Preventable Death Rates Fell Where Communities Expanded Population Health Activities through Multi-sector Networks

Glen P. Mays, University of Kentucky
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Glen Mays, PhD, MPH
Cezar Mamaril, PhD
Lava Timsina, MS
University of Kentucky

glen.mays@uky.edu
@GlenMays
publichealtheconomics.org

Systems for Action
National Coordinating Center
Systems and Services Research to Build a Culture of Health
Defining Population Health

- 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 and sectors
  - Infrastructure
  - Information
  - Incentives

Widely recommended activities to support multi-sector initiatives in population health

Foundational Capabilities for Population Health

- Engage stakeholders
- Assess needs & risks
- Identify evidence-based actions
- Develop shared priorities & plans
- Monitor, evaluate, feed back
- Commit shared resources & responsibilities

Measuring implementation of recommended population health activities

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 density**: organizations contributing to each activity
  - **Network centrality**: distribution of effort across organizations
Defining Comprehensive Delivery Systems for Population Health Activities

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

One of RWF’s Culture of Health Metrics

**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).

Estimating health outcomes associated with population health delivery systems

- **Outcomes**: all-cause mortality and deaths due to heart disease, diabetes, cancer, influenza, infant mortality, and residual
- **Exposure**: communities with/without a comprehensive system
- **Controls**: population size and density, metropolitan area designation, income per capita, unemployment, poverty rate, racial composition, age distribution, physician and hospital availability, insurance coverage, state and year fixed effects.
- **Estimation**: panel regression with fixed and random effects to account for repeated measures and clustering of communities within states
  - Two-stage instrumental-variables model to estimate effect of system changes on mortality rates (residual inclusion method)
- **N=1019 community-years**
Organizational contributions to population health activities, 1998-2014

<table>
<thead>
<tr>
<th>Type of Organization</th>
<th>1998</th>
<th>2014</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local public health agencies</td>
<td>60.7%</td>
<td>67.5%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Other local government agencies</td>
<td>31.8%</td>
<td>33.2%</td>
<td>4.4%</td>
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<tr>
<td>State public health agencies</td>
<td>46.0%</td>
<td>34.3%</td>
<td>-25.4%</td>
</tr>
<tr>
<td>Other state government agencies</td>
<td>17.2%</td>
<td>12.3%</td>
<td>-28.8%</td>
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<tr>
<td>Federal government agencies</td>
<td>7.0%</td>
<td>7.2%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Hospitals</td>
<td>37.3%</td>
<td>46.6%</td>
<td>24.7%</td>
</tr>
<tr>
<td>Physician practices</td>
<td>20.2%</td>
<td>18.0%</td>
<td>-10.6%</td>
</tr>
<tr>
<td>Community health centers</td>
<td>12.4%</td>
<td>29.0%</td>
<td>134.6%</td>
</tr>
<tr>
<td>Health insurers</td>
<td>8.6%</td>
<td>10.6%</td>
<td>23.0%</td>
</tr>
<tr>
<td>Employers/businesses</td>
<td>16.9%</td>
<td>15.3%</td>
<td>-9.6%</td>
</tr>
<tr>
<td>Schools</td>
<td>30.7%</td>
<td>25.2%</td>
<td>-17.9%</td>
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<tr>
<td>Universities/colleges</td>
<td>15.6%</td>
<td>22.6%</td>
<td>44.7%</td>
</tr>
<tr>
<td>Faith-based organizations</td>
<td>19.2%</td>
<td>17.5%</td>
<td>-9.1%</td>
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<tr>
<td>Other nonprofit organizations</td>
<td>31.9%</td>
<td>32.5%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Other</td>
<td>8.5%</td>
<td>5.2%</td>
<td>-38.4%</td>
</tr>
<tr>
<td>Comprehensive systems (prevalence)</td>
<td>24.2%</td>
<td>39.5%</td>
<td>63.2%</td>
</tr>
</tbody>
</table>
Mortality reductions associated with comprehensive systems 1998-2014

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
Conclusions and implications

- Large health gains accrue to comprehensive systems.
- Dense collaborative networks do more than just plan: prioritize, invest, evaluate, repeat (crowd-sourcing).
- Equity and opportunity: two-thirds of communities currently lack comprehensive systems.
- ACA incentives and resources may help:
  - Hospital community benefit
  - Value-based health care payments
  - Insurer and employer incentives
  - Public health agency accreditation
- Sustainability and resiliency are not automatic.