Downscaling the National Health Security Index: A Think Tank on Methods and Approaches

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Available at: https://works.bepress.com/glen_mays/327/
National Health Security Preparedness Index

Think Tank on Local-Area Index Results
20 March 2018, 10:00 am – 4:00 pm ET
AcademyHealth, Washington, DC

Supported by the Robert Wood Johnson Foundation
Index Program Office - 111 Washington Avenue #201, Lexington, KY 40536
HealthSecurity@uky.edu
www.nhsi.org
Agenda

10:00 am  Welcome and Introductions
• Glen Mays, University of Kentucky
• Laura Biesiadecki and Meghan McGinty, National Association of County and City Health Officials
• Introduction of Participants

Key questions for the day

10:30 am  Lessons from related measurement initiatives

11:45 am  Selecting the local geographic unit for Index measures

12:30 pm  Break for lunch (provided)

1:00 pm  Relevance of Index constructs & measures to local audiences and stakeholders

2:00 pm  Missing locally-relevant Index constructs & measures

3:00 pm  What’s next, concluding thoughts

4:00 pm  Adjourn
Agenda: Key Questions for the Day

Key Questions for the Day

- Why downscale the Index for local areas?
- Key audiences and user groups?
- What constructs and measures to include?
- Methods for downscaling?
Why a Health Security Index?

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

- Identify strengths and vulnerabilities
- Detect gains and losses
- Encourage coordination & collaboration
- Facilitate planning & policy development
- Support benchmarking & quality improvement
- Stimulate research & innovation
A Brief History

2012
- **Collaborative Development**: CDC, ASTHO and collaborating organizations

12/2013
- **1st Release**: Initial model structure and results
  - 5 domains and 14 subdomains
  - 128 measures

12/2014
- **2nd Release**: Revised model and results
  - 6 domains and 18 active subdomains
  - Measures: 119 retained + 75 new = 194 measures

1/2015
- **Transition to Robert Wood Johnson Foundation**
  - Validation studies and revision to methodology & measures

4/2016
- **3rd Release**: Revised model and results
  - 6 domains & 19 active subdomains
  - Measures: 65% retained, 12% respecified, 8 new = 135 total
  - Valid comparisons over time + confidence intervals

4/2017
- **4th Release**: Refined model and results
  - Added District of Columbia
  - Measures: 4 dropped, 7 respecified, 8 new = 139 total
Overview of the National Health Security Preparedness Index

What the Index measures

- Health Security Surveillance
  - Health Surveillance & Epidemiological Investigation
  - Biological Monitoring & Laboratory Testing
  - Management of Volunteers during Emergencies
  - Social Capital & Cohesion

- Community Planning & Engagement
  - Cross-Sector / Community Collaboration
  - Children & Other At-Risk Populations

- Incident & Information Management
  - Incident Management & Multi-Agency Coordination
  - Emergency Public Information & Warning
  - Legal & Administrative

- Healthcare Delivery
  - Prehospital Care
  - Inpatient Care
  - Long-Term Care
  - Home Care

- Countermeasure Management
  - Medical Materiel Management, Distribution, & Dispensing
  - Countermeasure Utilization & Effectiveness
  - Non-Pharmaceutical Intervention

- Environmental & Occupational Health
  - Food & Water Security
  - Environmental Monitoring
Measurement: National Health Security Index

- 139 individual measures
  - 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

<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>
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<tr>
<td>Healthcare delivery</td>
<td>0.596</td>
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<td>Countermeasure management</td>
<td>0.654</td>
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<tr>
<td>Environmental/occupational health</td>
<td>0.749</td>
</tr>
</tbody>
</table>
Steady but slow progress

*statistically significant change
The U.S. improved in most domains during 2013-16, except healthcare delivery and environmental health

*statistically significant change
2017 Index Release Key Findings

Geographic disparities in health security are large and persistent

2013

2014

2016

2015

Above average
Within average
Below average
% Increase in year
% Decrease in year
Health security tracks closely with social & economic determinants of health.

Percent of population below federal poverty threshold

Percent of population with health insurance coverage

2017 Index Release Key Findings

National Health Security Preparedness Index
Underlying drivers: occupational

Percent of workers with paid sick leave and telecommuting opportunities

*statistically significant change
Underlying drivers: organizational
Participation in Healthcare Preparedness Coalitions

- Hospitals
- EMS
- Emergency management
- Public health

2013 2014 2015 2016
Underlying drivers: community and systems

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

*statistically significant difference
Why downscale the Index?

- Improve salience for local communities
- Highlight geographic distribution of capabilities
- Examine correspondence of risks & capabilities
- Enhance opportunities for research & analysis
2017 Index Release Analyses

Related local measurement tools

- **Baseline Resilience Indicators for Communities** (Cutter et al.)
- **Social Vulnerability Index** (Flannigan et al.)
- **County Health Rankings** (Remington et al.)

Beccari et al. 2016
Key Challenges

- Availability of existing data sources
- Periodicity of data collection
- Geographic coverage of data
- Measurement validity and reliability
Lessons from Other Initiatives

- Mike Stoto, Georgetown University
  - World Health Organization research

- Peter Howe, Utah State University
  - Downscaling measures of health security
What’s the right unit for downscaling the Index?

- Directly funded jurisdictions
- Metropolitan areas
- Counties
- Other?
Relevance of Index Constructs & Measures

Current Index Constructs & Measures

How relevant to local audiences and stakeholders?

- Index measures that are clearly relevant
- Index measures that are clearly not relevant
- Index measures that need additional work to become relevant
Index Constructs & Measures

What’s missing that is relevant to local audiences and stakeholders?

- Constructs?
- Data sources for measure?
- Methods for downscaling data to local jurisdiction level?
- What’s known about measure data validity and reliability?
Next Steps and Concluding Thoughts

- Thoughts on Next Steps for Developing Local-area Index Results
- Concluding Comments
Thank You for Your Participation!

For More Information
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