Light tobacco smoker |
| 2. Do you NOW smoke cigarettes every day, some days or not at all? | |
STANDARD DOMAIN MEASURES

- Race/Ethnicity: U.S. Census (2 Q)
- Education: Educational Attainment (2 Q)
- Physical Activity: Exercise Vital Signs (2 Q)
- Tobacco Use: NHIS (2 Q)
- Social Connection and Isolation: NHANES III (4 Q)
- Neighborhood and Community Compositional Characteristic: Residential address (1 Q)
- Financial Strain: Overall Financial Resource Strain (1 Q)
- Stress: Elo et al. (2003) (1 Q)
- Depression: PHQ-2 (2 Q)
- Alcohol Use: AUDIT-C (3 Q)
- Neighborhood and Community Compositional Characteristic: Census Tract-Median Income
- Exposure to Violence: Intimate Partner Violence: HARK (4 Q)

NOTE: Bolded items are domains that are already frequently collected.
<table>
<thead>
<tr>
<th>Domain</th>
<th>Measure</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race or ethnic group</td>
<td>1. What is your race?</td>
<td>At entry</td>
</tr>
<tr>
<td></td>
<td>2. Are you of Hispanic, Latino, or Spanish origin?</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1. What is the highest level of school you have completed?</td>
<td>At entry</td>
</tr>
<tr>
<td></td>
<td>2. What is the highest degree you earned?</td>
<td></td>
</tr>
<tr>
<td>Financial-resource strain</td>
<td>How hard is it for you to pay for the very basics like food, housing, medical care, and heat?</td>
<td>Screen and follow up</td>
</tr>
<tr>
<td>Stress</td>
<td>Stress means a situation in which a person feels tense, restless, nervous, or anxious, or is unable to sleep at night because his or her mind is troubled all the time. Do you feel this kind of stress these days?</td>
<td>Screen and follow up</td>
</tr>
<tr>
<td>Depression</td>
<td>Over the past 2 weeks, how often have you been bothered by</td>
<td>Screen and follow up</td>
</tr>
<tr>
<td></td>
<td>1. Little interest or pleasure in doing things?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Feeling down, depressed, or hopeless?</td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td>1. On average, how many days per week do you engage in moderate to strenuous exercise (like walking fast, running, jogging, dancing, swimming, biking, or other activities that cause a light or heavy sweat)?</td>
<td>Screen and follow up</td>
</tr>
<tr>
<td></td>
<td>2. On average, how many minutes do you engage in exercise at this level?</td>
<td></td>
</tr>
<tr>
<td>Tobacco use</td>
<td>1. Have you smoked at least 100 cigarettes in your entire life?</td>
<td>Screen and follow up</td>
</tr>
<tr>
<td></td>
<td>If yes:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Do you now smoke cigarettes every day, some days, or not at all?</td>
<td></td>
</tr>
<tr>
<td>Alcohol use</td>
<td>1. How often do you have a drink containing alcohol?</td>
<td>Screen and follow up</td>
</tr>
<tr>
<td></td>
<td>2. How many standard drinks containing alcohol do you have on a typical day?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. How often do you have six or more drinks on one occasion?</td>
<td></td>
</tr>
<tr>
<td>Social connection or isolation</td>
<td>1. In a typical week, how many times do you talk on the telephone with family, friends, or neighbors?</td>
<td>Screen and follow up</td>
</tr>
<tr>
<td></td>
<td>2. How often do you get together with friends or relatives?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. How often do you attend church or religious services?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. How often do you attend meetings of the clubs or organizations you belong to?</td>
<td></td>
</tr>
<tr>
<td>Intimate-partner violence</td>
<td>1. Within the last year, have you been humiliated or emotionally abused in other ways by your partner or ex-partner?</td>
<td>Screen and follow up</td>
</tr>
<tr>
<td></td>
<td>2. Within the last year, have you been afraid of your partner or ex-partner?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Within the last year, have you been raped or forced to have any kind of sexual activity by your partner or ex-partner?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Within the last year, have you been kicked, hit, slapped, or otherwise physically hurt by your partner or ex-partner?</td>
<td></td>
</tr>
<tr>
<td>Residential address</td>
<td>What is your current address?</td>
<td>Verify at every visit</td>
</tr>
<tr>
<td>Census-tract median income</td>
<td>Geocoded</td>
<td>Update on address change</td>
</tr>
</tbody>
</table>
IMPLEMENTATION
ISSUES

SELF-REPORTED
DATA

PRIVACY
PROTECTION

LINKING
DATA

RESOURCE
CONSIDERATIONS
Informatics Challenges

• Standardization/Innovation
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- Standardization/Innovation
- Acquiring SBDH data in an efficient & privacy-preserving manner
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• Data storage that facilitates clinical care, research and patient self care
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• Acquiring SBDH data in an efficient & privacy-preserving manner
• Data storage that facilitates clinical care, research and patient self care
• Interpretation and accelerating knowledge building for the future
CMS: MU Stage 3 MU for everyone by 2018

ONC: ...determinants of health status are social

“qualified EHR” as defined in section 3000(13) of the Public Health Service Act as an electronic record of health-related information on an individual that includes patient demographic and clinical health information, such as medical history and problem lists;
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MU and certification rules emphasize API’s as a strategy

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Rapidly changing role of the Consumer and evolution of technology is not well reflected in the overall plan.

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Key elements of MU 3
- Protection
- e-Prescribing
- CDSS
- CPOE
- Patient access
- Care Coordination
- HIE
- Public health

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STANDARD DOMAIN MEASURES

- Self-Efficacy: NIH Toolbox (10 Q)
- Race/Ethnicity: OMB (2 Q)
- Optimism: LOT-R (6 Q)
- Dietary Pattern: Fruit and Vegetable Consumption (2 Q)
- Self-Efficacy: NIH Toolbox (10 Q)
- Race/Ethnicity: U.S. Census (2 Q)
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- Sex Orientation: Self identity (1 Q)
- Employment: MESA (1 Q)
- Financial Strain: Food Insufficiency (1 Q)
- Anxiety: PROMIS-7a (7 Q)
- Anxiety: GAD-7 (7 Q)
- Conscientiousness: Big Five Inventory (1 Q)
- Sex Orientation: Behavior (1 Q)
- Country of Origin: U.S. Census (2 Q)
- Financial Strain: Housing Insecurity (1 Q)
- Physical Activity: Accelometer

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QUESTIONS AND COMMENTS WELCOME!