Five Years of Measuring Health Security:
Steady but Uneven Progress

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

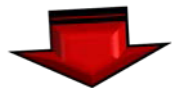**TO JOIN THE ZOOM MEETING BY COMPUTER**:
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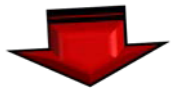
www.nhspi.org

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	Alpha
Health security surveillance	0.712
Community planning & engagement	0.631
Incident & information management	0.734
Healthcare delivery	0.596
Countermeasure management	0.654
Environmental/occupational health	0.749

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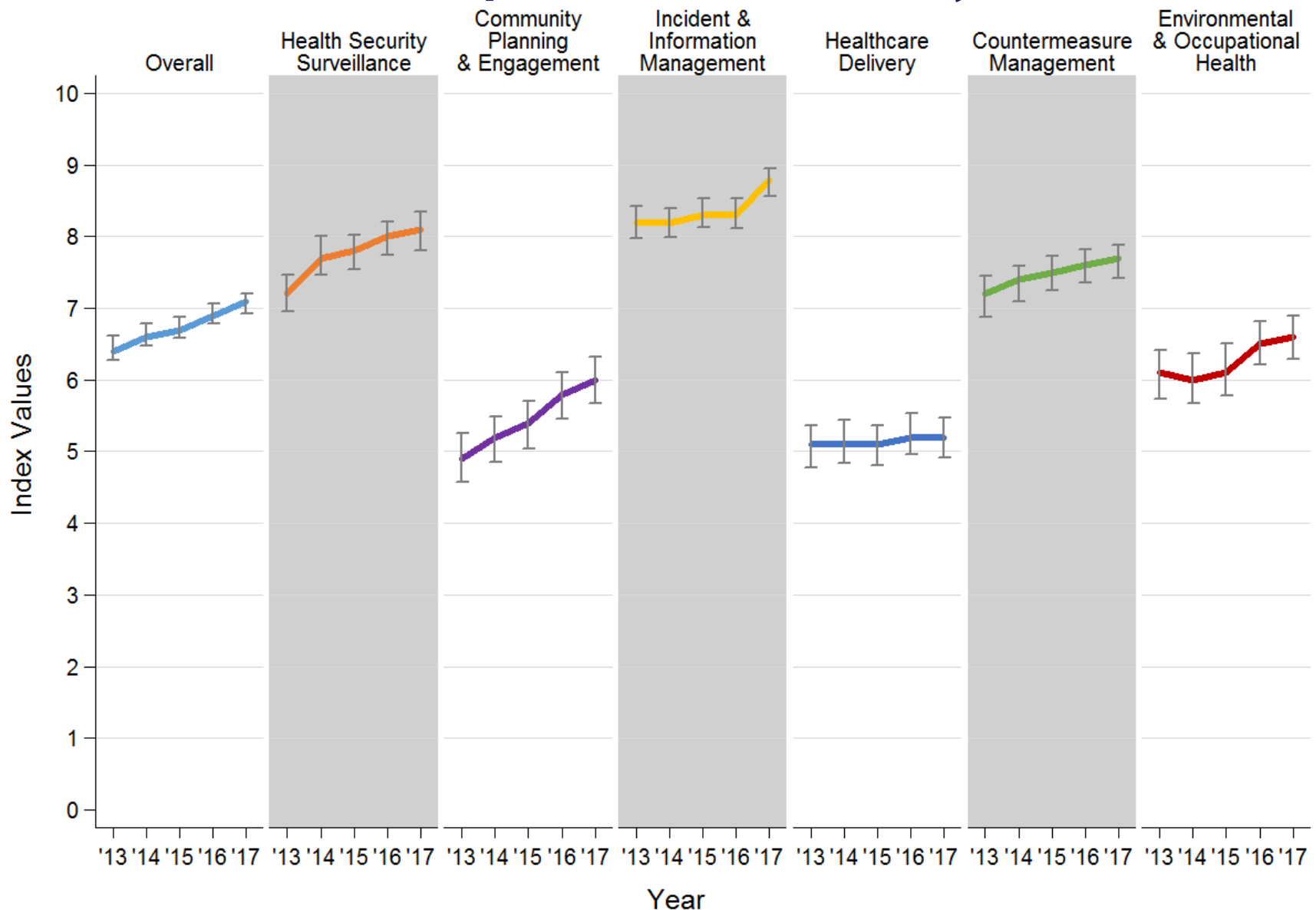
Index measurement domains & subdomains
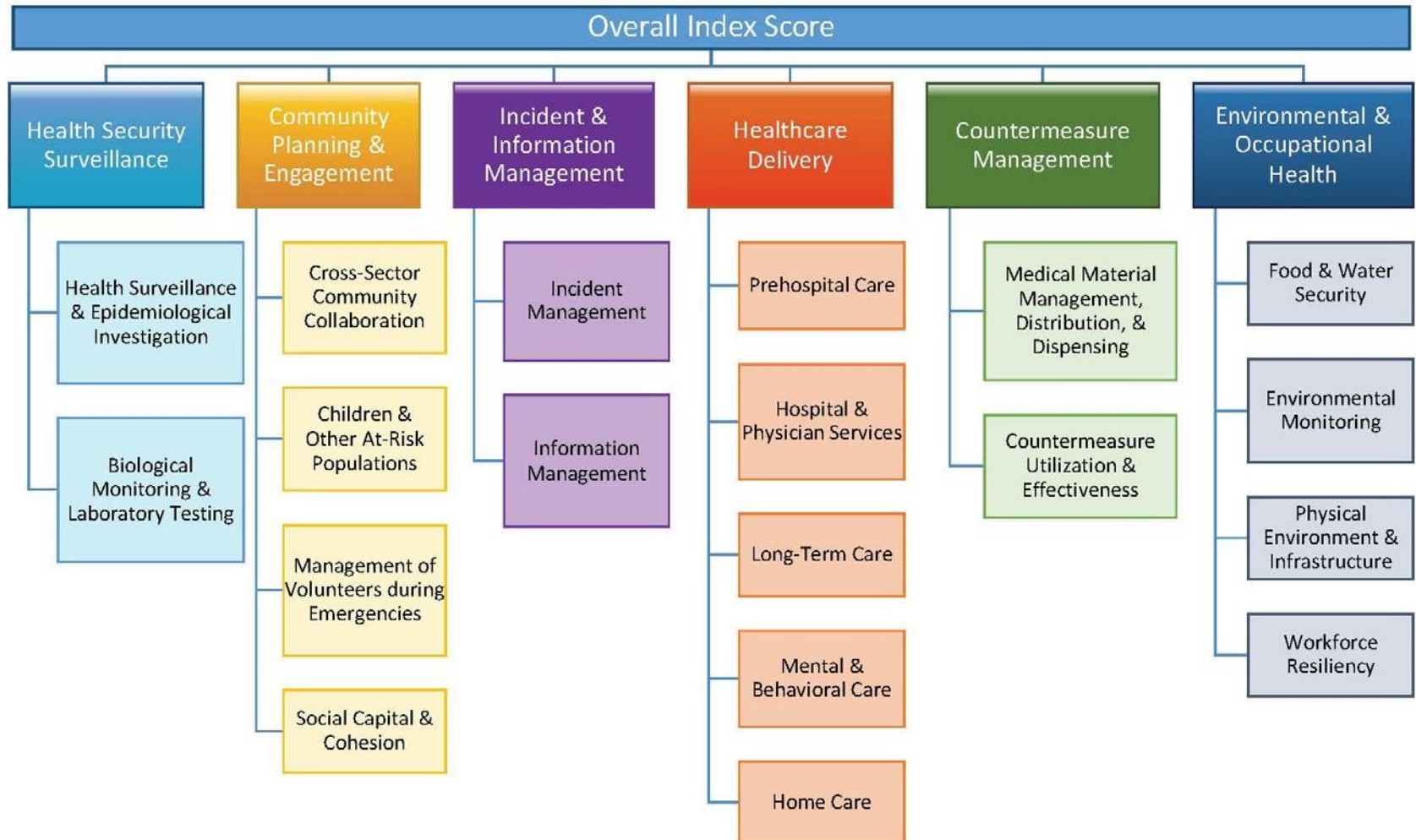
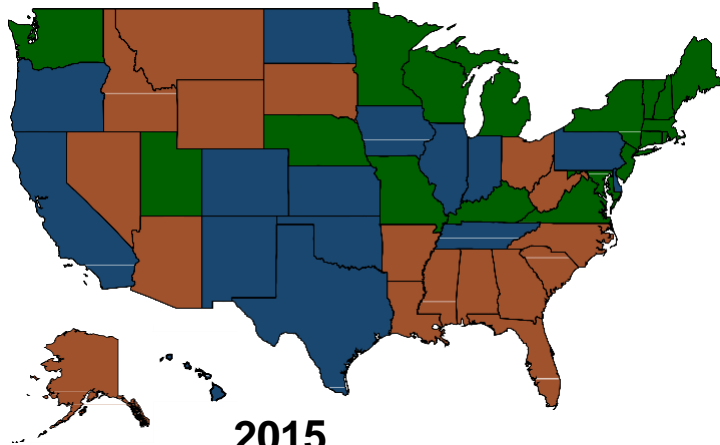# Steady progress, uneven pace
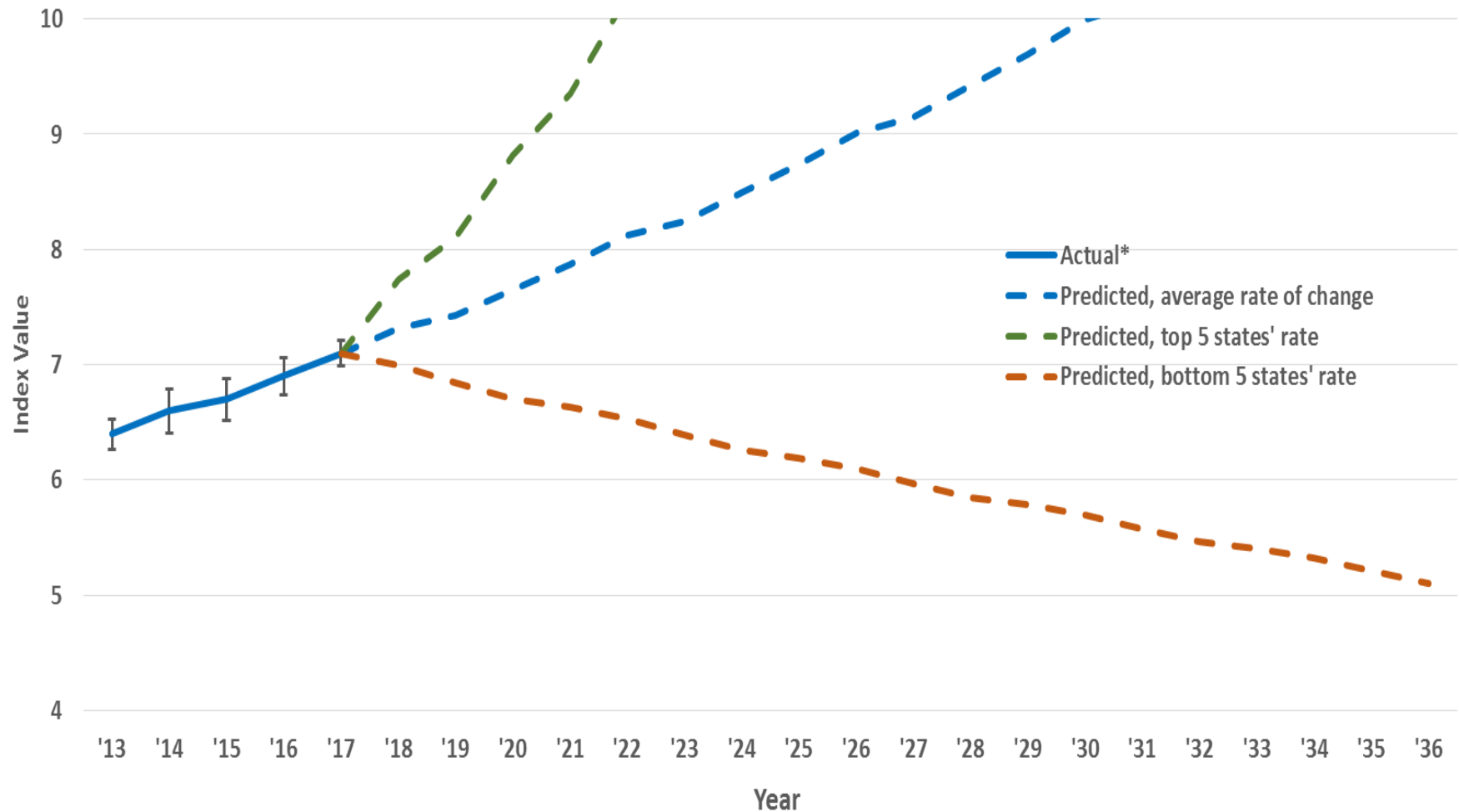
*statistically significant change

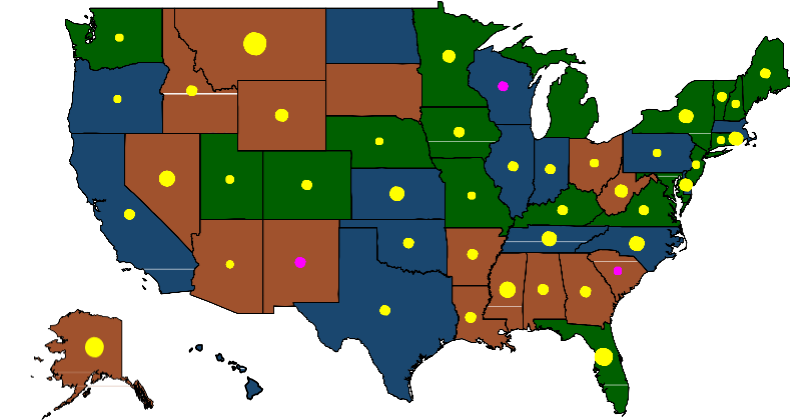# The U.S. improved in most domains during 2013-17, except healthcare delivery

Geographic differences in health security are large and growing

2013

2014

2015

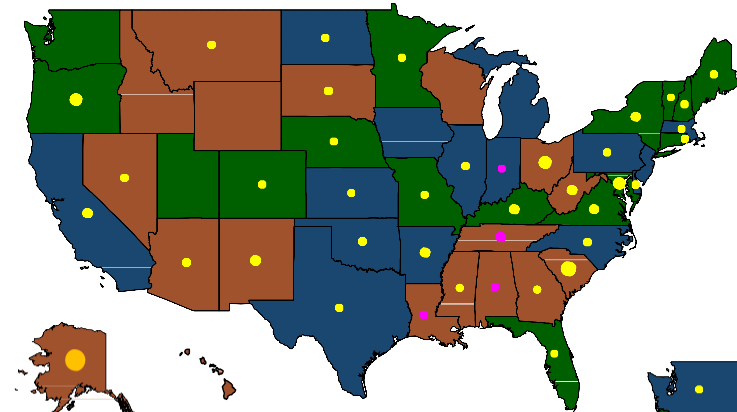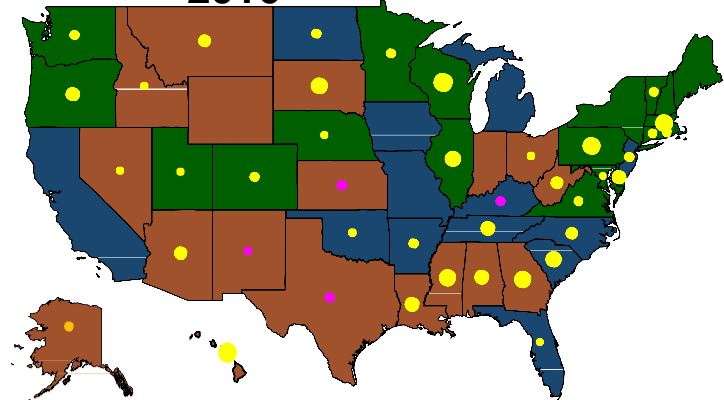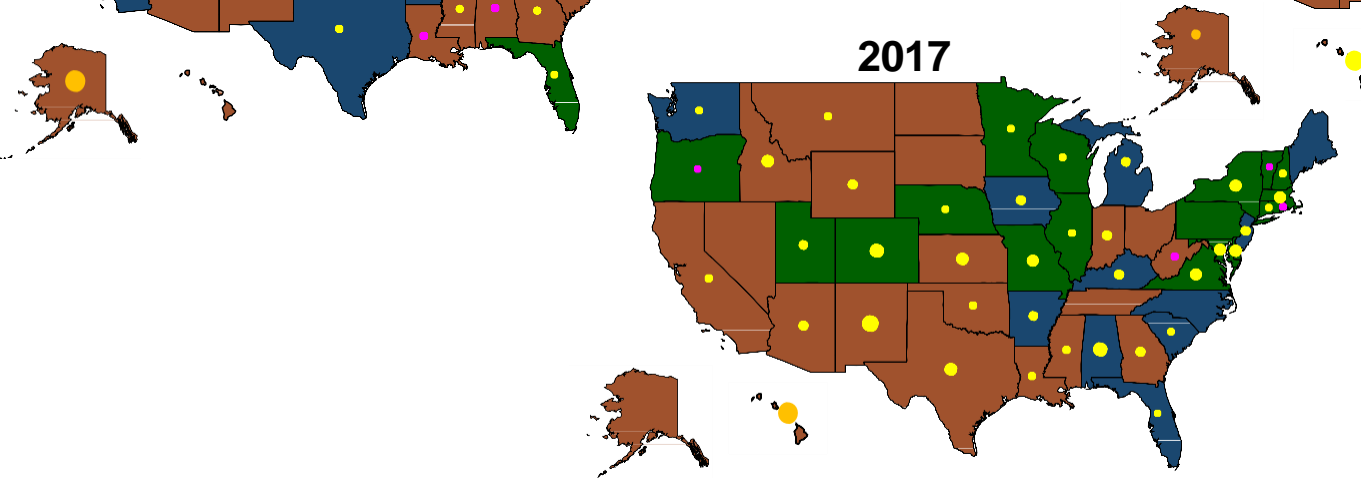**2016**

2017

- 🟡 % increase from prior year
- 🟣 % decrease from prior year
- 🟩 Above national average
- 🟦 Within national average
- 🟫 Below national average

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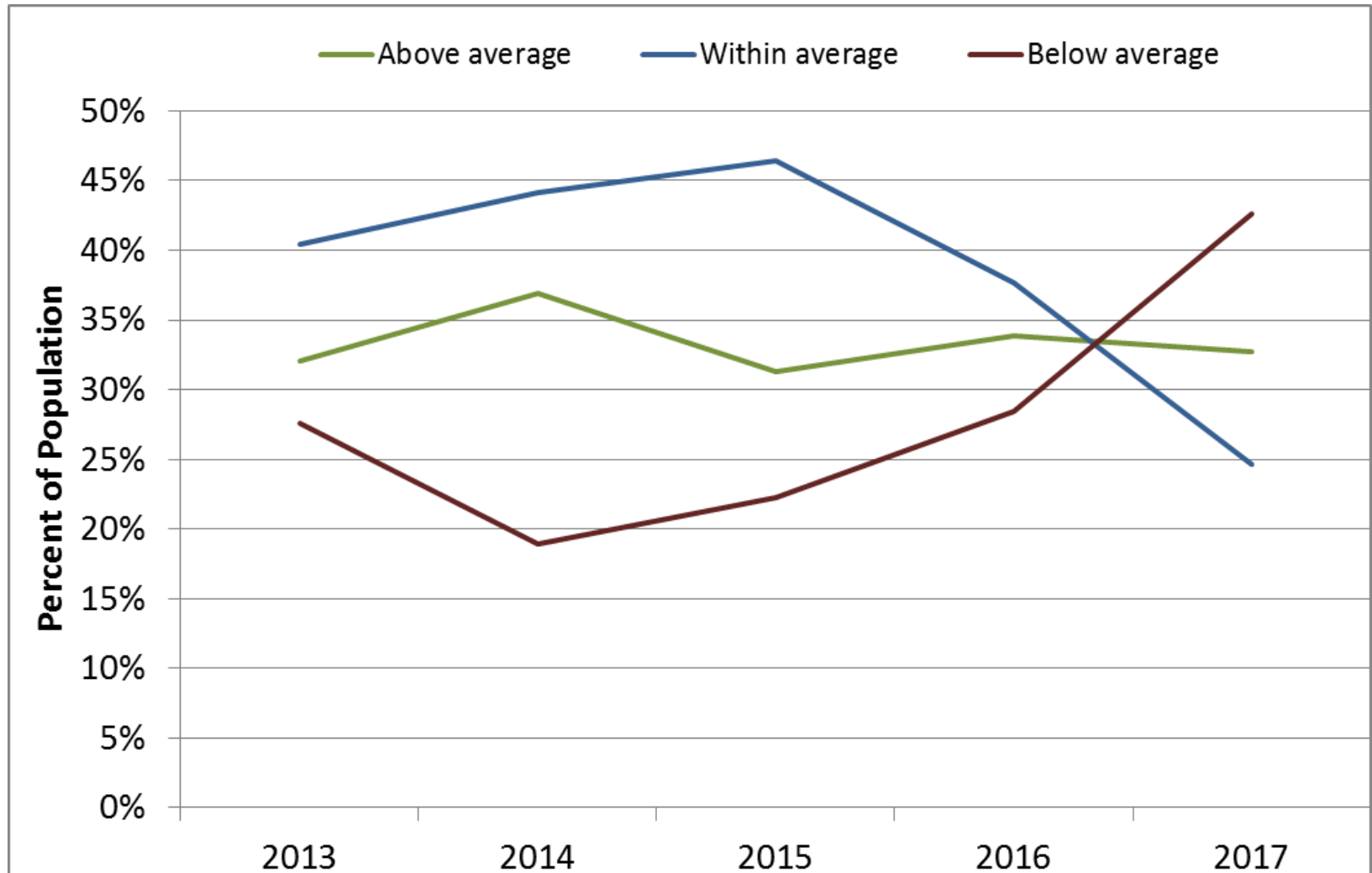
Gains in health security far surpassed losses

National →→ **+2.9%**

Lowest state (AK) → **+1.6%**

Highest state (MD) →→ **+3.9%**

Largest gain (NM) →→→ **+7.8%**

−1.5% ← Largest loss (WV)

| 5 | 5.5 | 6 | 6.5 | 7 | 7.5 | 8 | 8.5 | 9 |

Index Value in 2016 and 2017
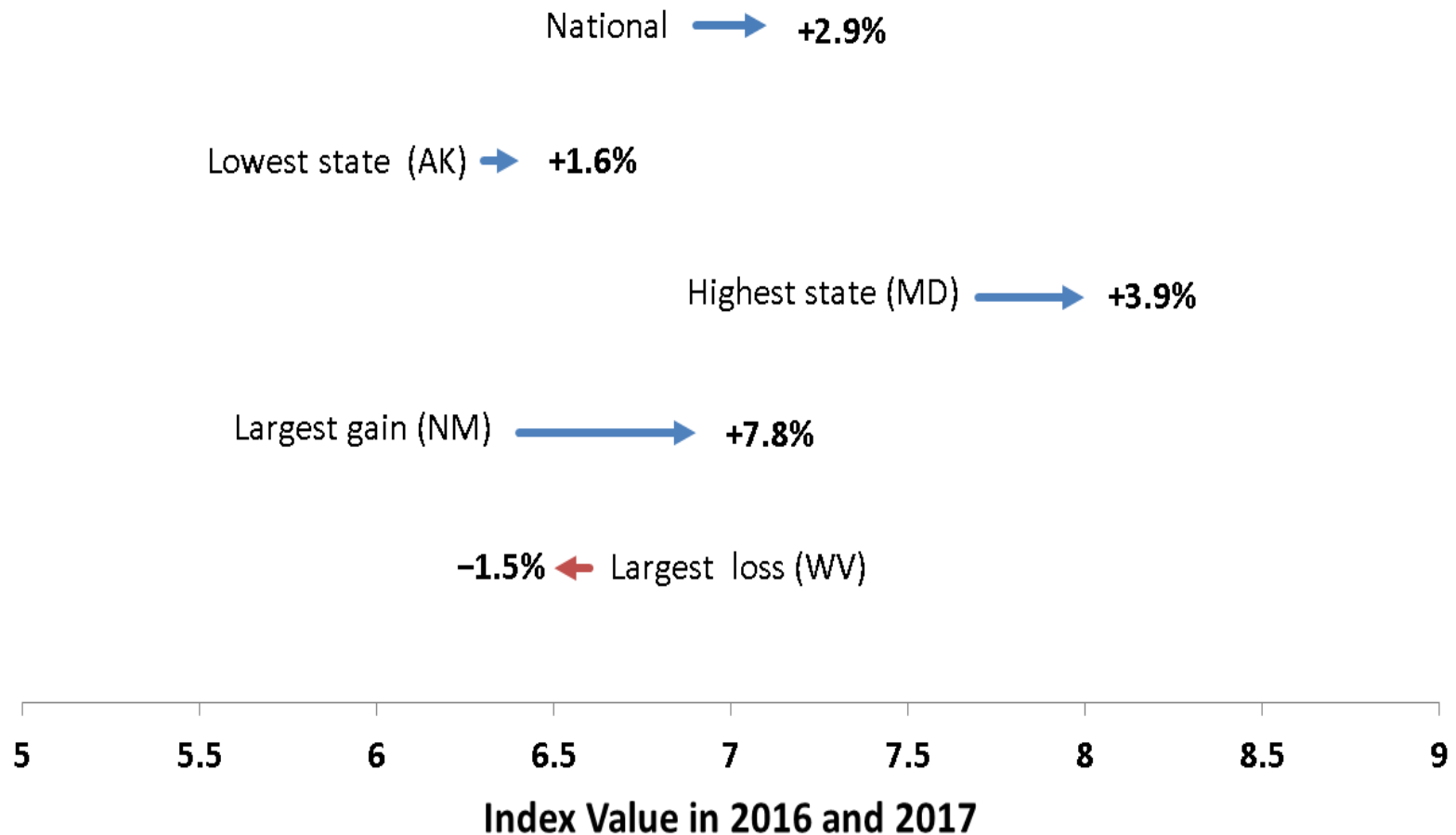
Improvements occurred across the U.S., but 12 states were steady or lost ground

Below national average   Within national average   Above national average

Y-axis: % Change from 2016
X-axis: 2017 Index Value
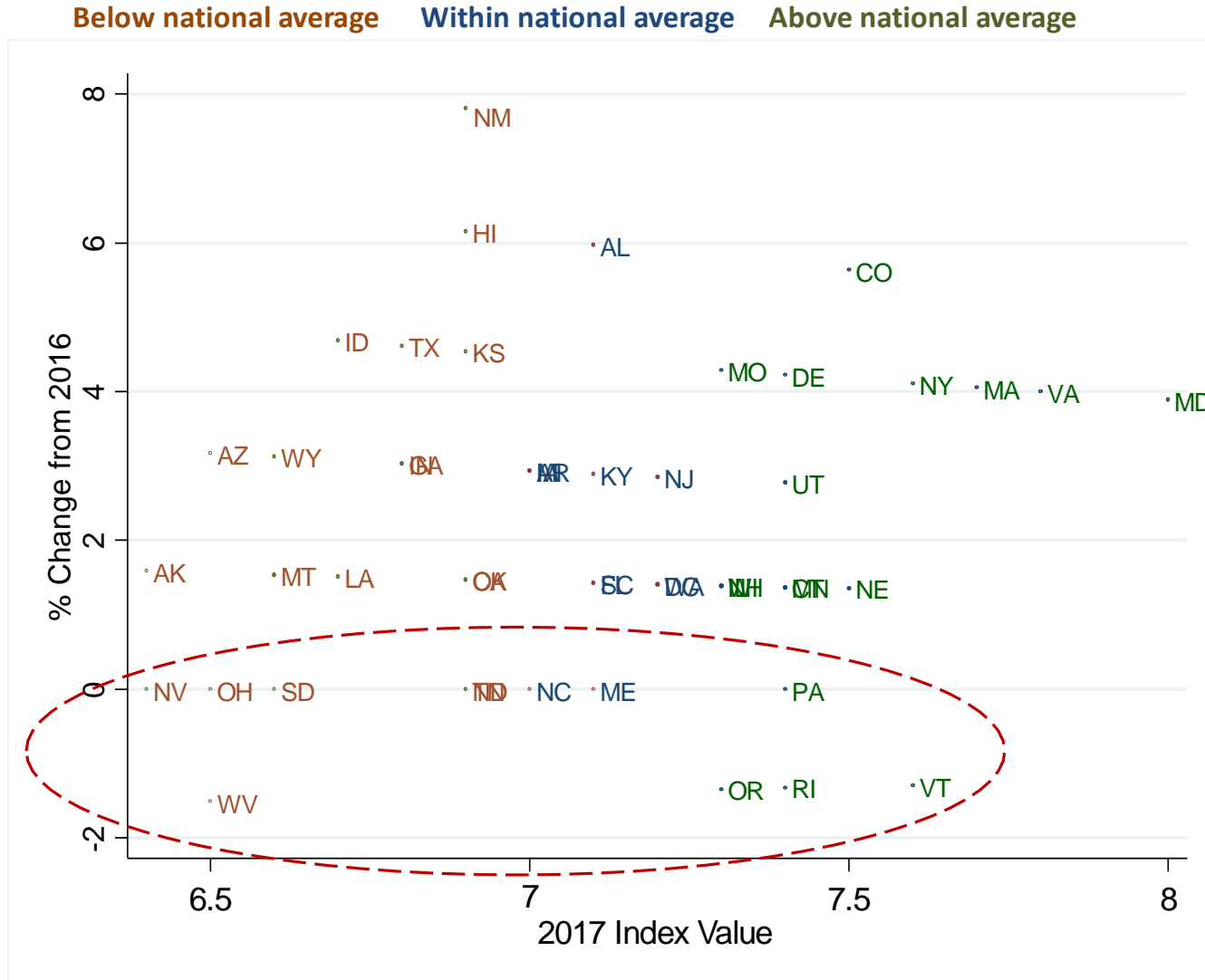
Changes in health security varied widely by domain

Lowest state   National average   Highest state

Health Security Surveillance
- US +1.3% ▶
- VT +8.2% ➡
- CO +0.0% ▶

Community Planning & Engagement
- US +3.4% ➡
- VT +0.0% ▶
- IA +0.0% ▶

Incident & Information Management
- US +6.0% ➡
- CO +22.8% ➡
- WV −5.3% ◀

Healthcare Delivery
- US +0.1% ◀
- DC −1.4% ◀
- AZ −2.7% ◀

Countermeasure Management
- US +0.1% ▶
- RI +0.0% ▶
- AK +3.5% ➡

Environmental & Occupational Health
- US +0.1% ▶
- VA +1.2% ▶
- WY +4.2% ➡

Index Value in 2016 and 2017

1   2   3   4   5   6   7   8   9   10
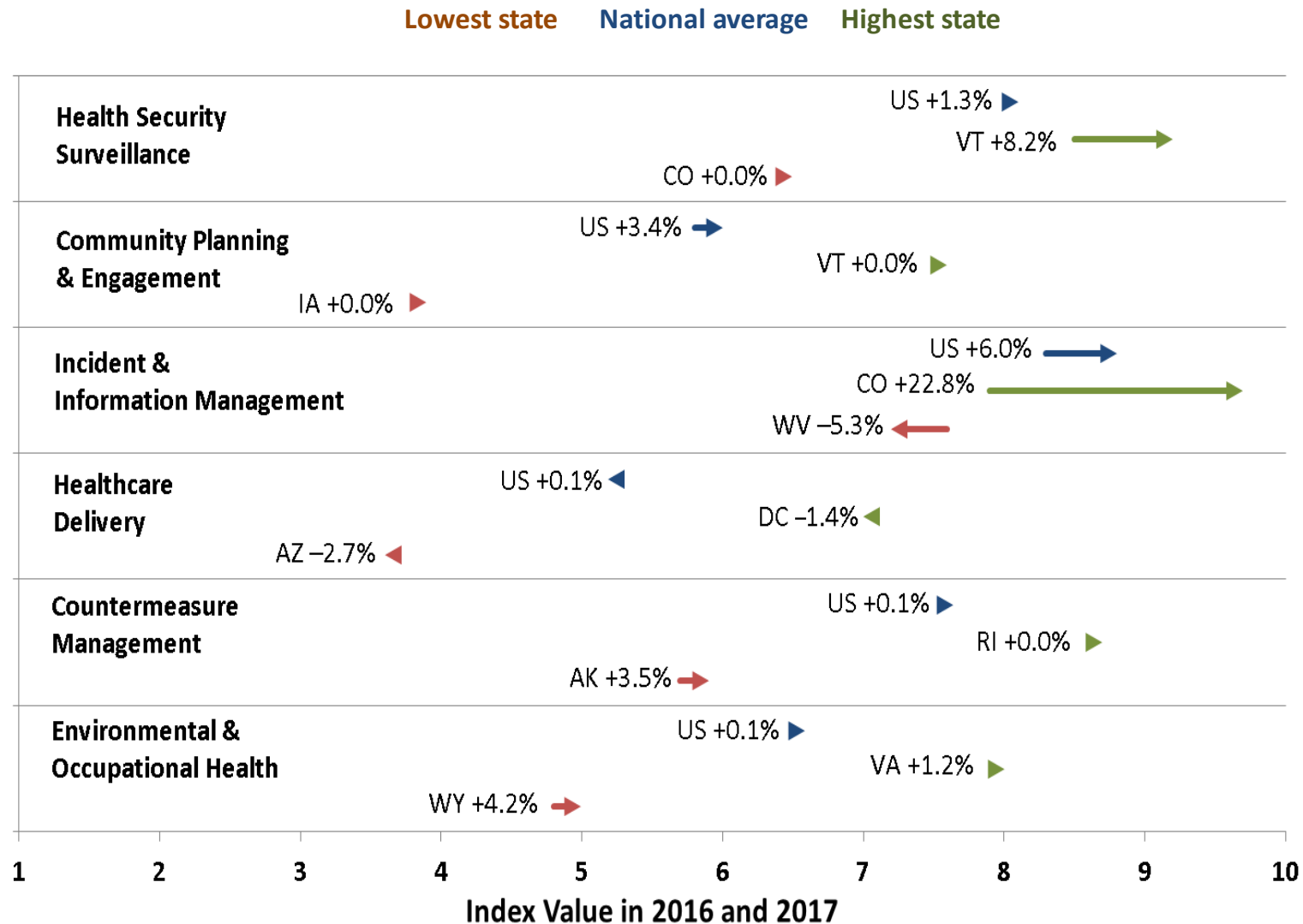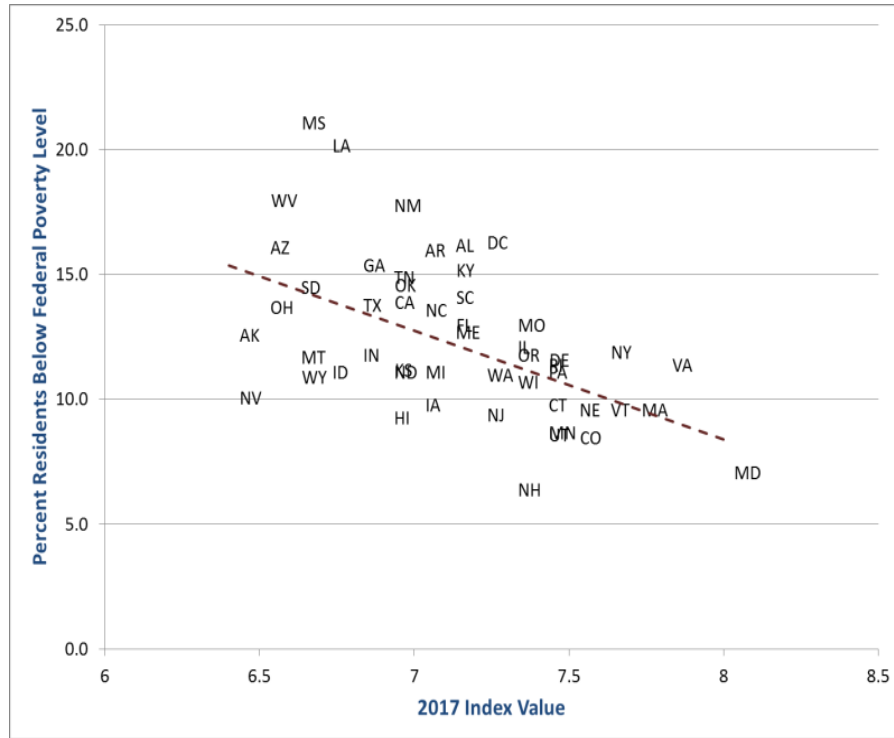
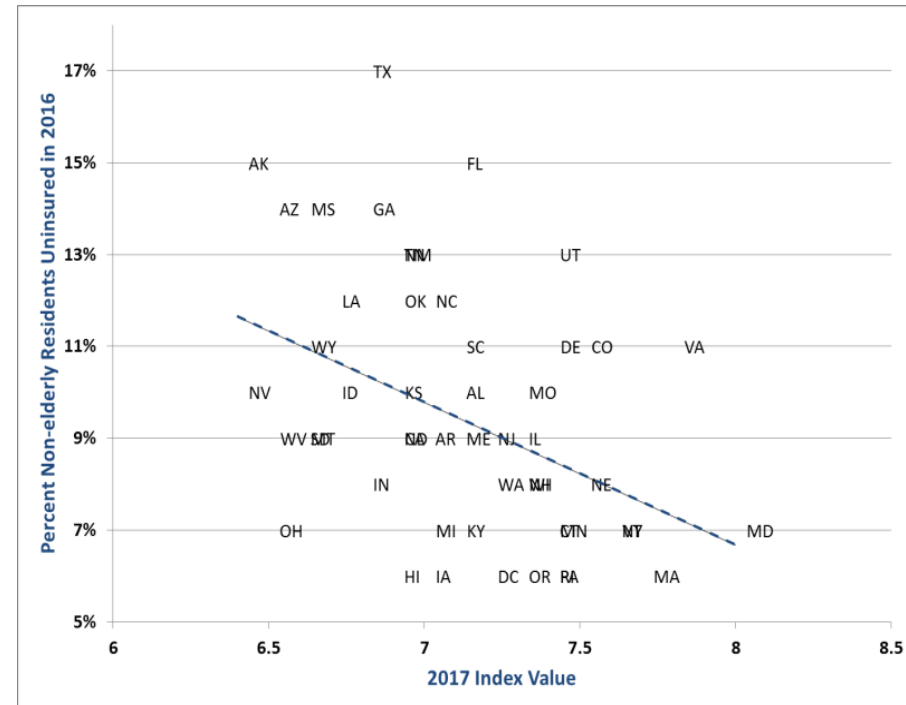# State transitions health security levels are common & bidirectional
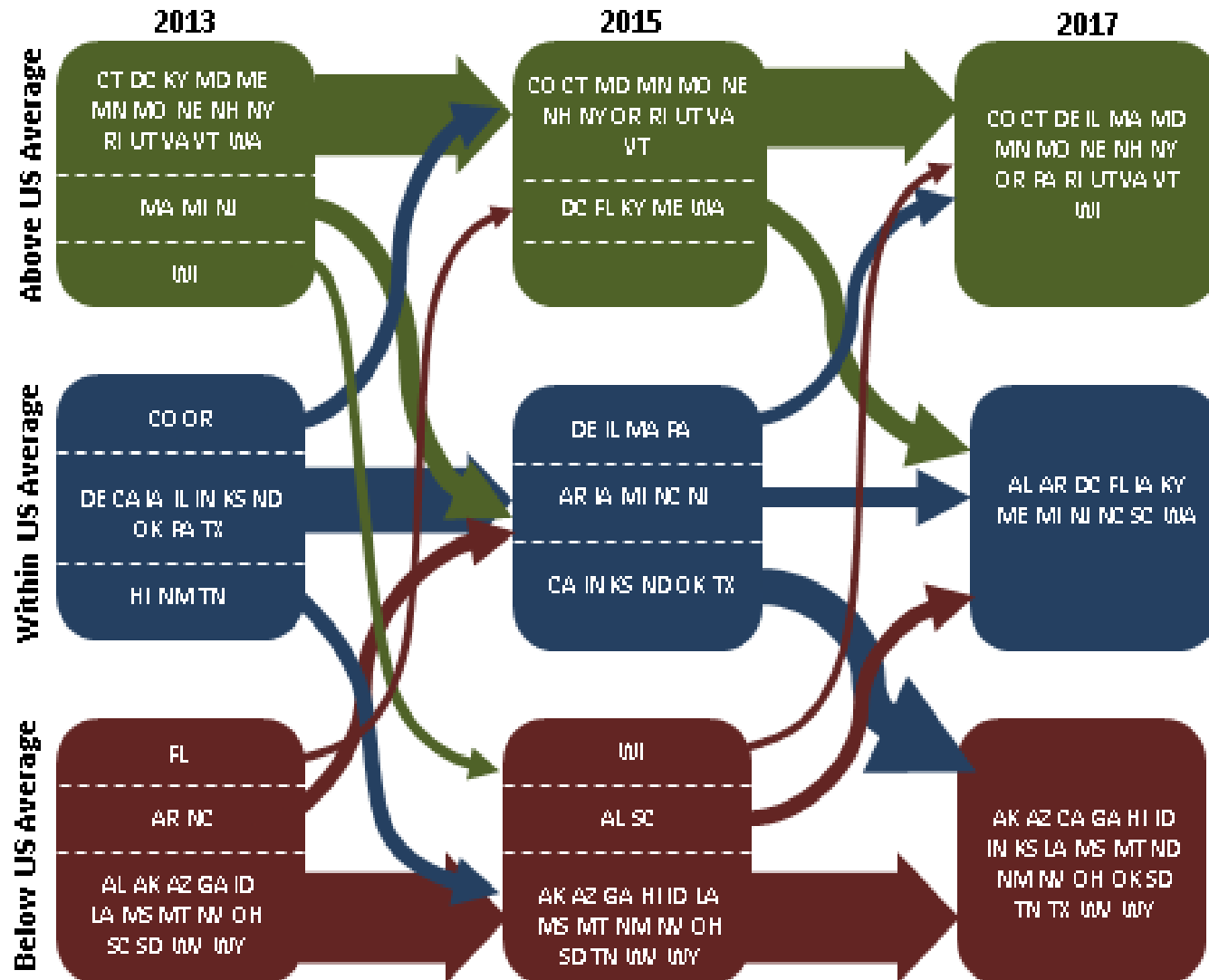
Health security tracks closely with social & economic determinants of health

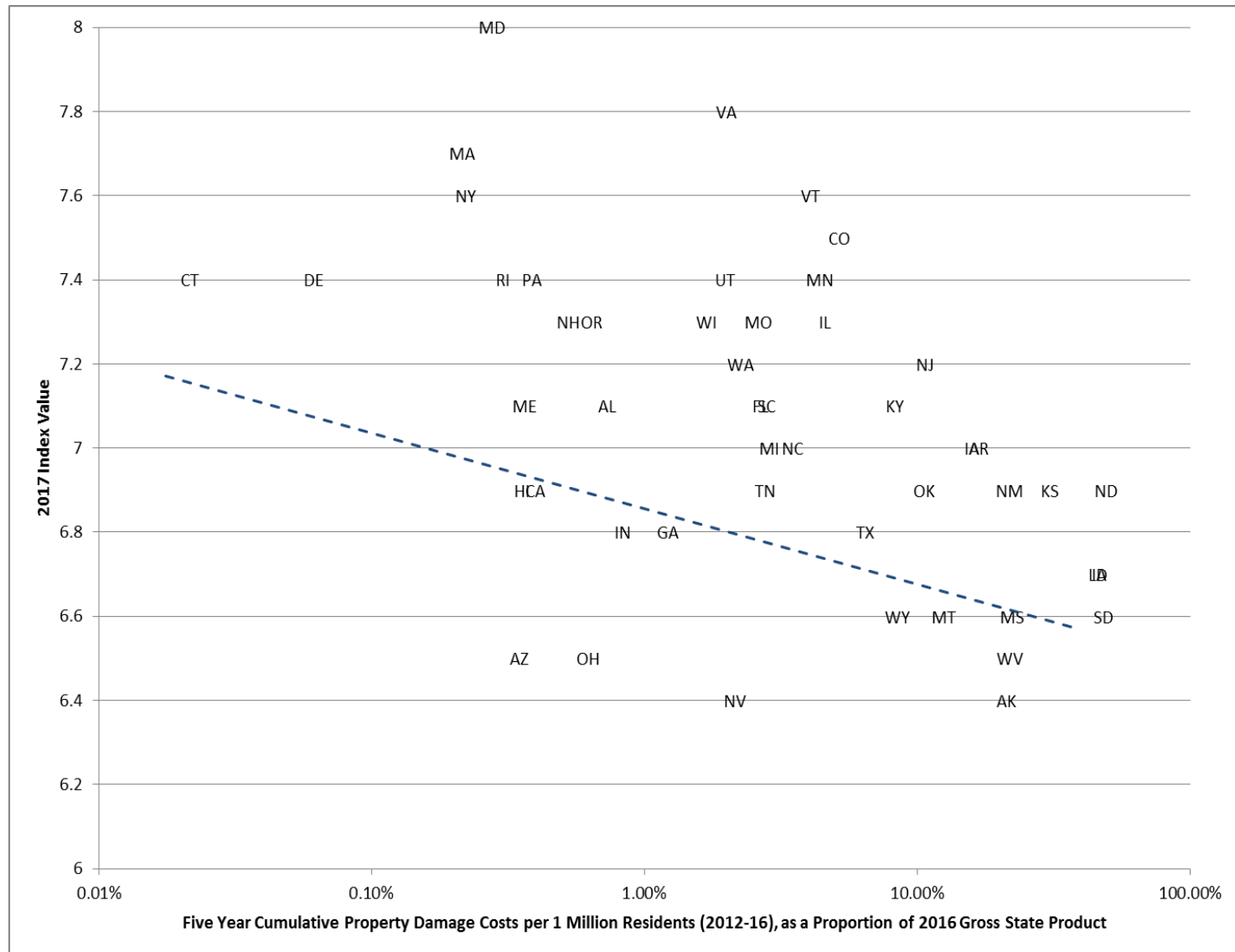**Percent of population below federal poverty threshold**

Percent of population without health insurance coverage

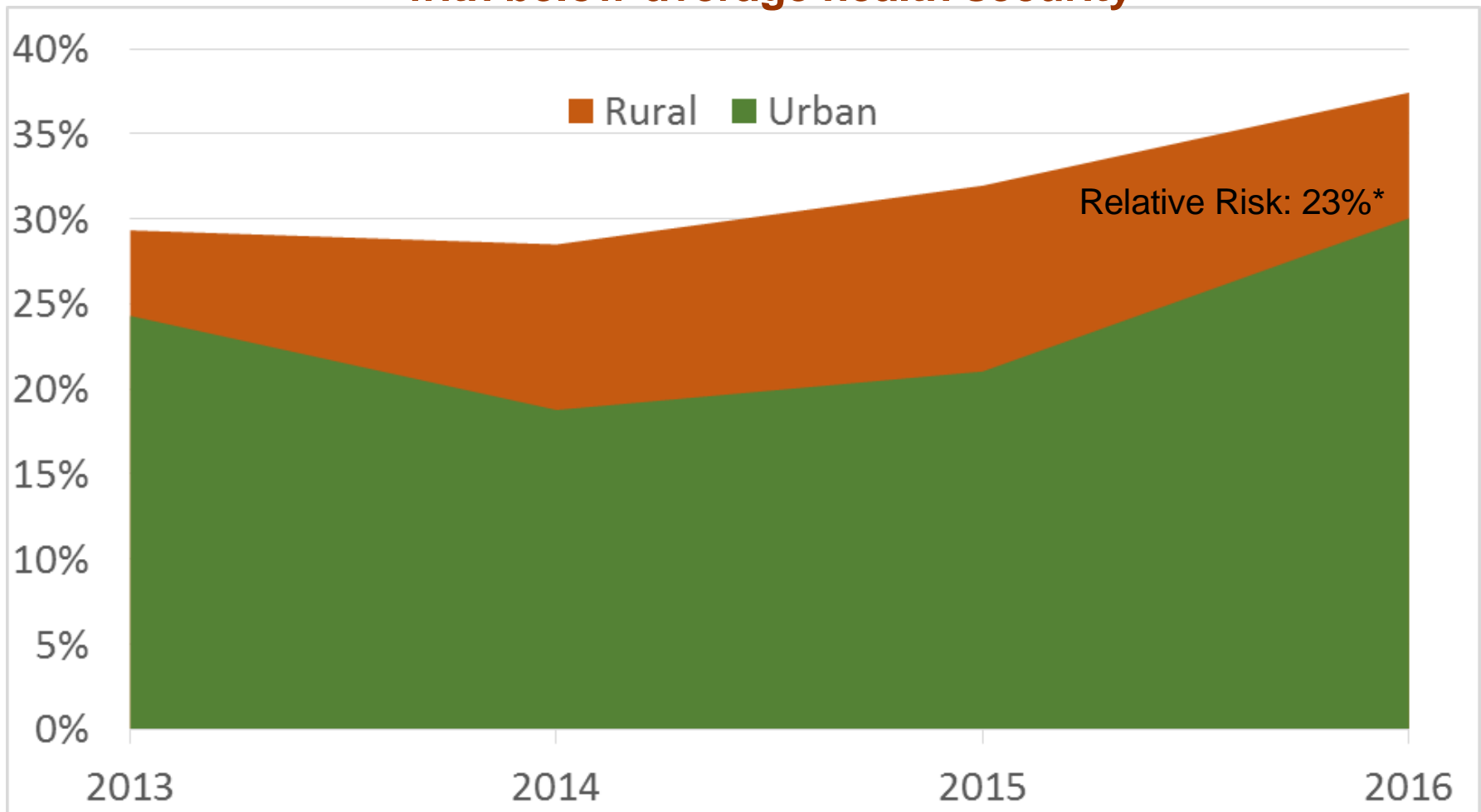# Health security levels vary inversely with the economic impact of past disasters

Rural-Urban differences in health security

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

Relative Risk: 23%*

Rural Urban

*statistically significant difference

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Underlying drivers: organizational
Participation in Healthcare Preparedness Coalitions
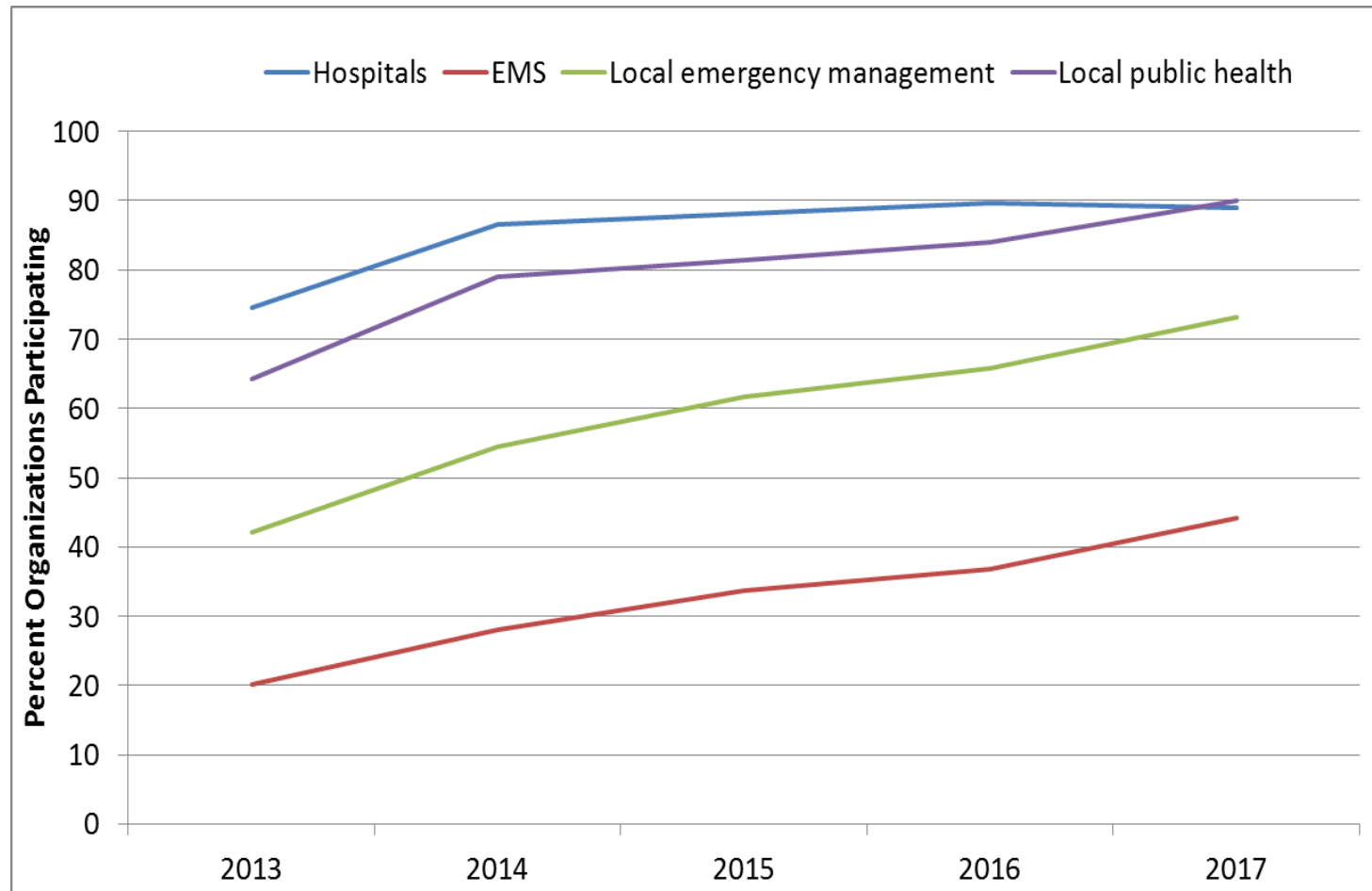
Underlying drivers: community and systems

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

*statistically significant difference

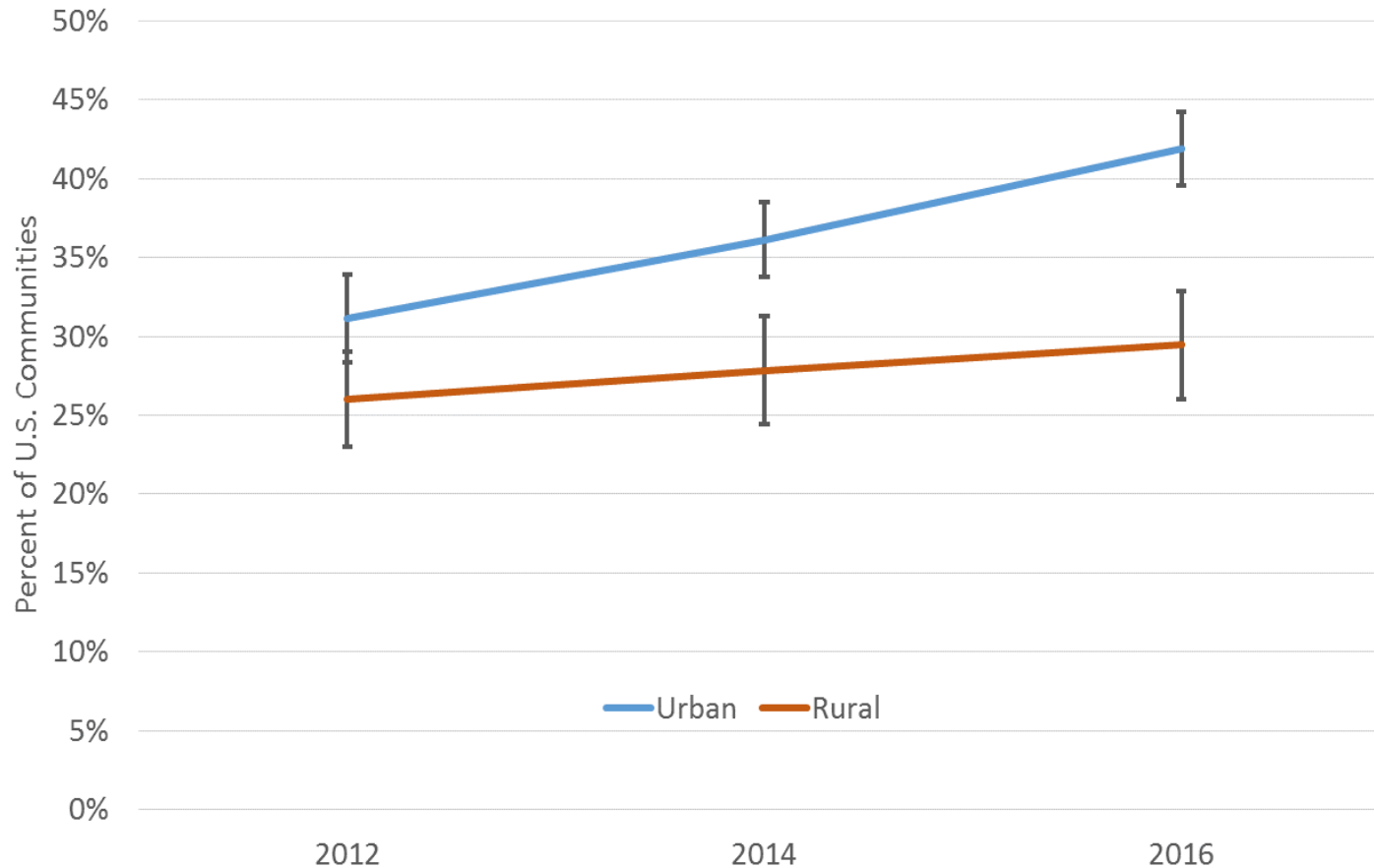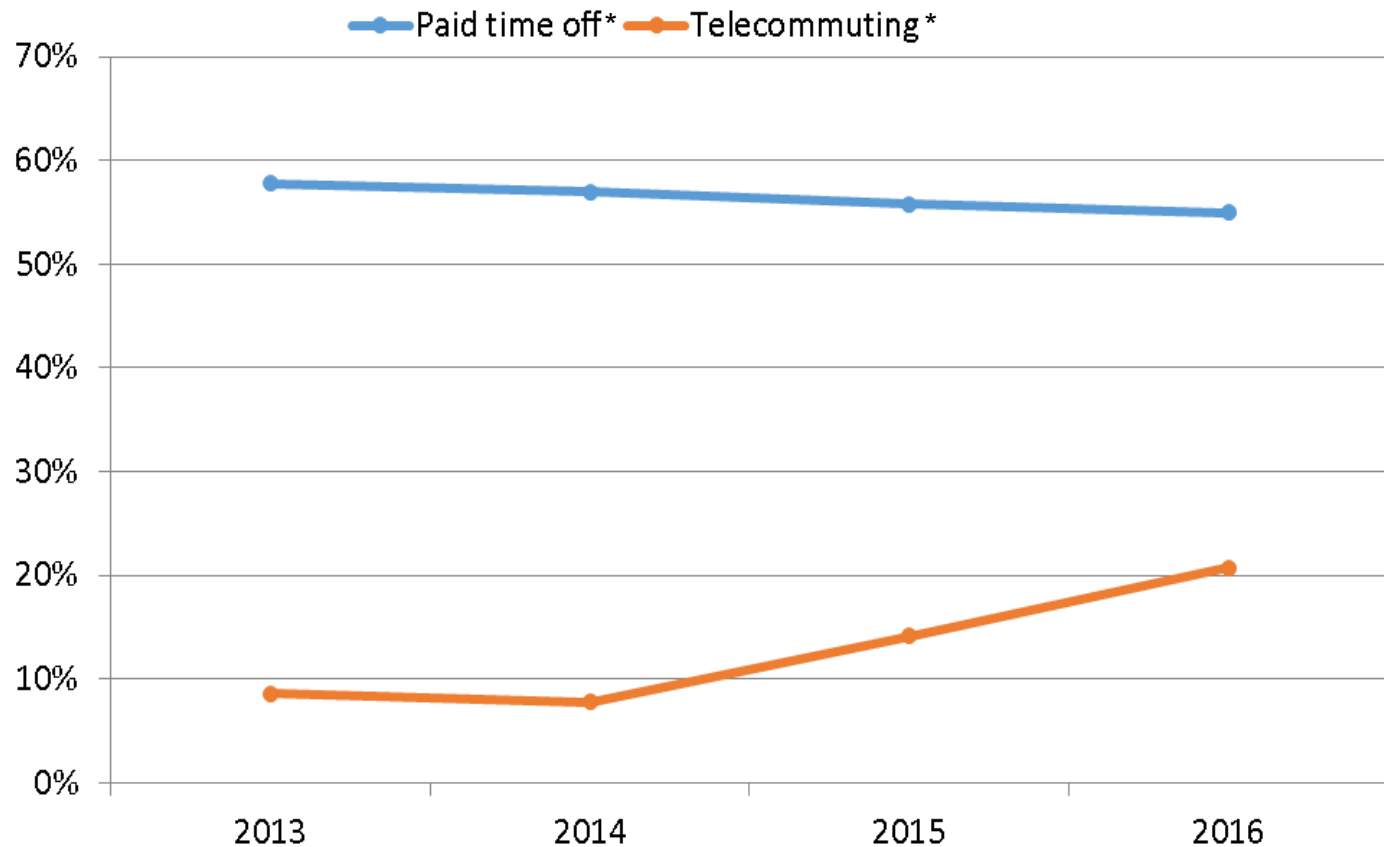# Underlying drivers: occupational

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

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Next Steps

- Data reconnaissance this summer

- Territories as well as local

- Present "straw man" results in early fall at next workgroup meeting (September 18)

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