Winter February 2, 2015

Improving Measures of Public Health Activity at Local and State Levels: The Multi-Network Practice and Outcome Variation Examination Study (MPROVE)

Glen P. Mays, University of Kentucky

Available at: https://works.bepress.com/glen_mays/193/
Improving Measures of Public Health Activity at Local and State Levels:

The Multi-Network Practice and Outcome Variation Examination Study (MPROVE)

Glen Mays, PhD, MPH
University of Kentucky

glen.mays@uky.edu

ASTHO Performance Policy Committee | 2 February 2015
Multi-Network Practice and Outcome Variation Examination Study (M PROVE)

- Identify implementation measures high-value services:
  - Chronic disease prevention
  - Communicable disease control
  - Environmental health protection

- Create registry of measures: consistent across communities

- Profile geographic variation in the delivery of selected public health services across local communities

- Decompose variation into attributable components:
  - need-sensitive or preference-sensitive factors
  - supply-sensitive factors

- Examine associations between service delivery & outcomes
Diffusion of Public Health PBRNs

- First cohort (December 2008 start-up)
- Second cohort (January 2010 start-up)
- Affiliate/Emerging PBRNs (2011-14)
## Participating MPROVE networks

<table>
<thead>
<tr>
<th>Network</th>
<th>State Agencies</th>
<th>Local Agencies*</th>
<th>Academic Units</th>
<th>Other</th>
<th>Total</th>
<th>Lead Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>1</td>
<td>55</td>
<td>2</td>
<td>15</td>
<td>73</td>
<td>Association</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>67</td>
<td>3</td>
<td>3</td>
<td>74</td>
<td>Local agency</td>
</tr>
<tr>
<td>MN</td>
<td>1</td>
<td>75</td>
<td>1</td>
<td>1</td>
<td>78</td>
<td>State agency</td>
</tr>
<tr>
<td>WA</td>
<td>1</td>
<td>36</td>
<td>2</td>
<td>1</td>
<td>40</td>
<td>Local agency</td>
</tr>
<tr>
<td>NJ</td>
<td>1</td>
<td>100</td>
<td>2</td>
<td>1</td>
<td>104</td>
<td>Academic</td>
</tr>
<tr>
<td>TN</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>20</td>
<td>Academic</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>337</td>
<td>12</td>
<td>22</td>
<td>371</td>
<td></td>
</tr>
</tbody>
</table>
MPROVE measurement dimensions

- **Availability/Scope:** specific activities produced
- **Volume/Intensity:** Frequency of producing activity over period of time
- **Capacity:** Labor and capital inputs assigned to an activity
- **Reach:** Proportion of target population reached by activity
- **Quality:** effectiveness, timeliness, equity of activity
- **Efficiency:** resources required to produce given volume of activity
Levels of Measurement

- **Community Level**: Includes services/activities regardless of who performs/contributes

- **Agency Level**: Focuses on activities directly contributed by governmental public health agency
Measure Selection Criteria

- Expected health impact
- Expected economic impact
- Control/influence by local public health agencies and their partners
- Pre-existing evidence of validity and reliability
- Feasibility of obtaining data
Example: Delphi Rating of Measures

Chronic Disease Measures: Feasibility x Health Impact Ratings
Final MPROVE Measures

- **Chronic disease prevention (8 measures)**
  - Tobacco prevention
  - Obesity prevention

- **Communicable disease control (14 measures)**
  - Immunization
  - Enteric disease control
  - STI control
  - Tuberculosis control

- **Environmental health protection (5 measures)**
  - Lead exposure protection
  - Food safety protection

http://works.bepress.com/glen_mays/82/
Analytic Methods

- MPROVE data linked with 2013 NACCHO Profile data on agency characteristics, and 2013 ARF data on community characteristics.

- Hierarchical random and fixed effects models to identify patterns and correlates of variation.

- Variance decomposition analysis to identify relative strength of institutional and community factors in explaining local variation.
Proportion of local settings reporting MPROVE measures
Local Health Department Resources Allocated to Promoting Physical Activity, Per Capita

<table>
<thead>
<tr>
<th></th>
<th>CO</th>
<th>FL</th>
<th>MN</th>
<th>NJ</th>
<th>TN</th>
<th>WA</th>
<th>6-States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>29%</td>
<td>35%</td>
<td>53%</td>
<td>52%</td>
<td>100%</td>
<td>67%</td>
<td>46%</td>
</tr>
<tr>
<td>If &gt;0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>0.07</td>
<td>0.03</td>
<td>0.00</td>
<td>0.00</td>
<td>0.17</td>
<td>0.10</td>
<td>0.00</td>
</tr>
<tr>
<td>25th pctle</td>
<td>0.10</td>
<td>0.05</td>
<td>0.13</td>
<td>0.04</td>
<td>0.17</td>
<td>0.16</td>
<td>0.08</td>
</tr>
<tr>
<td>50th pctle</td>
<td>0.47</td>
<td>0.24</td>
<td>0.33</td>
<td>0.08</td>
<td>0.17</td>
<td>0.31</td>
<td>0.19</td>
</tr>
<tr>
<td>Mean</td>
<td>5.30</td>
<td>0.80</td>
<td>1.30</td>
<td>0.54</td>
<td>0.17</td>
<td>0.57</td>
<td>1.52</td>
</tr>
<tr>
<td>75th pctle</td>
<td>1.94</td>
<td>0.43</td>
<td>0.95</td>
<td>0.19</td>
<td>0.17</td>
<td>0.62</td>
<td>0.48</td>
</tr>
<tr>
<td>Maximum</td>
<td>47.11</td>
<td>5.29</td>
<td>18.37</td>
<td>8.96</td>
<td>0.17</td>
<td>2.27</td>
<td>47.11</td>
</tr>
</tbody>
</table>
Implementation of community-wide health education campaigns to promote physical activity

6 states

CO
FL
MN
NJ
WA
TN
Implementation of clean indoor air policy enforcement activities

- Violations
- Investigations
- Citations/fines
- All
- Any

FL, MN, NJ, TN, WA, 6-States
### Agency implementation of services/supports to reduce tobacco use and/or exposure

<table>
<thead>
<tr>
<th>Activity</th>
<th>CO</th>
<th>FL</th>
<th>MN</th>
<th>NJ</th>
<th>TN</th>
<th>WA</th>
<th>6-States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agencies providing tobacco services &amp; supports (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Educational materials</td>
<td>90%</td>
<td>89%</td>
<td>73%</td>
<td>80%</td>
<td>100%</td>
<td>83%</td>
<td>83%</td>
</tr>
<tr>
<td>2 Educational media</td>
<td>56%</td>
<td>66%</td>
<td>40%</td>
<td>17%</td>
<td>100%</td>
<td>28%</td>
<td>41%</td>
</tr>
<tr>
<td>3 Cultural/linguistic specific materials</td>
<td>60%</td>
<td>62%</td>
<td>25%</td>
<td>41%</td>
<td>0%</td>
<td>31%</td>
<td>44%</td>
</tr>
<tr>
<td>4 Cultural/linguistic specific programs</td>
<td>60%</td>
<td>81%</td>
<td>48%</td>
<td>38%</td>
<td>100%</td>
<td>28%</td>
<td>52%</td>
</tr>
<tr>
<td>5 Educational/training programs</td>
<td>42%</td>
<td>45%</td>
<td>8%</td>
<td>16%</td>
<td>0%</td>
<td>10%</td>
<td>24%</td>
</tr>
<tr>
<td>6 Community development</td>
<td>37%</td>
<td>81%</td>
<td>48%</td>
<td>41%</td>
<td>100%</td>
<td>52%</td>
<td>51%</td>
</tr>
<tr>
<td>7 Policy development</td>
<td>44%</td>
<td>79%</td>
<td>56%</td>
<td>46%</td>
<td>50%</td>
<td>41%</td>
<td>53%</td>
</tr>
<tr>
<td>8 Policy implementation</td>
<td>44%</td>
<td>30%</td>
<td>--</td>
<td>45%</td>
<td>100%</td>
<td>41%</td>
<td>41%</td>
</tr>
<tr>
<td>9 Tobacco cessation programs</td>
<td>--</td>
<td>32%</td>
<td>--</td>
<td>9%</td>
<td>50%</td>
<td>17%</td>
<td>18%</td>
</tr>
<tr>
<td>10 Adult tobacco use surveillance</td>
<td>--</td>
<td>57%</td>
<td>--</td>
<td>13%</td>
<td>50%</td>
<td>28%</td>
<td>31%</td>
</tr>
<tr>
<td>11 Youth tobacco use surveillance</td>
<td>--</td>
<td>--</td>
<td>79%</td>
<td>12%</td>
<td>--</td>
<td>--</td>
<td>40%</td>
</tr>
<tr>
<td>Agencies providing all services/supports (%)</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Agencies providing any of the services/supports (%)</td>
<td>94%</td>
<td>96%</td>
<td>96%</td>
<td>87%</td>
<td>100%</td>
<td>90%</td>
<td>92%</td>
</tr>
<tr>
<td>Average number of services/supports offered (mean)</td>
<td>4.33</td>
<td>6.21</td>
<td>3.77</td>
<td>3.57</td>
<td>6.50</td>
<td>3.59</td>
<td>4.29</td>
</tr>
</tbody>
</table>
Average FTE staffing for communicable disease intervention specialists per 100,000 population
Average completion time for enteric disease investigations
Overall Patterns of Variation in Local Public Health Implementation

Estimates from random effects regression models
Correlates of Variation in Local Public Health Implementation

% of Total Variance

Estimates from state fixed-effects regression models
Preliminary Conclusions

- Wide variation in local availability of public health implementation measures
- Considerable within-state and between-state variation in implementation
- Patterns of variation are specific to domain & activity
- Institutional and community characteristics explain 30-50% of this variation
  - Harmful?
  - Wasteful?
  - Inequitable?
Additional Measure Validation

- Strong convergent and discriminant validity in 22 of 27 measures
- Moderate to strong predictive validity in 19 of 27 measures
- Problematic measures in tobacco, nutrition, physical activity are being revised and retested through follow-on study
Ongoing cross-state analyses

- Refining patterns & determinants of variation
  - Disentangling demand (need) from supply
  - System structure
  - Geospatial
  - Within and across domains of activity: composite measures

- Identifying population health correlates of variation
More information on the MPROVE Measures

MPROVE Final Measure Set
MPROVE Measure Specifications
MPROVE Research Protocol
MPROVE Data Acquisition Plan
MPROVE Measure Selection: Delphi Results
MPROVE Candidate Measure Inventory
MPROVE Measure Selection Criteria
MPROVE Comparative Report of Results
For More Information

Glen P. Mays, Ph.D., M.P.H.
glen.mays@uky.edu

Email: publichealthPBRN@uky.edu
Web: www.publichealthsystems.org
Journal: www.FrontiersinPHSSR.org
Archive: works.bepress.com/glen_mays
Blog: publichealththeconomics.org

Supported by The Robert Wood Johnson Foundation