The Value of Public Health: Strong Public Health Systems and Health Outcomes

Glen P. Mays, University of Kentucky

Available at: https://works.bepress.com/glen_mays/272/
The Value of Public Health: Strong Public Health Systems and Health Improvement

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publichealtheconomics.org
Ripped from the headlines

U.S. LIFE EXPECTANCY FALLS

<table>
<thead>
<tr>
<th></th>
<th>Both sexes</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>78.8</td>
<td>76.3</td>
<td>81.2</td>
</tr>
<tr>
<td>2014</td>
<td>78.9</td>
<td>76.5</td>
<td>81.3</td>
</tr>
</tbody>
</table>

SOURCE: CDC
Jim Sergent, USA TODAY

Published December 8, 2016
Losing ground in population health

Case A, Deaton A. Proceedings of the National Academy of Sciences 2015
But poor health is not uniformly poor among the poor

Chetty et al. JAMA 2016
Multiple systems & sectors drive health...

Proportional Contribution to Premature Death

- Genetic predisposition: 30%
- Behavioral patterns: 40%
- Social circumstances: 15%
- Environmental exposure: 5%
- Health care: 10%

...But existing systems often fail to connect

**Medical Care** ↔ **Social Services & Supports** ↔ **Public Health**

- Fragmentation
- Duplication
- Variability in practice
- Limited accessibility
- Episodic and reactive care
- Insensitivity to consumer values & preferences
- Limited targeting of resources to community needs

- Fragmentation
- Variability in practice
- Resource constrained
- Limited reach
- Insufficient scale
- Limited public visibility & understanding
- Limited evidence base
- Slow to innovate & adapt

**Waste & inefficiency**

**Inequitable outcomes**

**Limited population health impact**
How do we support effective population health improvement strategies?

- Designed to achieve large-scale health improvement: neighborhood, city/county, region

- Target fundamental and often multiple determinants of health

- Mobilize the collective actions of multiple stakeholders in government & private sector
  - Infrastructure
  - Information
  - Incentives

Public health provides the catalytic functions to fuel multi-sector actions in health

Foundational Population Health Capabilities

Engage stakeholders

Assess needs & risks

Identify evidence-based actions

Develop shared priorities & plans

Commit shared resources & responsibilities

Coordinate Implementation

Monitor, evaluate, feedback

Comprehensive Public Health Systems
One of RWJF’s Culture of Health National Metrics

- Implement a **broad scope** of population health activities
- Through **dense networks** of multi-sector relationships
- Including **central actors** to coordinate actions

Access to public health

Overall, 47.2 percent of the population is covered by a comprehensive public health system. Individuals are more likely to have access if they are non-White (51.5 percent vs. 45.5 percent White) or live in a metropolitan area (48.7 percent vs. 34.1 percent in nonmetropolitan areas).

What do we know about multi-sector work in population health?

National Longitudinal Survey of Public Health Systems

- Cohort of 360 communities with at least 100,000 residents
- Local public health officials report:
  - **Scope**: availability of 20 recommended population health activities
  - **Network**: organizations contributing to each activity
  - **Centrality of effort**: contributed by governmental public health agency
  - **Quality**: perceived effectiveness of each activity

** Expanded sample of 500 communities<100,000 added in 2014 wave
Variation in implementing foundational population health activities

National Longitudinal Survey of Public Health Systems
Mapping who contributes to population health

Node size = degree centrality
Line size = % activities jointly contributed (tie strength)

Network density and scope of activities

Density of Contributing Organizations

Proportion of Activities Contributed

Comprehensive Systems

- 1998
- 2014
### Classifying multi-sector delivery systems for population health 1998-2014

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Cluster 1</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>Cluster 2</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>Cluster 3</td>
<td>High</td>
<td>High</td>
<td>Mod</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>Cluster 4</td>
<td>Mod</td>
<td>High</td>
<td>Mod</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
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<tr>
<td>Cluster 5</td>
<td>Mod</td>
<td>High</td>
<td>Low</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>Cluster 6</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>Cluster 7</td>
<td>Low</td>
<td>Low</td>
<td>Mod</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
<td>30%</td>
</tr>
</tbody>
</table>

#### Key
- **Comprehensive (High System Capital)**
- **Conventional**
- **Limited**
Health effects attributable to multi-sector work

Impact of Comprehensive Systems on Mortality, 1998-2014

Fixed-effects instrumental variables estimates controlling for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. N=1019 community-years

- All-cause: -7.1%, p=0.08
- Heart disease: -24.2%, p<0.01
- Diabetes: -22.4%, p<0.05
- Cancer: -14.4%, p=0.07
- Influenza: -35.2%, p<0.05
- Residual: +4.3%, p=0.55
Economic effects attributable to multi-sector work

Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. N=1019 community-years. Vertical lines are 95% confidence intervals.
Economic effects attributable to multi-sector work

Impact of Comprehensive Systems on Life Expectancy by Income (Chetty), 2001-2014

Models also control for racial composition, unemployment, health insurance coverage, educational attainment, age composition, and state and year fixed effects. N=1019 community-years. Vertical lines are 95% confidence intervals.
Making the case for equity: larger gains in low-resource communities

Effects of Comprehensive Population Health Systems in Low-Income vs. High-Income Communities

Log IV regression estimates controlling for community-level and state-level characteristics

Mortality
Medical costs
95% CI
How much do foundational capabilities cost?

- A. Cost at current attainment level
- B. Projected cost of full attainment
- C. Unmet resource gap

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### How much do foundational capabilities cost?

<table>
<thead>
<tr>
<th>FPHS Domain</th>
<th>Current Resource Use</th>
<th></th>
<th>Expected Costs of Full Attainment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>5th</td>
<td>95th</td>
<td>Coef. Var.</td>
</tr>
<tr>
<td><strong>Foundational Capabilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Assessment</td>
<td>1.70</td>
<td>0.45</td>
<td>3.18</td>
<td>48.8%</td>
</tr>
<tr>
<td>Emergency Preparedness</td>
<td>2.57</td>
<td>0.66</td>
<td>4.91</td>
<td>50.6%</td>
</tr>
<tr>
<td>Communication</td>
<td>0.63</td>
<td>0.02</td>
<td>0.22</td>
<td>50.8%</td>
</tr>
<tr>
<td>Policy Development</td>
<td>1.52</td>
<td>0.35</td>
<td>3.00</td>
<td>53.3%</td>
</tr>
<tr>
<td>Community Partnerships</td>
<td>2.22</td>
<td>0.52</td>
<td>4.37</td>
<td>53.2%</td>
</tr>
<tr>
<td>Org. Competencies</td>
<td>9.82</td>
<td>4.38</td>
<td>15.39</td>
<td>34.1%</td>
</tr>
<tr>
<td>Total Foundational Capabilities</td>
<td>18.46</td>
<td>11.99</td>
<td>25.20</td>
<td>21.7%</td>
</tr>
<tr>
<td><strong>Foundational Areas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicable Disease</td>
<td>3.40</td>
<td>1.11</td>
<td>5.94</td>
<td>43.2%</td>
</tr>
<tr>
<td>Chronic Disease/Injury Prevention</td>
<td>3.30</td>
<td>0.85</td>
<td>6.26</td>
<td>50.0%</td>
</tr>
<tr>
<td>Environmental/Occupational Health</td>
<td>7.49</td>
<td>2.92</td>
<td>13.34</td>
<td>42.7%</td>
</tr>
<tr>
<td>Maternal Child Health</td>
<td>10.93</td>
<td>3.03</td>
<td>20.16</td>
<td>47.8%</td>
</tr>
<tr>
<td>Access/Linkage to Clinical Care</td>
<td>4.56</td>
<td>1.10</td>
<td>8.82</td>
<td>51.8%</td>
</tr>
<tr>
<td>Total Foundational Areas</td>
<td>29.68</td>
<td>18.84</td>
<td>41.37</td>
<td>23.2%</td>
</tr>
<tr>
<td><strong>TOTAL FPHS</strong></td>
<td>48.14</td>
<td>35.32</td>
<td>61.50</td>
<td>16.4%</td>
</tr>
</tbody>
</table>

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Estimating ROI

Establishing strong PH systems across the U.S.:

- Produce 1.5M additional life-years
- Require $10.9B in additional spending
- Cost $7335 per life-year gained
- Offset by reductions in medical care spending
  - 1.6 percentage point reduction in hospital uncompensated care costs = $2B in offsets

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# Getting to sustainable financing

<table>
<thead>
<tr>
<th>Structural element</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Strong multi-sector governance model</td>
<td>Do I have a seat at the table?</td>
</tr>
<tr>
<td>2. Clear goals, activities, division of responsibility</td>
<td>What are we buying?</td>
</tr>
<tr>
<td>3. Clarity on implementation costs</td>
<td>What is the investment?</td>
</tr>
<tr>
<td>4. Credible estimates of health &amp; economic outcomes</td>
<td>What are the returns?</td>
</tr>
<tr>
<td>5. Robust evaluation and monitoring systems</td>
<td>How will we know success?</td>
</tr>
</tbody>
</table>

**Willingness to Pay**
Financing sources & models

- Dedicated state and local government allocations (CO, OH, OR, WA)
- Medicaid administrative match/claiming (ME, AR, OR)
- Hospital community benefit allocations (MA, ME, MI)
- AHC/ACO shared savings models (WA, MN)
- Community health trusts (MA)
- Public/private joint ventures (KY, OH, NC)
Conclusions: What we know and still need to learn

- Large potential benefits of system integration
- Inequities in integration are real & problematic
- Integration requires support
  - Infrastructure
  - Institutions
  - Incentives
- Sustainability and resiliency are not automatic
Act on aligned incentives

Exploit the disruptive policy environment

Innovate, prototype, study – then scale

Pay careful attention to shared governance, decision-making, and financing structures

Demonstrate value and accountability to the public