Understanding Geographic Variation and Change in Health Security: Results from the 2018 National Index

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Understanding Geographic Variation and Change in Health Security: Results from the 2018 National Index

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Health security requires **collective actions** across many activities and sectors

- Surveillance
- Environmental monitoring
- Laboratory testing
- Communication systems
- Response planning
- Incident management
- Emergency response
- Surge capacity
- Management & distribution of countermeasures
- Continuity of healthcare delivery
- Community engagement
- Workforce protection
- Volunteer management
- Education & training
- Drills & exercises
- Information exchange
- Evacuation & relocation
- Infrastructure resiliency
- Protections for vulnerable populations
Why a Health Security Index?

Track national progress in health security as a shared responsibility across sectors

- Raise public awareness
- Identify strengths and vulnerabilities
- Detect gains and losses
- Encourage coordination & collaboration
- Facilitate planning & policy development
- Support benchmarking & quality improvement
- Stimulate research & innovation
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
  - Weighted average
  - 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

<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>
Methods & Data

Index measurement domains & subdomains

Overall Index Score

Health Security Surveillance
- Health Surveillance & Epidemiological Investigation
- Biological Monitoring & Laboratory Testing
  - Management of Volunteers during Emergencies
  - Social Capital & Cohesion
- Cross Sector Community Collaboration
- Children & Other At-Risk Populations

Community Planning & Engagement

Incident & Information Management
- Incident Management
- Information Management

Healthcare Delivery
- Prehospital Care
- Hospital & Physician Services
- Long-Term Care
- Mental & Behavioral Care
- Home Care

Countermeasure Management
- Medical Materiel Management, Distribution, & Dispensing
- Countermeasure Utilization & Effectiveness

Environmental & Occupational Health
- Food & Water Security
- Environmental Monitoring
- Occupational Health
- Built Environment
Steady but slow progress

*statistically significant change
Results

The U.S. improved in most domains during 2013-17, except healthcare delivery.
Geographic differences in health security are large and growing.
Gains in health security far surpassed losses

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

Improvements occurred across the U.S., but 12 states trailed or lost ground

Below national average  Within national average  Above national average

% Change from 2016

2017 Index Value
Changes in health security varied widely by domain

<table>
<thead>
<tr>
<th>Domain</th>
<th>Lowest state</th>
<th>National average</th>
<th>Highest state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Security Surveillance</td>
<td></td>
<td>US +1.3%</td>
<td>VT +8.2%</td>
</tr>
<tr>
<td>Community Planning &amp; Engagement</td>
<td>IA +0.0%</td>
<td>VT +0.0%</td>
<td></td>
</tr>
<tr>
<td>Incident &amp; Information Management</td>
<td></td>
<td>US +6.0%</td>
<td>CO +22.8%</td>
</tr>
<tr>
<td>Healthcare Delivery</td>
<td>AZ -2.7%</td>
<td>DC -1.4%</td>
<td></td>
</tr>
<tr>
<td>Countermeasure Management</td>
<td></td>
<td>US +0.1%</td>
<td>RI +0.0%</td>
</tr>
<tr>
<td>Environmental &amp; Occupational Health</td>
<td>WY +4.2%</td>
<td>VA +1.2%</td>
<td></td>
</tr>
</tbody>
</table>
Results

State transitions health security levels are common & bidirectional
Health security tracks closely with social & economic determinants of health

Results

Percent of population below federal poverty threshold

Percent of population without health insurance coverage
Health security levels vary inversely with the economic impact of past disasters.
Rural-Urban differences in health security

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

Relative Risk: 23%*

*statistically significant difference
Results

Underlying drivers: organizational

Participation in Healthcare Preparedness Coalitions

![Graph showing participation trends from 2013 to 2017 for Hospitals, EMS, Local emergency management, and Local public health.]
Results

Underlying drivers: community and systems

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

*statistically significant difference
Results

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?
- Networks and coalitions are key drivers
- Private sector contributions are important
- Social determinants matter
- Geographic stratification is a vulnerability
- 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
- Short panel
- Observational, not causal, estimates
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Visit or join an Index workgroup at [http://nhspi.org/get-involved/](http://nhspi.org/get-involved/)
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