Health Management and Policy Presentations   Health Management and Policy

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Learning from Geographic Variation and Change in Preparedness: The 2016 National Health Security Preparedness Index

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Learning from Geographic Variation and Change in Preparedness:

The 2016 National Health Security Preparedness Index

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NATIONAL HEALTH SECURITY PREPAREDNESS INDEX

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Public Health & Disasters Conference | University of Utah
Provo, Utah ● 3 May 2016

UK
UNIVERSITY OF
KENTUCKY
see blue.

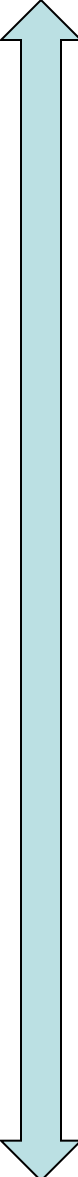# Why a Preparedness Index?

Increase awareness & understanding of preparedness as a shared responsibility of multiple sectors in government and society

- **Identify strengths and vulnerabilities**
- **Track progress**
- **Encourage coordination & collaboration**
- **Facilitate planning & policy development**
- **Support benchmarking & quality improvement**
- **Drive research & development**

A Brief History

2012
- **Collaborative Development**: Partnership led by CDC, ASTHO and >25 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
  - 119 retained + 75 new = 194 measures
  - 75% of retained measures have updated data

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 subdomains
  - 65% measures retained, 12% respecified, 8 new additions =134
  - 90% of retained measures have updated data from 2nd release

Current Index Structure

Overall Index Score					
Health Security Surveillance	**Community Planning & Engagement**	**Incident & Information Management**	**Healthcare Delivery**	**Countermeasure Management**	**Environmental & Occupational Health**
Health Surveillance & Epidemiological Investigation	Cross-Sector / Community Collaboration	Incident Management & Multi-Agency Coordination	Prehospital Care	Medical Materiel Management, Distribution, & Dispensing	Food & Water Security
Biological Monitoring & Laboratory Testing	Children & Other At-Risk Populations	Emergency Public Information & Warning	Inpatient Care	Countermeasure Utilization & Effectiveness	Environmental Monitoring
	Management of Volunteers during Emergencies	Legal & Administrative	Long-Term Care	Non-Pharmaceutical Intervention	
	Social Capital & Cohesion		Mental & Behavioral Healthcare		
			Home Care		

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2016 Methodological Enhancements

- ***Consolidation***: reduce correlated, redundant & noisy measures
- ***Composition***: expand social, environmental economic indicators of preparedness & resiliency
- ***Grouping & weighting:*** use empirical methods for internal consistency, discriminant power
- ***Scaling:*** reflect distributional properties
- ***Comparisons:*** address accuracy and uncertainty
- ***Trending***: apply new methods/measures retrospectively

2016 Changes in Measure Set

- 42 measures eliminated due to data periodicity >3 years
- 29 measures eliminated due to poor construct validity
- 22 measures respecified to improve construct validity
- 8 newly added measures

Construct Validity

Domain	2014 Alpha	2016 Alpha
Health security surveillance	0.377	0.712
Community planning & engagement	0.382	0.631
Incident & information management	0.455	0.734
Healthcare delivery	0.354	0.596
Countermeasure management	0.231	0.654
Environmental/occupational health	0.546	0.749

Staiger D, Dimick JB, Baser O, Fan Z and Birkmeyer JD. Empirically derived composite measures of surgical performance. Medical Care 2009;47: 226- 233. Hays RD, Hayashi T. Beyond internal consistency reliability: rationale and user's guide for multitrait analysis program on the microcomputer. Behavioral Research Methods 1990;22(2):167-75.

Current Index Structure and Methodology

- **134 individual measures**

  ↓ **Weighted average**

- **19 subdomains**

  ↓ **Weighted average**

- **6 domains**

  ↓ **Weighted average**

- **State overall values**

  ↓ **Unweighted average**

- **National overall values**

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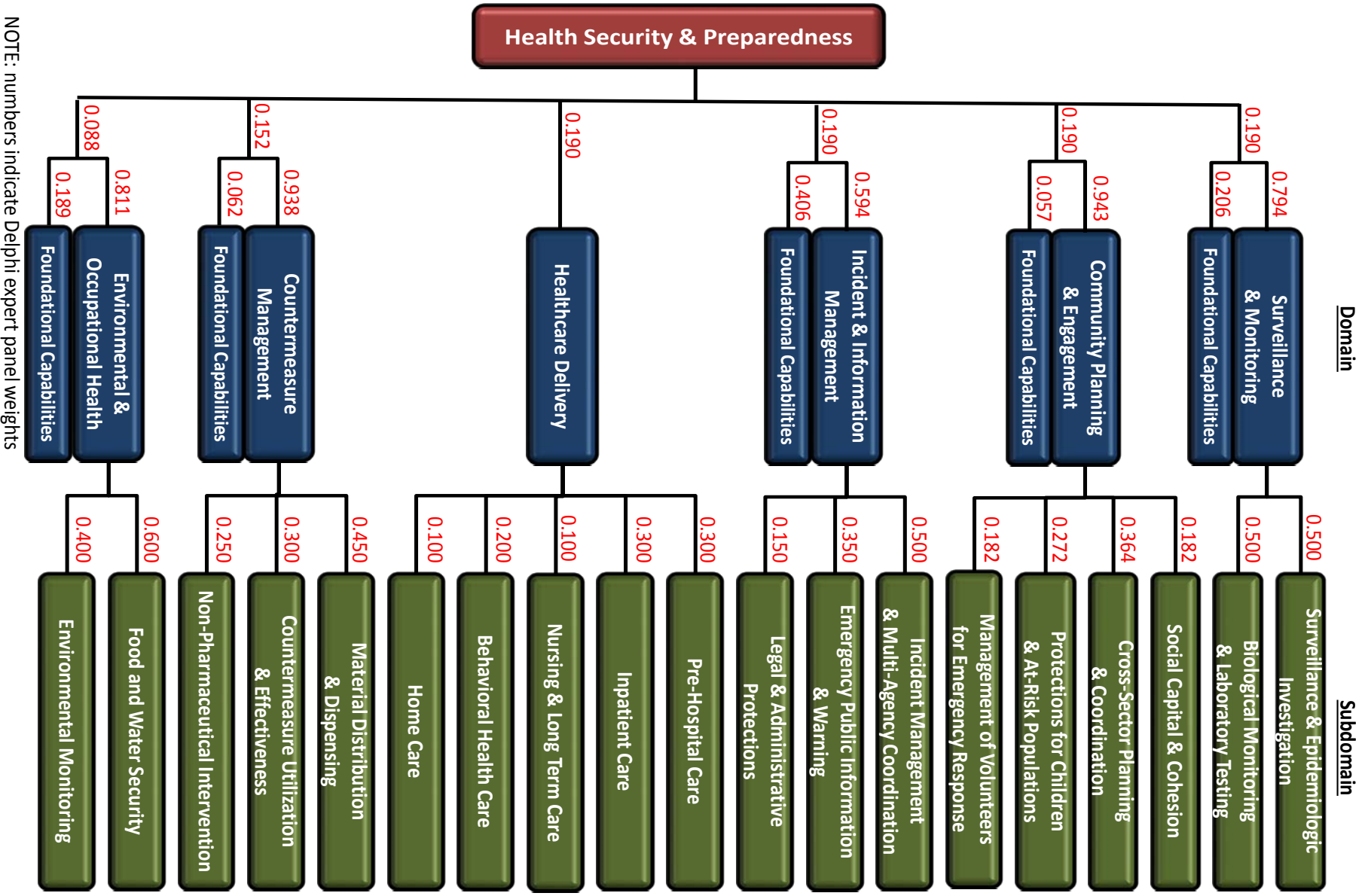
- Normalized to 0-10 scale using min-max scaling to preserve distributions

- 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, 2014 and 2015

NATIONAL SCORING
8.2 Highest State Result
6.5 Lowest State Result
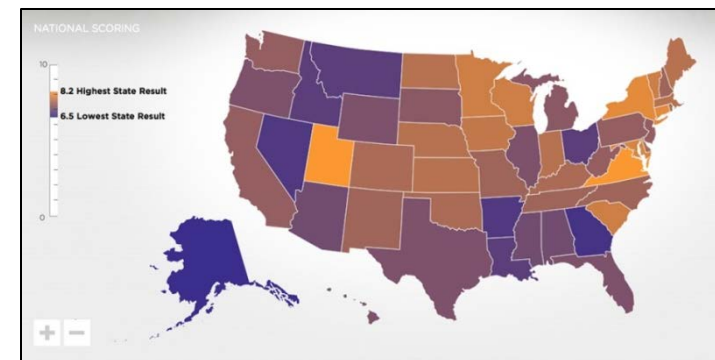
Index Delphi Weights & Foundational Capabilities

Health Security & Preparedness

NOTE: numbers indicate Delphi expert panel weights

Domain level:

- 0.088 — Environmental & Occupational Health
  - 0.189 Foundational Capabilities
  - 0.811 Environmental & Occupational Health
- 0.152 — Countermeasure Management
  - 0.062 Foundational Capabilities
  - 0.938 Countermeasure Management
- 0.190 — Healthcare Delivery
- 0.190 — Incident & Information Management
  - 0.406 Foundational Capabilities
  - 0.594 Incident & Information Management
- 0.190 — Community Planning & Engagement
  - 0.057 Foundational Capabilities
  - 0.943 Community Planning & Engagement
- 0.190 — Surveillance & Monitoring
  - 0.206 Foundational Capabilities
  - 0.794 Surveillance & Monitoring

Subdomain level:

- Environmental & Occupational Health
  - 0.400 Environmental Monitoring
  - 0.600 Food and Water Security
- Countermeasure Management
  - 0.250 Non-Pharmaceutical Intervention
  - 0.300 Countermeasure Utilization & Effectiveness
  - 0.450 Material Distribution & Dispensing
- Healthcare Delivery
  - 0.100 Home Care
  - 0.200 Behavioral Health Care
  - 0.100 Nursing & Long Term Care
  - 0.300 Inpatient Care
  - 0.300 Pre-Hospital Care
- Incident & Information Management
  - 0.150 Legal & Administrative Protections
  - 0.350 Emergency Public Information & Warning
  - 0.500 Incident Management & Multi-Agency Coordination
- Community Planning & Engagement
  - 0.182 Management of Volunteers for Emergency Response
  - 0.272 Protections for Children & At-Risk Populations
  - 0.364 Cross-Sector Planning & Coordination
  - 0.182 Social Capital & Cohesion
- Surveillance & Monitoring
  - 0.500 Biological Monitoring & Laboratory Testing
 - 0.500 Surveillance & Epidemiologic Investigation

1. **National preparedness trended upward in most functional areas during 2013-15, except in environmental health and healthcare delivery**
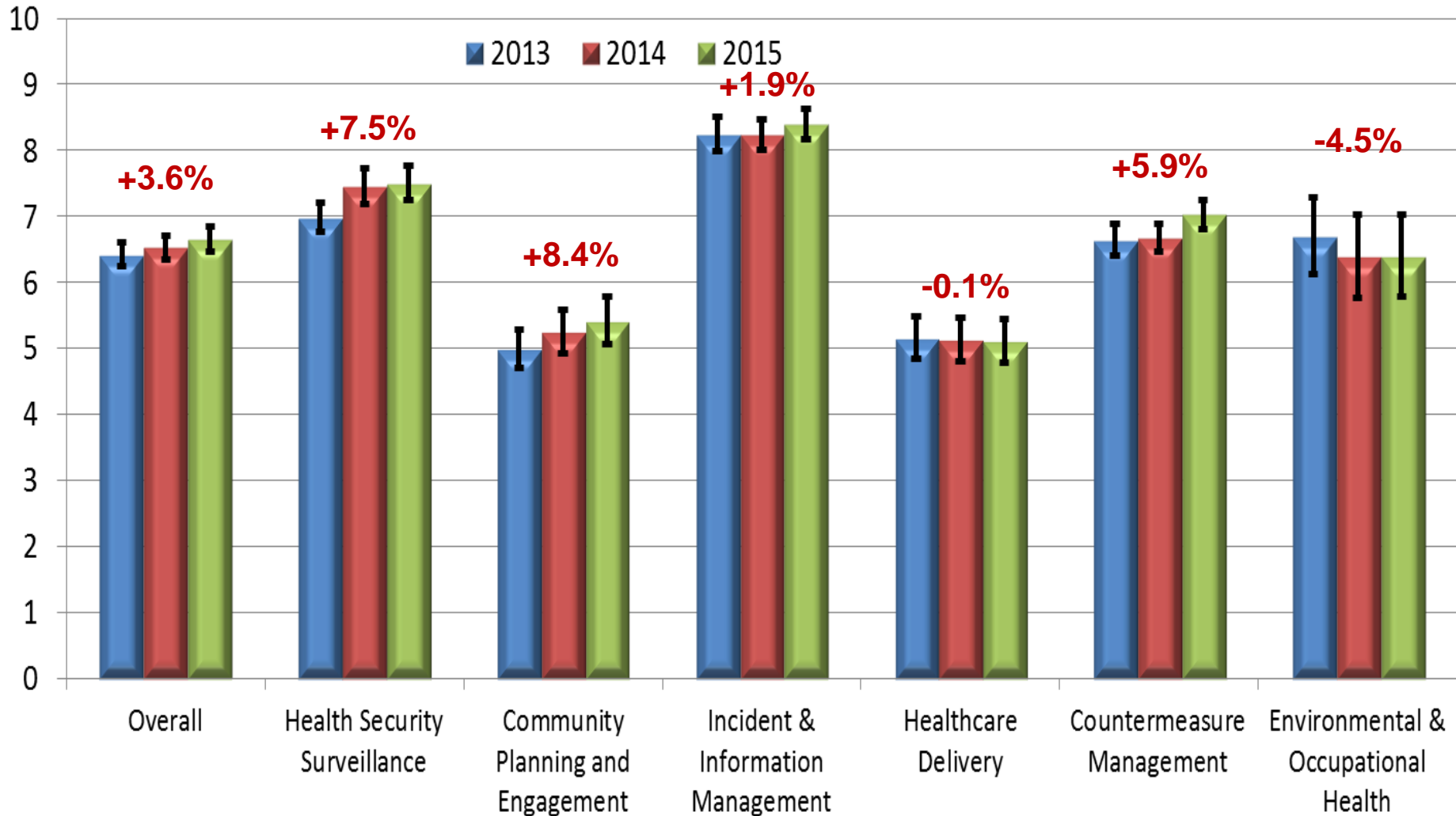
# 2. Preparedness improved in most states during 2013-15, but significant geographic differences remain.

Legend:
- Significantly below national average in 2015
- Within national average confidence interval
- Significantly above national average in 2015
- % increase 2013-2015
- % decrease 2013-2015
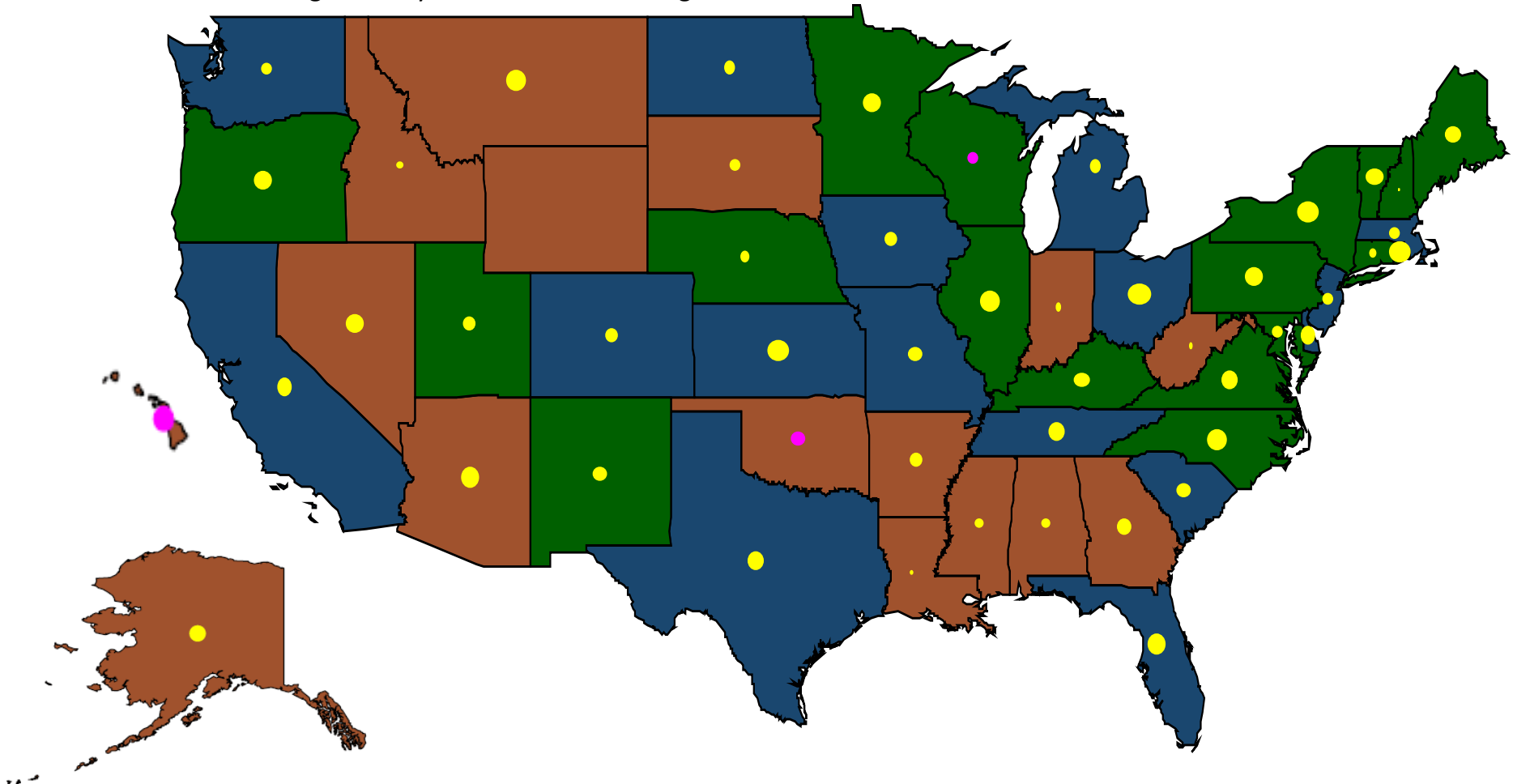
3. Preparedness levels improved by an average of 3.6% between 2013 and 2015. Individual state trends ranged from a 9.1% improvement to a 3.5% decline.
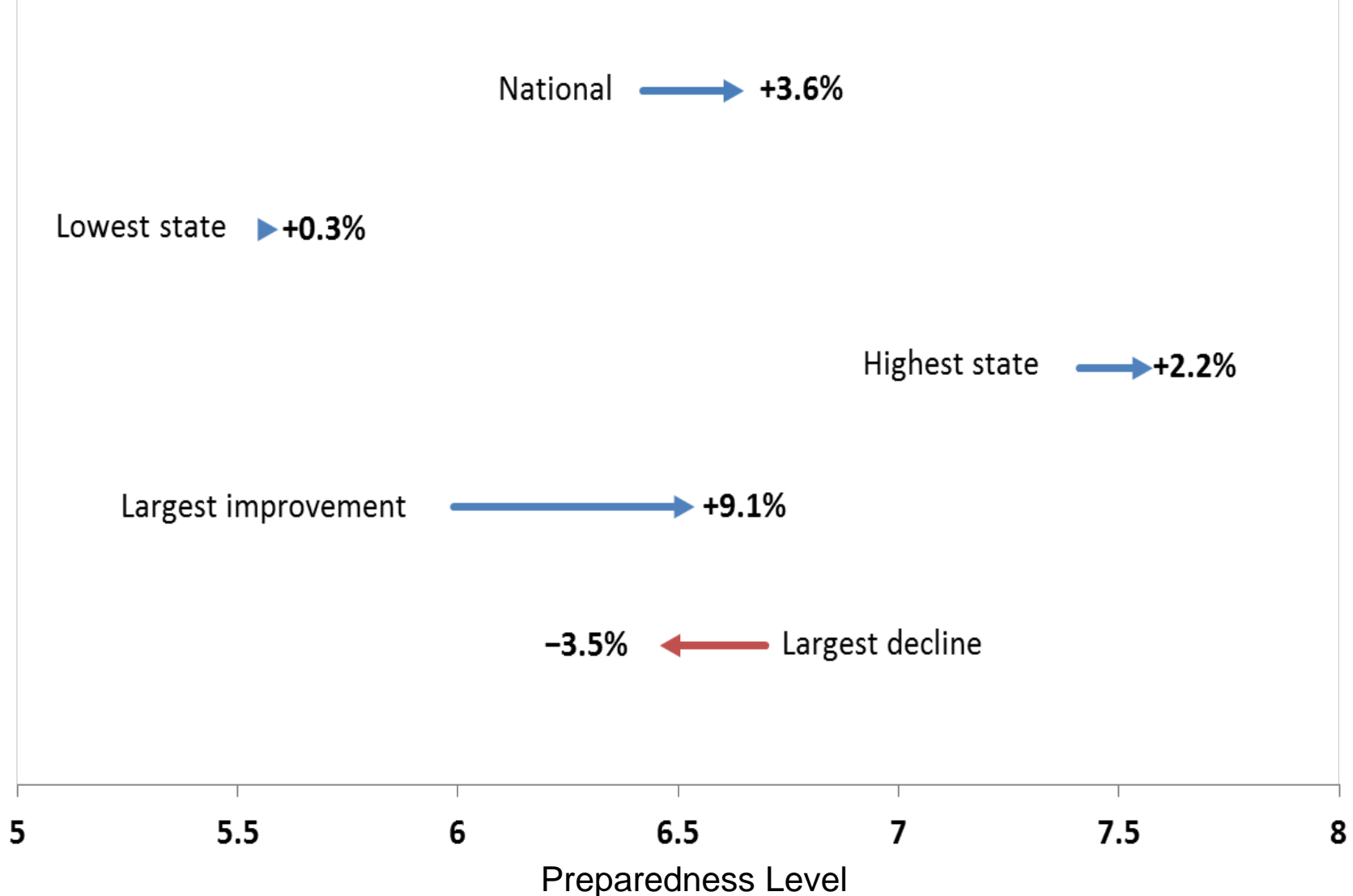
4. Improvements in preparedness occurred across the U.S. in both above-average and below-average states. However, some below-average states continued to lose ground.


● Below national average   ● Within national average   ● Above national average

2015 State Preparedness Level
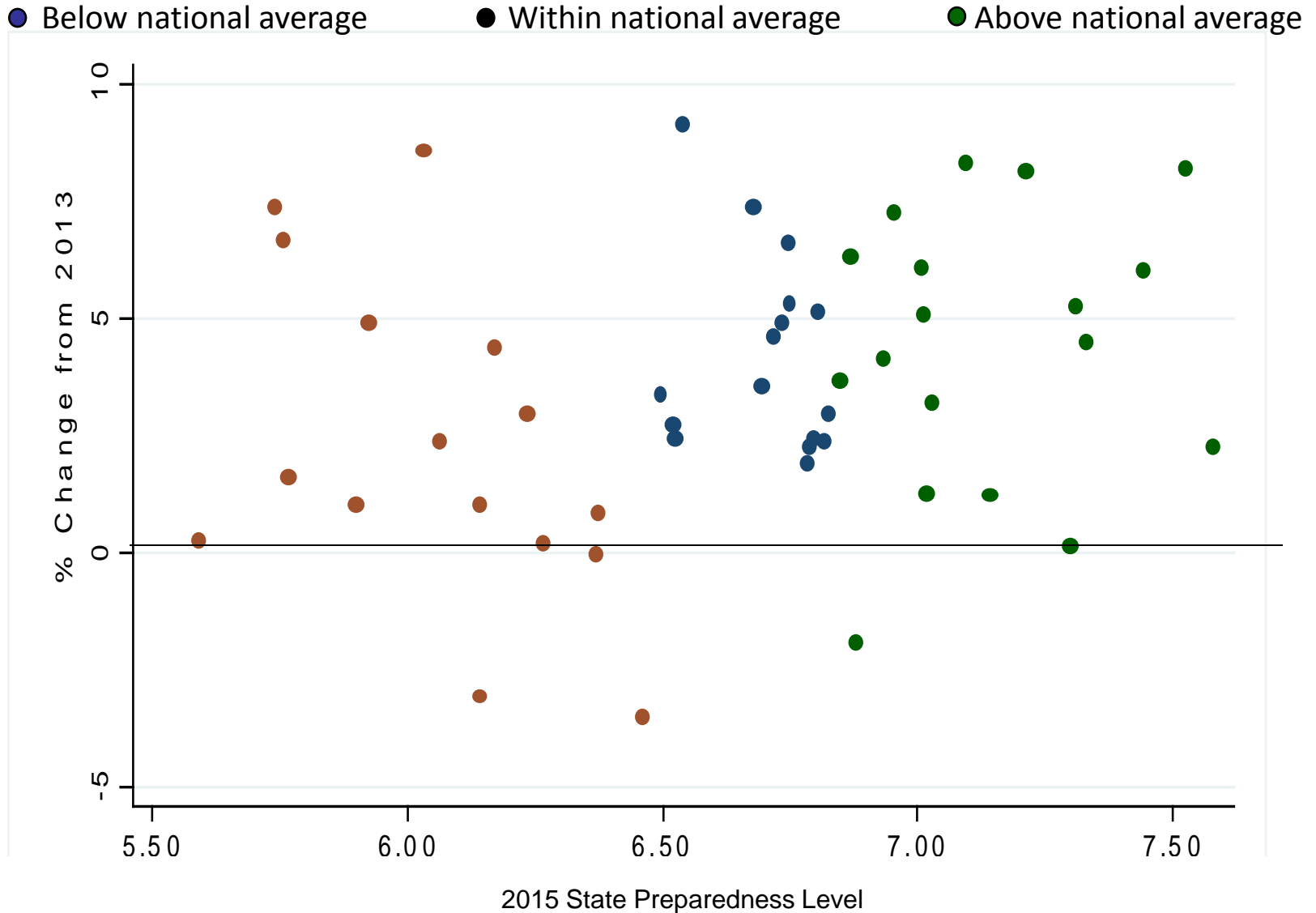
5. An increasing number of states score above the national average preparedness level.

2016 National Health Security Preparedness Index Results

NOTE: Dotted lines represent statistical confidence intervals for the national average Index score.

6. Changes in preparedness levels varied widely across states and domains.

Preparedness Levels 2013 and 2015
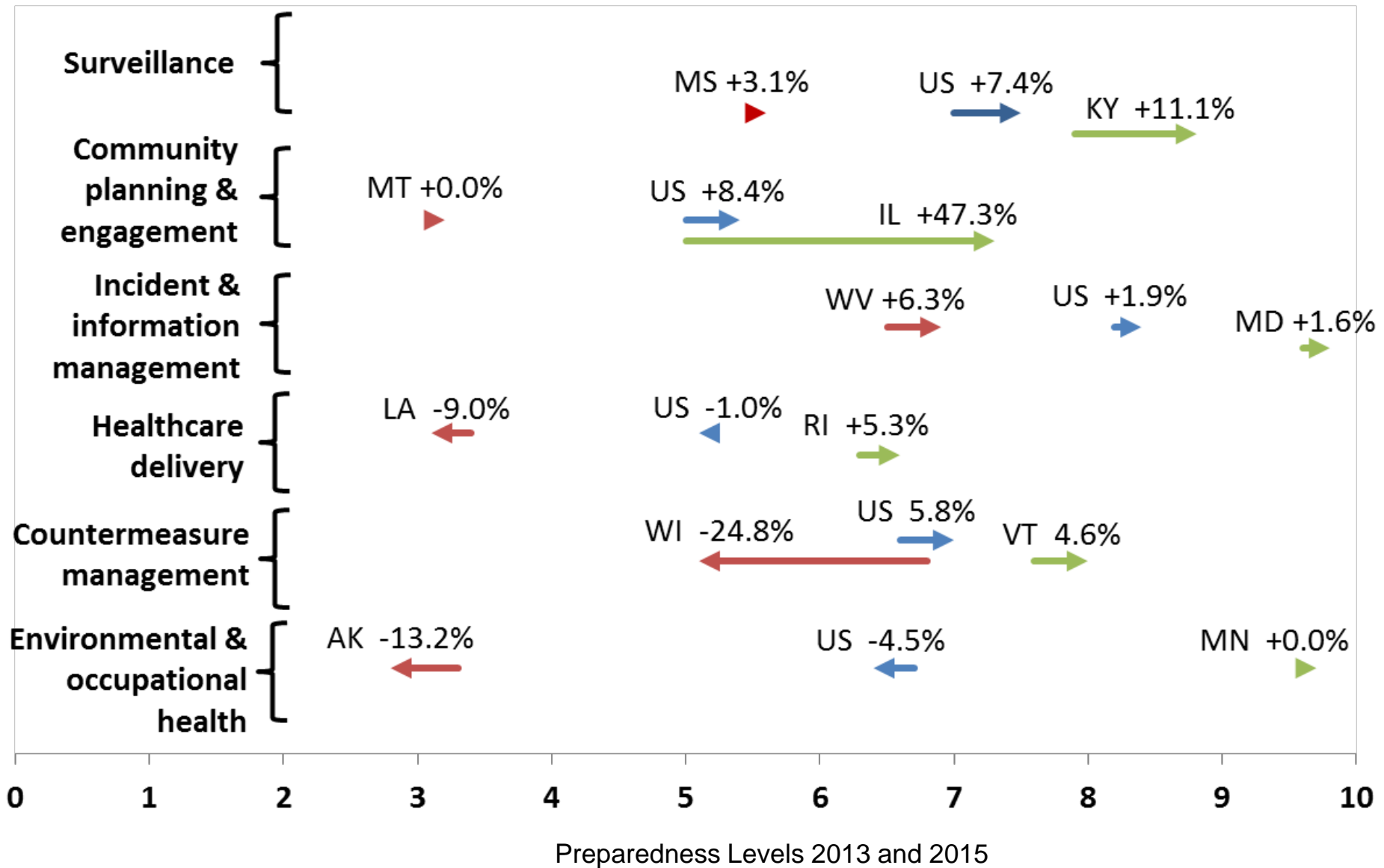
7. Gaps in preparedness between the highest and lowest states are large and persistent, and they have increased in environmental health and in healthcare delivery.
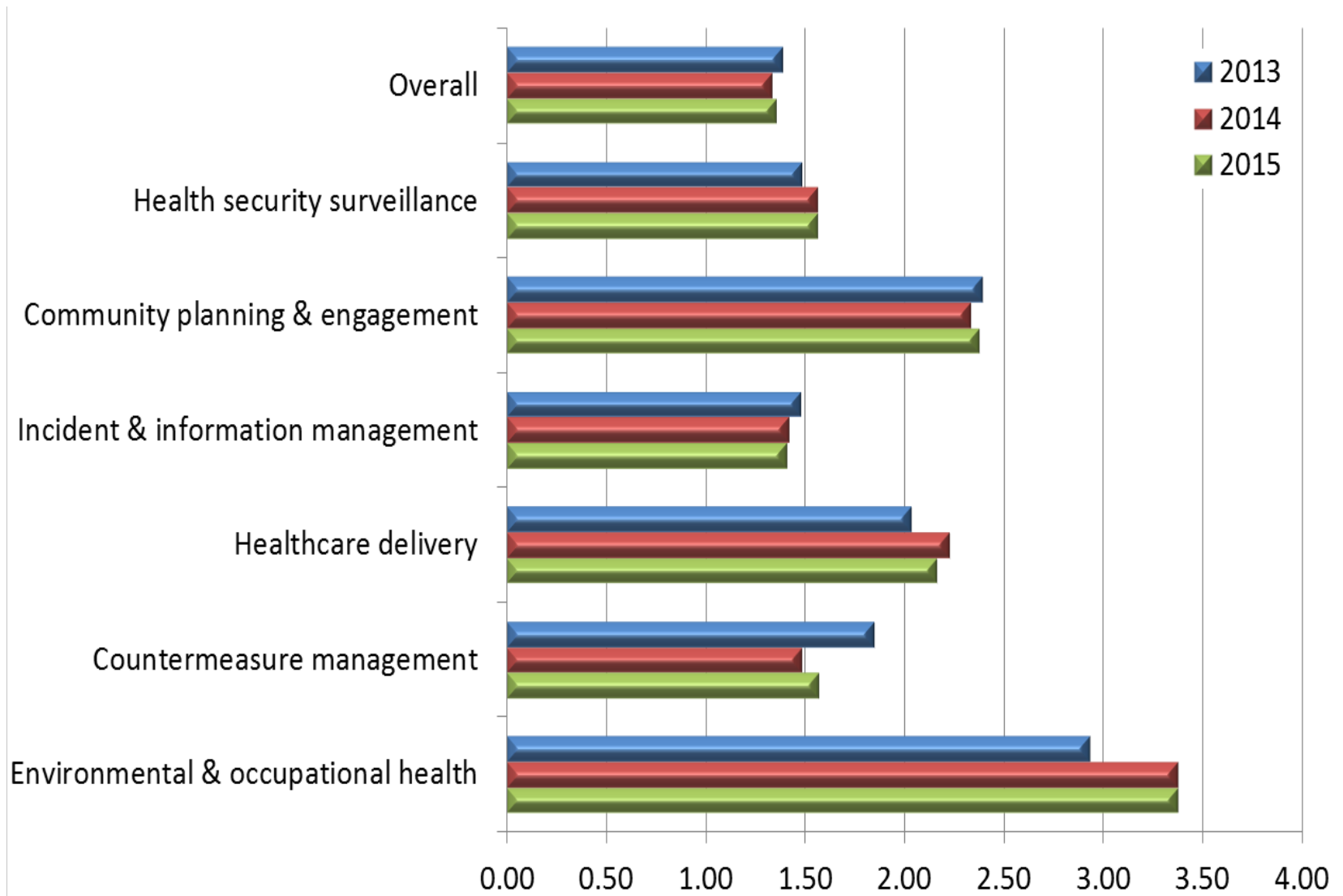
8. 20-23% of the variation in state preparedness levels can be explained by differences in infectious disease protections.
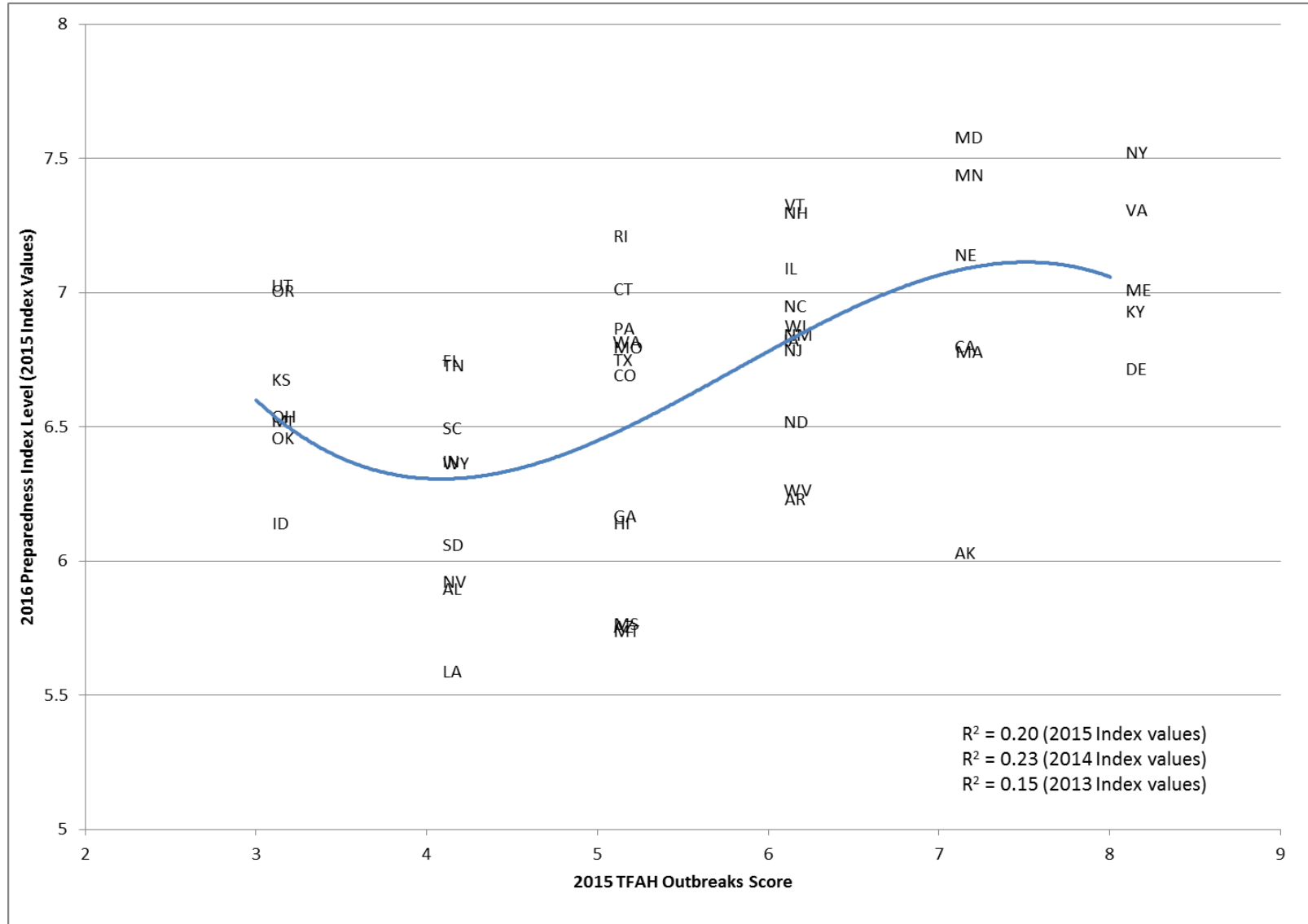
Caveats and cautions

- Imperfect measures & latent constructs
- Missing capabilities
- Timing and accuracy of underlying data sources

Next Steps

- 2016 Public Release on April 26
  www.nhspi.org
- National convening to showcase uses: Fall 2016
- Continued work to incorporate advances in measurement: ASPR, CDC, NIH, AHRQ, HP2020
- Additional analysis to understand causes and consequences of change

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National Advisory Committee Members | 2015-16

1. Tom Inglesby, (Chair) UPMC Center for Health Security
2. Robert Burhans, Emergency Management Consultant
3. Anita Chandra, RAND
4. Ana-Marie Jones, Collaborating Agencies Responding to Disasters
5. Eric Klinenberg, New York University
6. Jeff Levi/Dara Lieberman, Trust for America's Health
7. Nicole Lurie, Assistant Secretary for Preparedness and Response
8. Stephanie Lynch, Caddo Parish (LA) Commissioner
9. Suzet McKinney, Chicago Department of Public Health
10. Stephen Redd, CDC Office of Public Health Preparedness & Response
11. Richard Reed, American Red Cross (through 2/2016)
12. Martin Jose Sepulveda, IBM Corporation
13. Claudia Thompson, NIH National Institute of Environmental Health Sci.
14. John Wiesman, Washington State Secretary of Health

For More Information

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National Program Office

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