Five Years of Measuring Health Security: Steady but Uneven Progress

Analytic Methodology and Model Design Virtual Workgroup Meeting
May 15, 2018

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www.nhspi.org
**Measurement: National Health Security Index**

- **140 individual measures, 59 data sources**
  - Weighted average
- **19 subdomains**
  - Weighted average
- **6 domains**
  - Weighted average
- **State overall values**
  - Unweighted average
- **National overall values**

- Normalized to 0-10 scale using min-max scaling to preserve distributions
- Imputations based on multivariate longitudinal models
- Empirical weights based on Delphi expert panels
- Bootstrapped confidence intervals reflect sampling and measurement error
- Annual estimates for 2013-2016

**Reliability by Domain**

<table>
<thead>
<tr>
<th>Reliability by Domain</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health security surveillance</td>
<td>0.712</td>
</tr>
<tr>
<td>Community planning &amp; engagement</td>
<td>0.631</td>
</tr>
<tr>
<td>Incident &amp; information management</td>
<td>0.734</td>
</tr>
<tr>
<td>Healthcare delivery</td>
<td>0.596</td>
</tr>
<tr>
<td>Countermeasure management</td>
<td>0.654</td>
</tr>
<tr>
<td>Environmental/occupational health</td>
<td>0.749</td>
</tr>
</tbody>
</table>
Steady progress, uneven pace

*statistically significant change
The U.S. improved in most domains during 2013-17, except healthcare delivery
Results

Geographic differences in health security are large and growing

2013

2014

2015

2016

2017

% increase from prior year
% decrease from prior year
Above national average
Within national average
Below national average

Above national average
Within national average
Below national average
A growing share of US residents live in regions with below-average health security
Gains in health security far surpassed losses

- National: +2.9%
- Lowest state (AK): +1.6%
- Highest state (MD): +3.9%
- Largest gain (NM): +7.8%
- Largest loss (WV): -1.5%

Index Value in 2016 and 2017
Improvements occurred across the U.S., but 12 states were steady or lost ground.
Changes in health security varied widely by domain

<table>
<thead>
<tr>
<th>Health Security Surveillance</th>
<th>Lowest state</th>
<th>National average</th>
<th>Highest state</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>US +1.3%</td>
<td>VT +8.2%</td>
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<tr>
<td></td>
<td></td>
<td>CO +0.0%</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Community Planning &amp; Engagement</th>
<th>Lowest state</th>
<th>National average</th>
<th>Highest state</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IA +0.0%</td>
<td>US +3.4%</td>
<td>VT +0.0%</td>
</tr>
</tbody>
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<table>
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<th>Incident &amp; Information Management</th>
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<th>National average</th>
<th>Highest state</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>US +6.0%</td>
<td>CO +22.8%</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>WV -5.3%</td>
</tr>
</tbody>
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<table>
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<th>National average</th>
<th>Highest state</th>
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<tbody>
<tr>
<td></td>
<td>AZ -2.7%</td>
<td>US +0.1%</td>
<td>DC -1.4%</td>
</tr>
</tbody>
</table>

<table>
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<th>Countermeasure Management</th>
<th>Lowest state</th>
<th>National average</th>
<th>Highest state</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>US +0.1%</td>
<td>RI +0.0%</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AK +3.5%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<th>Environmental &amp; Occupational Health</th>
<th>Lowest state</th>
<th>National average</th>
<th>Highest state</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WY +4.2%</td>
<td>US +0.1%</td>
<td>VA +1.2%</td>
</tr>
</tbody>
</table>

Index Value in 2016 and 2017
State transitions health security levels are common & bidirectional
Health security tracks closely with social & economic determinants of health

Percent of population below federal poverty threshold

Percent of population without health insurance coverage
Results

Health security levels vary inversely with the economic impact of past disasters
Results

Rural-Urban differences in health security

Percent of population residing in a state with below-average health security

Relative Risk: 23%*

*statistically significant difference
Underlying drivers: organizational participation in healthcare preparedness coalitions

The graph shows the percentage of organizations participating from 2013 to 2017, categorized by type:
- Hospitals
- EMS
- Local emergency management
- Local public health
Underlying drivers: community and systems

Communities with Strong Multi-Sector Networks (Comprehensive Public Health Systems)

Results

*statistically significant difference
Underlying drivers: occupational

Percent of workers with paid sick leave and telecommuting opportunities

*statistically significant change
Conclusions & Implications

- National progress is clear, can we accelerate & spread?
- Geographic stratification is a vulnerability -- address geographic differences with regional partnerships
- Networks and coalitions are key drivers
- Private sector contributions are important
- Social determinants matter
- Strengths & weaknesses are state-specific, flexibility and tailoring are key
- Better data & measures are needed
Caveats and cautions

- Imperfect measures & latent constructs
- Timing and accuracy of underlying data sources
- Unobserved within-state heterogeneity
- Observational, not causal, estimates
- Trends limited to 5 years
Downscaling the Index

- Improve salience for local communities
- Highlight geographic distribution of capabilities
- Examine correspondence of risks & capabilities
- Enhance opportunities for research & analysis
Key Challenges

- Availability of existing data sources
- Periodicity of data collection
- Geographic coverage of data
- Measurement validity and reliability
Next Steps

- Data reconnaissance this summer
- Territories as well as local
- Present “straw man” results in early fall at next workgroup meeting (September 18)
National Advisory Committee Members | 2017-18

Supported by the Robert Wood Johnson Foundation

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