Impact of Social Determinants on Health Care Provision

Patty Brown, Esq., President of Johns Hopkins Healthcare
Linda Dunbar, JHHC Vice President of Care Management
Tak Igusa, Associate Director, Johns Hopkins Systems Institute
Jerry Krill, Assistant Director, Science & Technology, Applied Physics Laboratory
Approach to Session

• Diverse backgrounds and experience – from legal to nursing to aerospace
• Considered the issues and approaches to address them
• Developed hypothesis – system approach and modeling of total environment may provide insights

Premise: Diverse expertise can provoke novel solutions to complex problems.
This Session

- Patty Brown – Mission and Business Imperative for all health care delivery systems
- Linda Dunbar – Useful population health models
- Tak Igusa – Ecological and system science models
- Jerry Krill – Summary in context of Hopkins inHealth Initiative
- All – discussion as time permits
Addressing the Social Determinants of Health: A Health System Perspective

Presented by: Patricia M.C. Brown, Esq.
5/4/2012
Health Care Reform: Two Overarching Principles

- **One**: Move to a Population Health Framework:

  A bridge between Public Health and the Delivery of Health

  Where our delivery system is directly responsive to the individual as well as the public health needs of our community, and outcomes matter.

- **Two**: Reorganize our delivery system around disease and/or health, with care management as the cornerstone of the new delivery system

What is Population Health?

The study of

“Health outcomes, patterns of health determinants, and policies and interventions that link the two.”

Moving from Managed Care to Care Management

Managed Care
Historically: “Managed Care” meant making decisions about necessity and appropriateness of services for each patient

Care Management
Today: Care Management is collaborative, uses patient assessments, data sources, healthcare planning, advocacy, and statistics to improve member health

Use of data to understand patient health

JHHC takes a Care Management approach that seeks to understand and respond to the needs of its members using a variety of data sources to inform decisions and benefit the health of the member population.
# Data Sources

<table>
<thead>
<tr>
<th></th>
<th>Where does this data come from?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What data do we use to learn about our populations?</strong></td>
<td></td>
</tr>
<tr>
<td>Utilization</td>
<td>Claims Data, Pharmacy Data, Encounters Data, ACGs</td>
</tr>
<tr>
<td>Morbidity</td>
<td>Claims Data, Pharmacy Data, Morbidity Analysis, ACGs, Encounters Data</td>
</tr>
<tr>
<td>Patterns of Care</td>
<td>Referral data, Authorization Data, Case Management records, Claims Data, Encounters Data</td>
</tr>
<tr>
<td>Costs</td>
<td>Claims Data, Pharmacy Data, Encounters Data</td>
</tr>
<tr>
<td>Quality of Life/ Mental Health</td>
<td>SF-12 Surveys, PHQ Surveys</td>
</tr>
<tr>
<td>Risk Factors and Health Behaviors</td>
<td>Health Risk Assessments, Patient Self-report data, Claims data, ACGs, Encounters Data</td>
</tr>
<tr>
<td>Patient Activation</td>
<td>Patient Activation Measure Surveys</td>
</tr>
</tbody>
</table>
CASE STUDY: EAST BALTIMORE POPULATION
## Who are our Medicaid Enrollees?

<table>
<thead>
<tr>
<th></th>
<th>East Baltimore</th>
<th>Priority Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong></td>
<td>13,658</td>
<td>249,956</td>
</tr>
<tr>
<td><strong>Mean Age (Years)</strong></td>
<td>18.8</td>
<td>17.5</td>
</tr>
<tr>
<td><strong>% New Enrollees</strong></td>
<td>12.0%</td>
<td>21.1%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>57.9%</td>
<td>57.2%</td>
</tr>
<tr>
<td>Male</td>
<td>42.1%</td>
<td>42.8%</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>86.2%</td>
<td>45.8%</td>
</tr>
<tr>
<td>Caucasian</td>
<td>6.1%</td>
<td>32.6%</td>
</tr>
<tr>
<td>Asian</td>
<td>0.4%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3.9%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Unknown</td>
<td>3.4%</td>
<td>8.1%</td>
</tr>
<tr>
<td><strong>Medicaid Eligibility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSI</td>
<td>16.1%</td>
<td>9.2%</td>
</tr>
<tr>
<td>TANF</td>
<td>83.9%</td>
<td>90.8%</td>
</tr>
</tbody>
</table>
Prevalence Rate per 1000 for Select Conditions in 2011

- Asthma
- Hypertension
- Obesity
- Depression
- Substance Abuse
- Smoking
- Low Back Pain
- HIV/AIDS
- Headaches
- Anxiety Disorders
- CHF
- COPD
- Cancer
- Ischemic Heart Disease

Legend:
- East Baltimore
- Priority Partners
Highest Prevalence Conditions in East Baltimore & Examples of Social Determinants

- Asthma: Unhealthy environment and housing
- Depression: Low social capital and increased stress
- Obesity: Food deserts and unsafe neighborhoods for exercise
- Hypertension: Stressful environments, unhealthy neighborhoods
- Substance Abuse: Lack of social support/coping mechanisms and lack of alternative opportunity
The Business Case for Addressing Social Determinants: A Health Plan Perspective

- Improves member health and experience
- Potential to reduce costs
- Promotes policy changes
- Increases healthcare sustainability
- Supports the mission and vision of Johns Hopkins HealthCare
An innovative community-based care management model at the clinical practice level which meets the demands of risk population by incorporating:

1. Integrated Primary Care – Case Management, Community Care Coordinators (CHW), Behavioral Health, Social Work, EBMC primary care staff, Health Education

2. Social Networking – Social support through mentor and peer to peer support systems
Mission

Improve health of Priority Partners Managed Care Organization members at East Baltimore Medical Center by aligning with community members, the community and health system partners (Johns Hopkins HealthCare/PPMCO, Johns Hopkins Community Physicians, faculty of the JHU)
Keys to Achieving Mission

- **Community Member**
  - Identify health and social needs, improve primary care, prevention and quality indicators of chronic disease
  - Engage and empower members to self management of chronic conditions

- **Community**
  - Partner with community stakeholders (mentors, peers)

- **Health System**
  - Collaborate with EBMC and JHHS to create “ACO-like” entity, measuring improvements in individual and population health, and evaluation financial investments, cost and Return on Investment (ROI)
Goal

• In 2009, approval by JHHC for a three year pilot to develop and implement the care delivery model, improve indicators of quality and overall health, reduce unplanned care and thereby reduce costs, and improve the member’s experience with the healthcare system at EBMC.

• Achieve goal through:
  – The implementation of process-based care through a community-based, integrated primary care management team
  – The social support networks dedicated to health and wellness
Community-based Care Management Model

Priority Partners
MCO
Integrated Primary Care Team

EBMC

Community Members

Community Care Coordinator (CCC)

Social Networking

Mentor
Peer
Peer
Peer

Mentor
Peer
Peer
Peer
Care management based on needs of each individual and community neighborhood

Health conditions
- Chronic disease: hypertension, diabetes, dyslipidemia, HIV, CHF, obesity
- Psychiatric illness

Health behaviors
- Addiction: substance use, smoking
- Wellness: healthy diet, exercise, stress management, prenatal care
- Adherence: medications, physician visits

Social needs
- Violence, poverty, economic status
Develop and Test Risk Prediction Model: Conceptual Basis Model

• **Goal:** Create a model that will be used to target and deliver clinical interventions to patients that are at risk for future hospitalization(s).

• **The model:**
  – Will identify the highest opportunity patients for interventions;
  – Is based on patient, provider, and health system factors that will determine health needs;
  – Is grounded in clinical logic—clinical variables are meaningful to members of the care team and when combined, produce a risk score that is a robust predictor of costs and utilization;
  – Based on the best available evidence.
Prediction Model Approach

1. Identify patients meeting diabetes diagnoses criteria in dataset (2006, 2007, 2008)
2. Identify predictor variables in 2009 dataset
3. Identify event outcomes (hospitalization) in 2010 dataset

Statistical Approach
Regression (OLS, GLM, Logistic), longitudinal analyses
Variables in the Predictive Model

Hospitalization in 2010

Demographic
- Age
- Sex
- Zip Code
- Region
- JHHC Line of Business

Total Costs

Pharmacy:
- Total Count
- Use of insulin
- Use of Insulin Pen
- Lack of claims for supplies
- Claims for Glucagon
- Untreated diabetes
- PPI use

Adjusted Clinical Groups (ACG) Risk Score

Enrollment lapse
- Any
- # of lapses

Co-morbid Conditions:
- Elevated lab values
- Diabetes complications
- Hyperlipidemia
- CAD
- HF
- Renal
- COPD
- Asthma
- Depression
- Substance Use

Utilization
- Primary
- Specialty
- Hospital Admits

Demographic

Total Costs
## Clinical Assessment of Members with High Risk Scores

### Diabetes High Risk Patient Prelim. Notes

<table>
<thead>
<tr>
<th>RS</th>
<th>PCP</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.78</td>
<td>BB</td>
<td>Colon CA w/ Liver Mets; Declines CM (2011); had Omega Life and Terrie P.</td>
</tr>
<tr>
<td>0.76</td>
<td>BB</td>
<td>Was in CM w/ Kathy.</td>
</tr>
<tr>
<td>0.74</td>
<td>BB</td>
<td>Kathy tried contacting for CM, no contact or CM started</td>
</tr>
<tr>
<td>0.64</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.63</td>
<td>BB</td>
<td>Good CM Candidate; PP</td>
</tr>
<tr>
<td>0.63</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.55</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.55</td>
<td>BB</td>
<td>Good CM Candidate; poss. already approached but refused</td>
</tr>
<tr>
<td>0.53</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.46</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.45</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.45</td>
<td>BB</td>
<td>Guided Care</td>
</tr>
<tr>
<td>0.44</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.43</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.42</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.41</td>
<td>BB</td>
<td>Good CM Candidate</td>
</tr>
<tr>
<td>0.40</td>
<td>BB</td>
<td>Possibly Good CM Candidate; Breast CA at JHH</td>
</tr>
<tr>
<td>0.46</td>
<td>HY</td>
<td>Possibly Good CM Candidate</td>
</tr>
<tr>
<td>0.45</td>
<td>HY</td>
<td>Possibly Good CM Candidate</td>
</tr>
<tr>
<td>0.50</td>
<td>KC</td>
<td>Possibly Good CM Candidate</td>
</tr>
<tr>
<td>0.45</td>
<td>KC</td>
<td>Possibly Good CM Candidate</td>
</tr>
<tr>
<td>0.45</td>
<td>KC</td>
<td>In CMDM pgm.; Rebecca Siri (sp?) is her CM</td>
</tr>
</tbody>
</table>
Program to Improve Self Management

**Step 1:**
Use registry data to stratify diabetes patients according to short-term risk for hospitalization or ED use

- Recently hospitalized
- High score on JHHC risk prediction tool
- Referral from PCP

**Step 2:**
Pinpoint problem self-management areas and intervention needs

- Comprehensive assessment (60 min F2F interview)

**Step 3:**
Algorithms triggered by assessments target intervention to specific behavior needs

- Targeted interventions
  - F2F meetings w/ health counselor, psychologist
  - Close telephone follow-up; Referrals to SW, etc
  - NCM coordinates with PCP + ‘Behavior Team’

**How will we know if the program is working?**

**Outcome measures:** Reduce ED visits and hospitalizations.

**Process measures:** Improve control of A1c, BP, lipids, meds and visit adherence

- Monthly monitoring of stratification criteria

**Highest Risk**
- Recently hospitalized
- High score on JHHC risk prediction tool
- Referral from PCP

**Medium Risk**
- A1c, BP, and/or lipids poorly controlled
- Non-adherent to meds or visit

**Low Risk**
- None of the above: Good control, good adherences

**“Public health messaging”**

Self awareness program system-wide

Phone reminders
Power of Social Networks

• Individual management and outcome of chronic disease is largely a function of behaviors: small, daily decisions that in aggregate influence health

• And these behaviors are largely a function of our context

• And a key contextual element is our social network
Social Networks

• Composition
  – Individual Members of the Community
  – Hubs
  – Links

• Commonalities
  – Neighborhood
  – Common health issues
  – Shared values
• **GOAL:** Facilitate the emergence of a culture of health in a community by utilizing the existing social network structure
  - Support
  - Motivation
  - Accountability
  - Education
  - Skill building
  - Navigation

• **Concept has been used successfully in the past**
  - AA/NA therapeutic communities: Addicts helping addicts
  - Peer buddies within VA population
  - Peer mothers in a high-risk population
Social Network

• **Enhance existing relationships**
  – Provide cell phones to facilitate communication
    • Able to use cell phones as long as a minimum number of contacts are made to network members
    • Establish guidelines for use
  – Sponsor social networking events

• **Support new relationships**
  – Link community members with similar concerns
  – Link community members to mentor
  – Link mentor with Health System through Community Care Coordinators
Software to support Social Networking assessment and management
NIH Center of Excellence (U54)
Systems-related Pediatric Obesity Research & Training

Youfa Wang
Larry Cheskin
Josh Epstein
Joel Gittelsohn
Tom Glass
Shiriki Kumanyika
Tak Igusa

Systems Science
Nutrition
Economics
Biology
GIS
Sociology
Statistics
Epidemiology
Example center project: Intervention in Baltimore inner-city neighborhoods

- Wholesale
- Grocers
- Carryouts
- Rec centers
- Households
- Caregivers
- Child
- Obesity

- Food energy flow
- Control valve
- Regulatory input

- Health Dept

Example center project: Intervention in Baltimore inner-city neighborhoods
Disconnected Healthcare Delivery

Neighborhood Climate

- Poor health behaviors
- Unaddressed social needs
- Low self-esteem

Chronic disease treatment

Community Healthcare Provider

Hospital

High-cost ER admits

Individual

Outcomes

Capacity

Peer

Low capacity
Poor outcomes
Model Development: Community-Outreach

Community Healthcare Provider
- CCC Supervisor
- Nurse Care Manager
- Community Care Coordinator
- Certified Medical Assistant

Hospital

Integrated Primary care

Individual Outcomes
Capacity
Social Networking

Neighborhood Climate
Leveraged social strengths

Shared responsibility

Improved health behaviors

Community Healthcare Provider

Hospital

CCC Supervisor

Nurse Care Manager

Community Care Coordinator

Certified Medical Assistant

Mentor

Peer

Individual

Outcomes

Capacity

Peer Influence

Shared responsibility

Social Networking

Neighborhood Climate
Leveraged social strengths

Improved health behaviors

Community Healthcare Provider

Hospital

CCC Supervisor

Nurse Care Manager

Community Care Coordinator

Certified Medical Assistant

Mentor

Peer

Individual

Outcomes

Capacity

Peer Influence
Health Informatics

Diagram showing various healthcare roles and their interactions:
- Community Healthcare Provider
- CCC Supervisor
- Community Care Coordinator
- Nurse Care Manager
- Certified Medical Assistant
- Mentor
- Peer
- Individual
- Outcomes
- Hospital

Exchange of Health Information
Community-Based Care Management

Tiered Levels of Care

Community Healthcare Provider

CCC Supervisor
Community Care Coordinator

Nurse Care Manager
Certified Medical Assistant

Mentor
Peer

Individual

Outcomes

Capacity
Financial Assessment

- Community Healthcare Provider
  - CCC Supervisor
  - Community Care Coordinator
    - Mentor
    - Peer
  - Nurse Care Manager
  - Certified Medical Assistant
    - Individual
      - Capacity
      - Outcomes

- Hospital
- Medicaid, Health Plans
Coordinated Research

Participants

- JHU Academic Divisions
- APL
- JH Hospital
- JH HealthCare
- JH Community Physicians

Community-Based Participatory Research

Health Informatics

Financial Assessment

Systems Modeling

Funding Sources

- NIH
- RWJF
- CMS
I. Information for Health
Create new information system platform for “Apps” development (e.g., iPad;). Wraps around EPIC; Health experts enabled to create tools for population and patient decision support; IT products that extend the reach of JHM experts

II. Collaborative Communities for Health
Combine knowledge from clinical research and clinical care; Each JHM participant/patient benefits from all who came before and benefits all who come after; Bioethics framework; Novel clinical research designs for learning; JHM clinical care cohorts using JHM “apps”

III. Bioscience Discovery to Advance Health
Invest in infrastructure to support bioscience discovery: genomics; epigenomics; computational biology;...
JHU Health Measurement Laboratory; Pasteur’s Quadrant

IV. Organizational Models for Affordable Health
Apply HiH principles, methods, and tools to improve patient and population health at more affordable costs.
Johns Hopkins populations
DoD populations

Cancer Screening

Brain Imaging

Autoimmune Disease

Obesity/Diabetes
Notional “Health Track” Process

**Patient A**
- Birth data or new patient in system
- Medical test data and lifestyle factors
- Checkup
- Smoothed data based on population
- Medical issues
- Remedial therapy
- Continued follow-up
- Projected health trend

**Patient B**
- Initial data
- Diagnosis of heart condition
- Monitoring
- Surgery
- Projected health trend

[Logos and affiliations, including Johns Hopkins University and Applied Physics Laboratory]
Concluding Hypotheses

1. New solution approaches can result from collaboration involving diverse perspectives and expertise

2. System modeling may provide insights to more effectively address medical needs in a social determinants context

3. Hopkins *in*Healthcare Initiative can facilitate

*The work continues ...*