Leveraging Data for Public Health

Dialogue for Health Series
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FIGURE 1—A schematic definition of the field of population health.
Efforts at Integration

Figure 1. IHI Population Health Composite Model

Interventions

Social factors contribute up to 60% of premature death.
Do patient electronic health records (EHRs) provide the information to know how to reduce unexpected readmissions?
Creating a composite of Social Determinants of Health for the State of Illinois

The Challenge
Making data meaningful at the level of communities to assess health needs and respond to those needs while at the same time Incentivizing individuals in the communities to engage with such data to produce actionable insights.

The Solution
To achieve this balance, data must be meaningful at the population level for resource allocation AND at the individual level for prevention or cure.

Any solution must combine both upstream and downstream data.

UPSTREAM SIGNALS
- Social environment
- Physical infrastructure
- Workplace issues
- Health behavior maps
- Etc.....

OTHER PUBLIC HEALTH DATASETS
- Procedures at county/community level
- Prescription drugs and claim counts
- Health and fitness access

Health Insights and Needs Assessment at Community Level
## TOP APR-DRGs Resulting in 30-day Readmission Chains

<table>
<thead>
<tr>
<th>State</th>
<th>State Medicare FFS</th>
<th>State Medicaid FFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Heart Failure</td>
<td>Heart Failure</td>
</tr>
<tr>
<td>2</td>
<td>Bipolar Disorders</td>
<td>Septicemia &amp; Disseminated Infections</td>
</tr>
<tr>
<td>3</td>
<td>Septicemia &amp; Disseminated Infections</td>
<td>Chronic Obstructive Pulmonary Disease</td>
</tr>
<tr>
<td>4</td>
<td>Chronic Obstructive Pulmonary Disease</td>
<td>Other Pneumonia</td>
</tr>
<tr>
<td>5</td>
<td>Major Depressive Disorders &amp; Other/Unspecified Psychoses</td>
<td>Cardiac Arrhythmia &amp; Conduction Disorders</td>
</tr>
</tbody>
</table>
The Population Health Stratification

- **High Risk**
  - Complex Diseases and Comorbidities
  - 5%

- **Moderate Risk**
  - One or Several Chronic Diseases
  - 15-30%

- **Low Risk**
  - No Chronic Conditions
  - 60-80%

- **Aggressive Case Management**
  - Require Case Management to drive down utilization of high cost services and improve health

- **Active Care Coordination**
  - One or several chronic diseases. PCMH with care coordination to improve management of chronic conditions

- **Preventive Health**
  - Low Utilization of health care services. Focus on preventive health and health system loyalty

Increasing Complexity

Increasing Utilization And Cost
Super Utilizers

Diabetic Visit - 20 MINUTES

July 2015

120,690
2,016 Hrs

Not in the Office

September 2015

Diabetic Visit - 20 MINUTES
Geographic Clustering Lower Extremity
Using CHW to decrease complications from Diabetes

Constructing a data infrastructure for understanding diabetes in Chicago

Childhood Asthma Gaps in Outcomes Trials
CHICAGO Trials

homes visits to reduce asthma triggers resulting in ED visits

Combining resources to achieve meaningful use of electronic health records

Using CHW to decrease complications from Diabetes
Predictive Analytics Arc
Prediction in Action - Lead

Prediction Saves Time & Money

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Buildings</th>
<th>Time</th>
<th>Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Predictive Model</td>
<td>197,157</td>
<td>76 Years</td>
<td>$98 M</td>
</tr>
<tr>
<td>Current Model</td>
<td>42,695</td>
<td>16.4 Years</td>
<td>$21.3 M</td>
</tr>
<tr>
<td>Model Forecast</td>
<td>378</td>
<td>2 Months</td>
<td>$189,000</td>
</tr>
</tbody>
</table>
Solution to finding food poisoning and taking action on Twitter
Can Angry Tweets Predict Heart Disease
Natural Language Processing
Big Data, Social Media, Claims Data
The Opportunity Before Us

Charitable Contributions
Chicago Hospitals, 2011

- Medicare / Medicaid Shortfalls: $501,490,973 (35%)
- Free Care: $479,151,189 (33%)
- Medical Education: $208,776,483 (14%)
- Community Health Services: $88,032,949 (6%)
- Research: $108,244,032 (7%)
- Donations & Volunteerism: $49,978,910 (3%)
- Language Services: $6,637,200 (1%)
THANK YOU