Summer June 25, 2015

Public Health Metrics: Key Considerations and Criteria for Food Safety Modernization

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Key Considerations and Criteria for Food Safety Modernization

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Collaborative Food Safety Forum • 25 June 2015
Washington, DC

Public health services & systems research

A field of inquiry examining the ***organization***, ***financing***, and ***delivery*** of public health services at local, state and national levels, and the ***impact*** of these activities on ***population health***

Strategies to promote health and prevent disease & injury on a population-wide basis: programs, policies, administrative practices

Mays, Halverson, and Scutchfield. 2003

Considerations for "good" public health metrics

- ***Relevance*** to program or policy goal

- ***Health impact*** : incidence, prevalence & severity

- ***Economic impact:*** costs and resource use→opportunity cost

- ***Distributional impact:*** equity and disparities in impact

- ***Tractability:*** influenced by relevant actors/actions

- ***Degree & velocity of change:*** over relevant time periods

- ***Attribution:*** confounding, selection, surveillance bias

- ***Measurement quality***: validity, reliability, sensitivity, specificity

- ***Feasibility:*** data availability, collection/reporting burden

- ***Public values/preferences:*** what matters most to the public

Considerations for "good" public health metrics

Measuring outcomes

- Morbidity, mortality, cost, experiences, QOL/wellbeing

- Attribution, sensitivity, and specificity can be problematic

- Programs may have diffuse effects on multiple outcomes

Measuring processes/activities

- Strength of evidence that processes impact outcomes

- Proximal indicators of progress

Measuring structures/inputs

- Human, capital, informational resources

- May be context-sensitive

- Structural equivalence of multiple implementation strategies

Selecting Measures Based on Expected Health Impact: VOI Approach

◆ Proportion of the population currently exposed to the risk factor(s) addressed by the measured activity [risk exposure]

◆ Proportion of the exposed population that is expected to be reached by the measured activity [expected reach]

◆ Relative risk of the health outcome(s) comparing the exposed to the unexposed population [preventable fraction]

◆ Relative risk of the health outcome(s) comparing the population reached by the measured activity to the population not reached [efficacy]

AL Siu, EA McGlynn, et al. 1992

VOI Example

◆ **Activity**:   Community-wide campaigns to increase physical activity

             Community Guide: "Strong Evidence of Effectiveness"

◆ **Risk Exposure (Adults)**: 64% failure to receive recommended PA

◆ **Preventable fraction**: 24% reduction in premature mortality

◆ **Efficacy**: median net improvement of 4% in receipt of recommended PA

◆ **Expected Reach**: 30%

◆ **Impact fraction**: expected proportional reduction in the outcome
   attributable to improvement of the measured activity

$$= \ 0.64 * 0.30 * 0.04 * 0.24$$
$$= \ 0.00184$$

Task Force on Community Preventive Services. Recommendations to increase physical activity in communities. Am J Prev Med 2002;22 (4S):67-72.

6

Example: Measurement Selection and Use in Public Health Practice-Based Research Networks

- First cohort (December 2008 start-up)
- Second cohort (January 2010 start-up)
- Affiliate/Emerging PBRNs (2011-14)
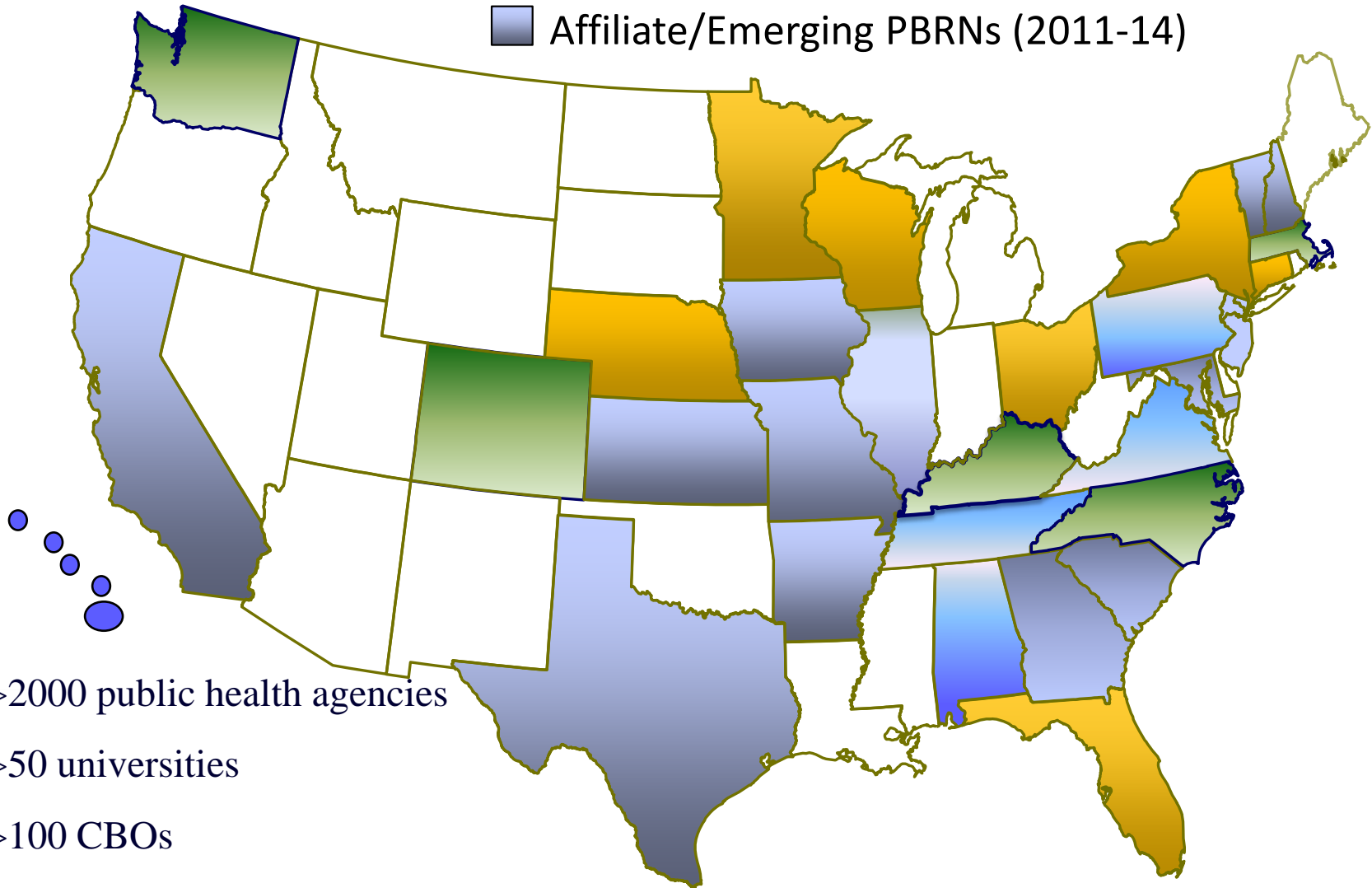
>2000 public health agencies

>50 universities

>100 CBOs

Multi-Network Practice and Outcome Variation Examination Study (MPROVE)

6 Participating PBRNs

- Identify measures of high-value public health services:
  - **Chronic disease prevention**
  - **Communicable disease control**
  - **Environmental health protection**

- Create registry of measures: consistent across communities

- Profile geographic variation in the delivery of selected public health services across local communities

- Decompose variation into attributable components:
  - need-sensitive or preference-sensitive factors
  - supply-sensitive factors

- Examine associations between service delivery & outcomes

Participating MPROVE networks

Network	State Agencies	Local Agencies*	Academic Units	Other	Total	Lead Institution
CO	1	55	2	15	73	Association
FL	1	67	3	3	74	Local agency
MN	1	75	1	1	78	State agency
WA	1	36	2	1	40	Local agency
NJ	1	100	2	1	104	Academic
TN	1	2	2	1	20	Academic
Total	6	337	12	22	371	

MPROVE measurement dimensions

- ***Availability/Scope:*** specific activities produced

- ***Volume/Intensity:*** Frequency of producing activity over period of time

- ***Capacity:*** Labor and capital inputs assigned to an activity

- ***Reach:*** Proportion of target population reached by activity

- ***Quality:*** effectiveness, timeliness, equity of activity

- ***Efficiency:*** resources required to produce given volume of activity

Levels of measurement

- **Community Level**: Includes services/activities regardless of who performs/contributes

- **Agency Level**: Focuses on activities directly contributed by governmental public health agency

Measure selection criteria

- Expected health impact

- Expected economic impact

- Control/influence by public health agencies and their partners

- Pre-existing evidence of validity and reliability

- Feasibility of obtaining data

Example: Delphi Rating of Measures

Chronic Disease Measures: Feasibility x Health Impact Ratings

Health Impact

Feasibility
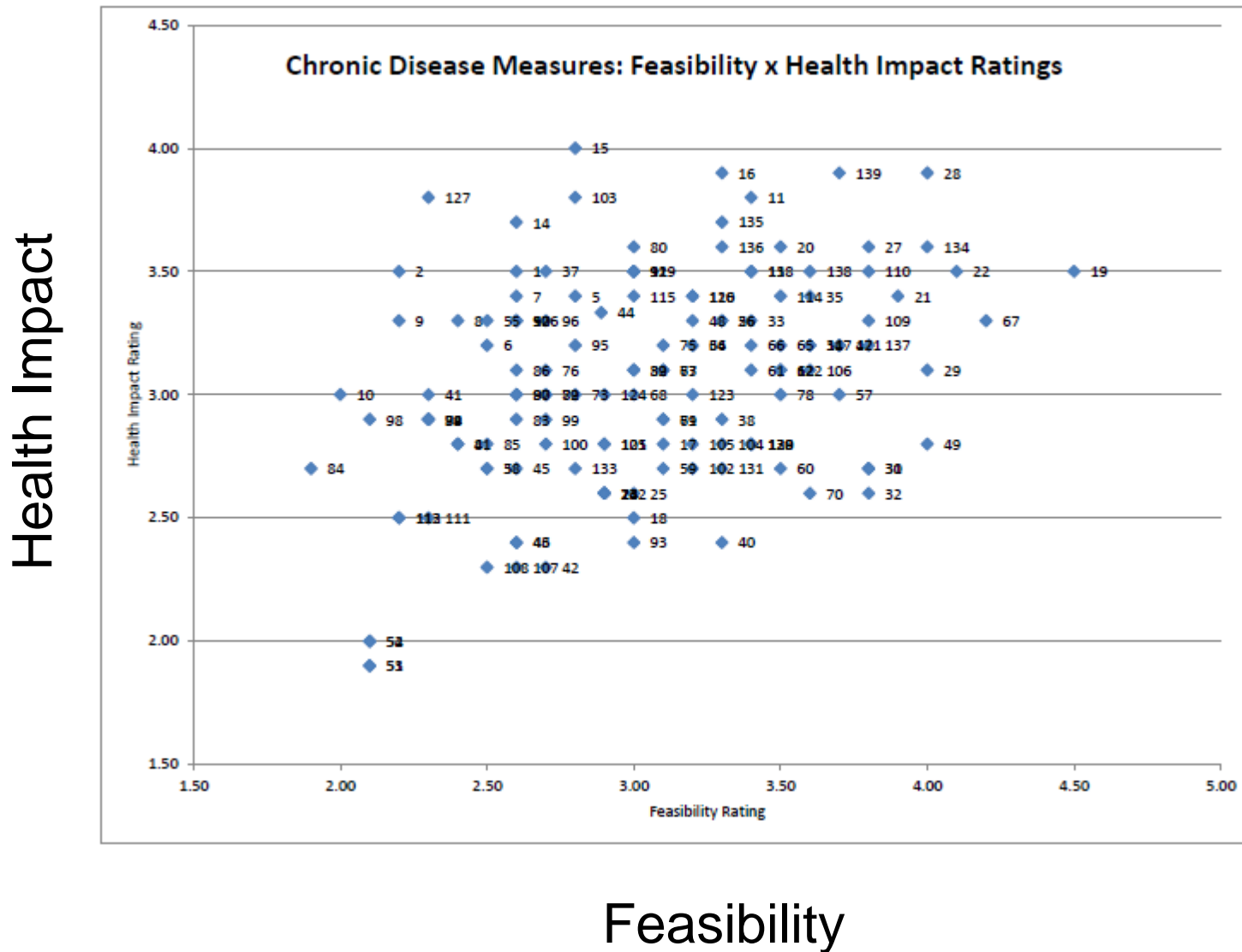
Final MPROVE Measures

- **Chronic disease prevention (8 measures)**
  - Tobacco prevention
  - Obesity prevention

- **Communicable disease control (14 measures)**
  - Immunization
  - Enteric disease control
  - STI control
  - Tuberculosis control

- **Environmental health protection (5 measures)**
  - Lead exposure protection
  - Food safety protection

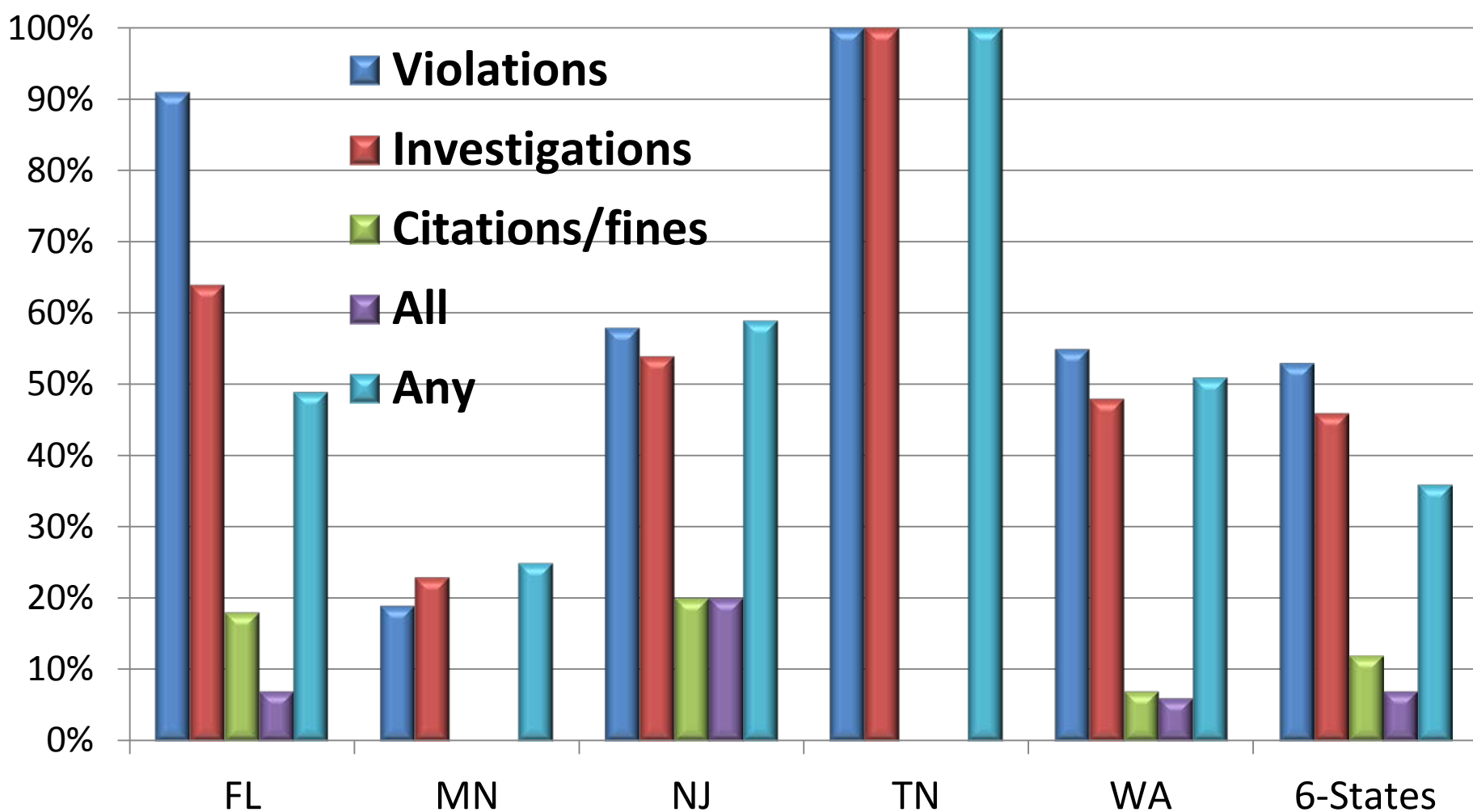Available at: **http://works.bepress.com/glen_mays/82/**

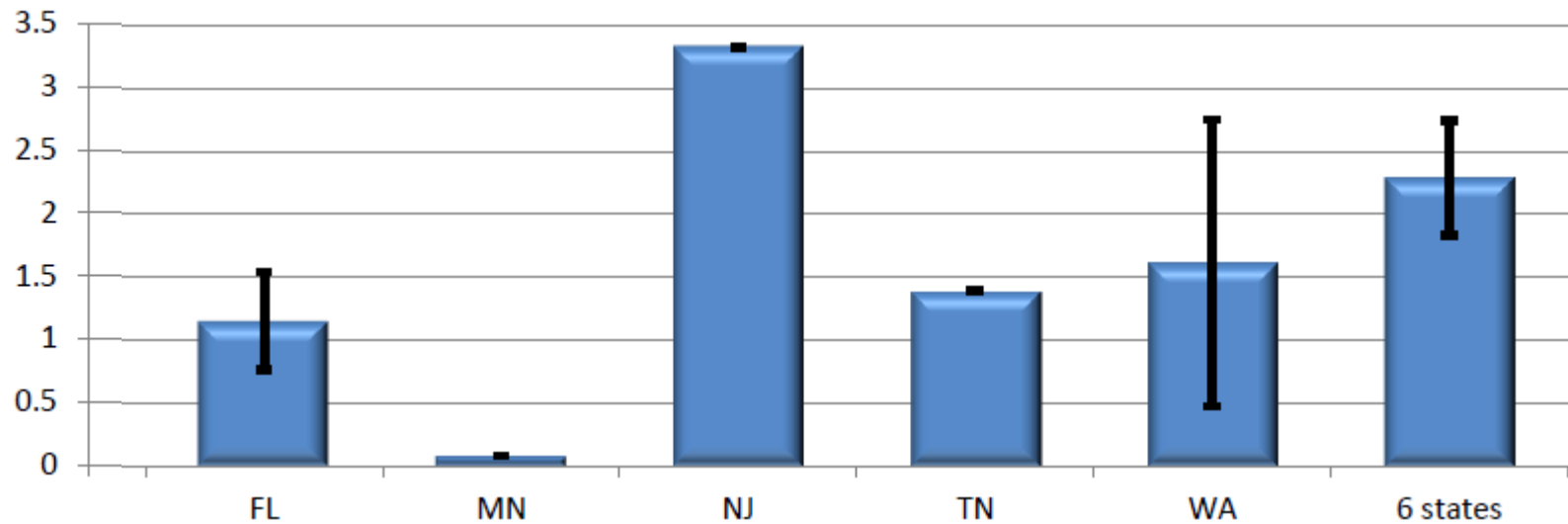# Proportion of local settings able to report MPROVE measures
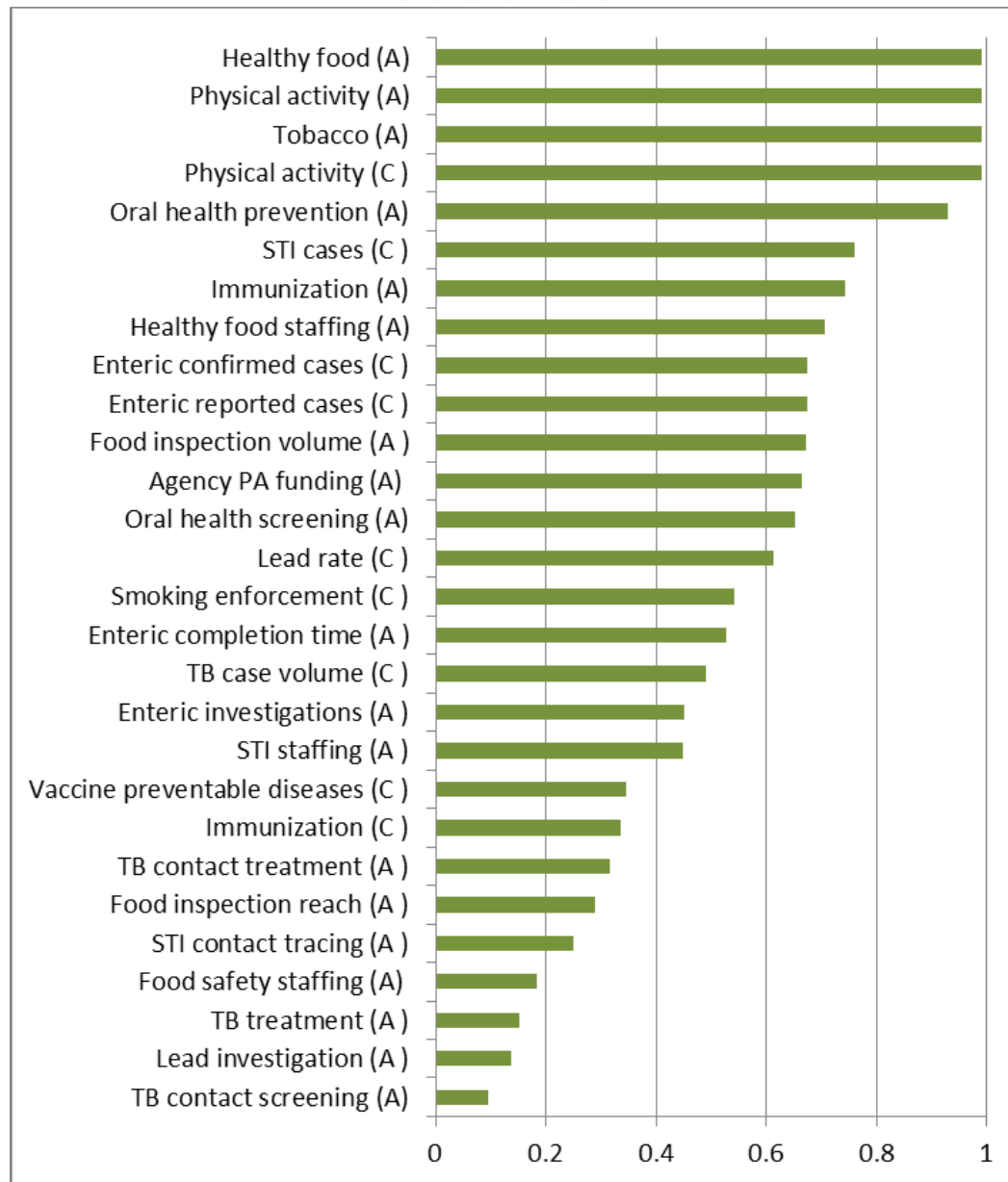
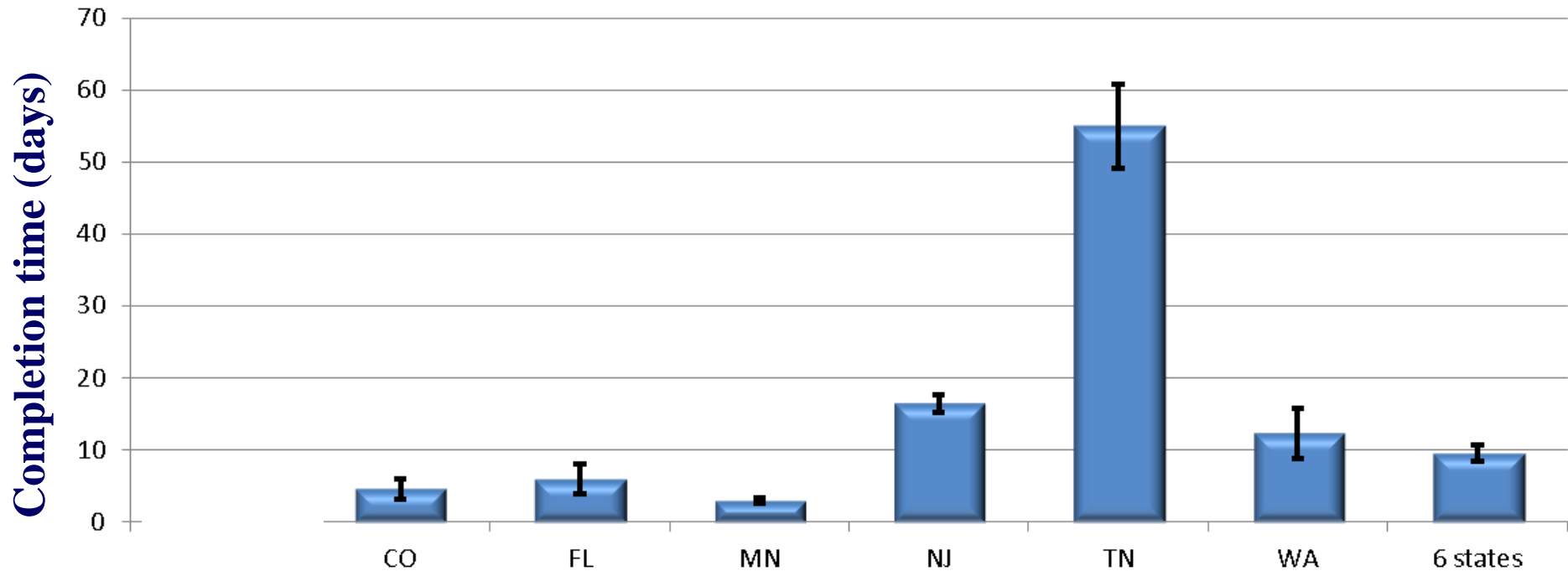# Implementation of community-wide health education campaigns to promote physical activity
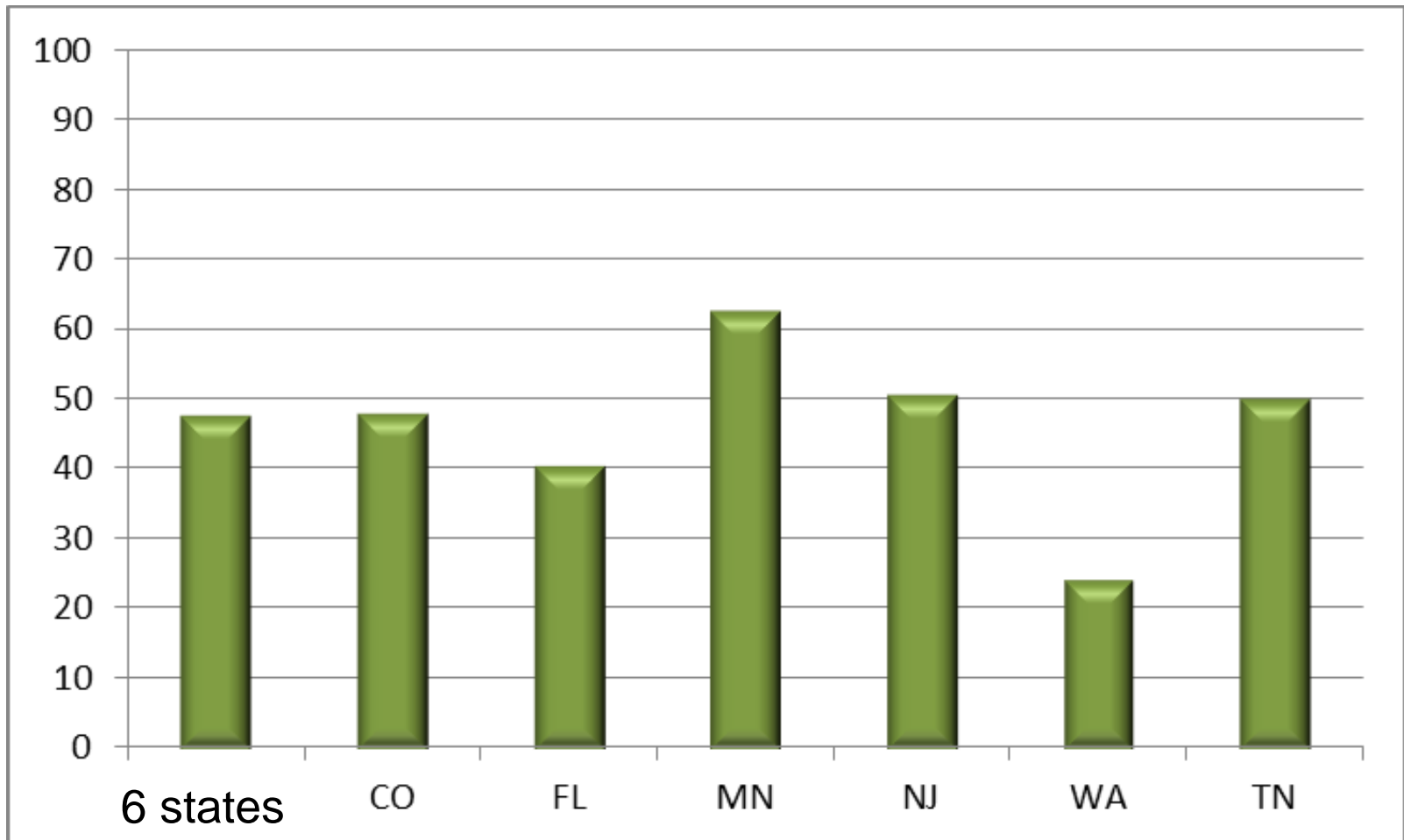
Implementation of clean indoor air policy enforcement activities
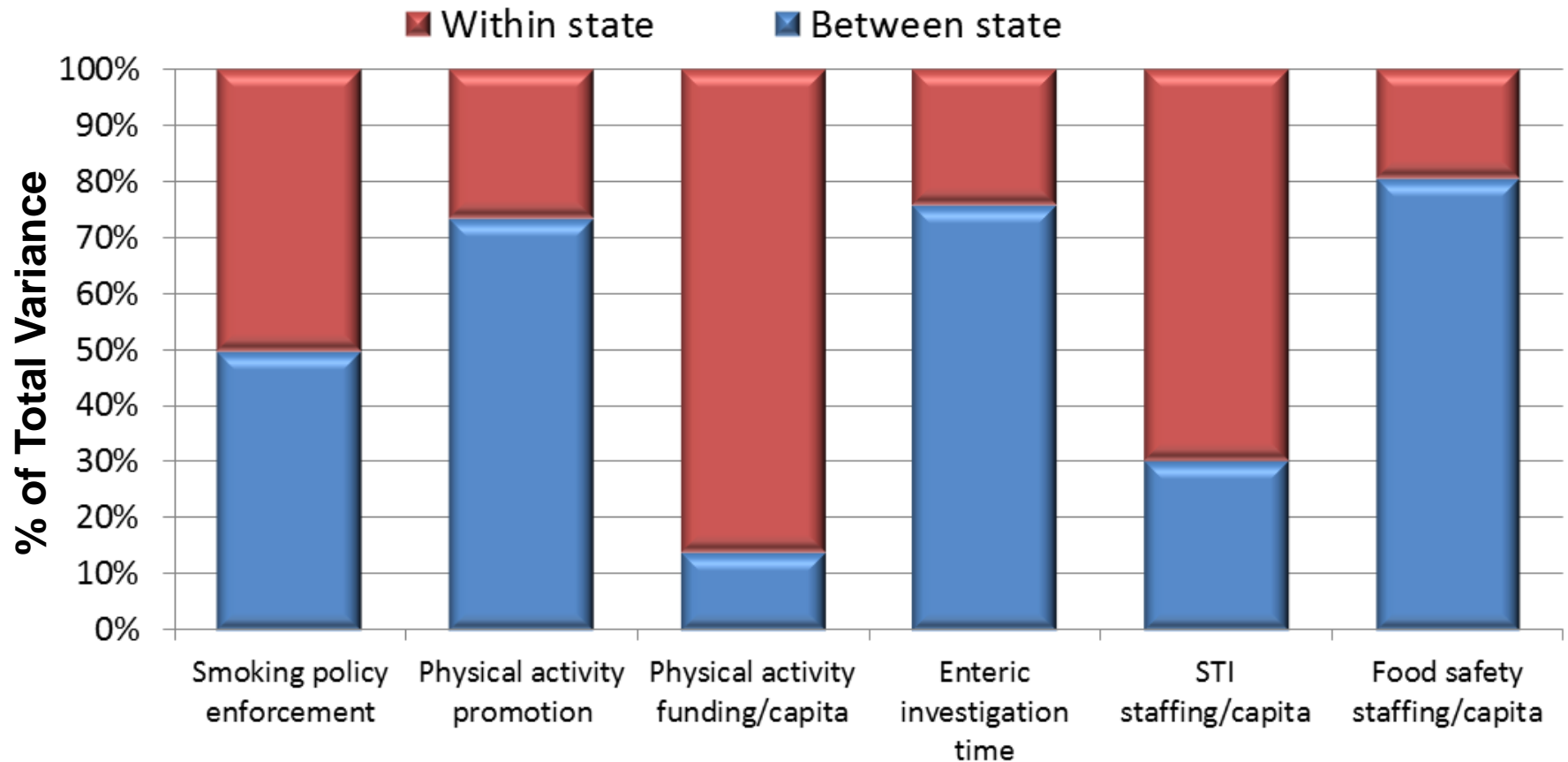
Average FTE staffing for communicable disease intervention specialists per 100,000 population

Average completion time for enteric disease investigations

Overall Patterns of Variation in Local Public Health Measures

Estimates from random effects regression models

Correlates of Variation in Local Public Health Measures

% of Total Variance (y-axis, 0% to 100%)

Categories (x-axis): Tobacco Policy, PA Funding, Enteric Investigation, STI staffing, Food safety staffing

Legend:
- Unexplained local
- Unexplained state
- Local BOH
- LHD $/capita
- Race
- Income/capita
- Popln
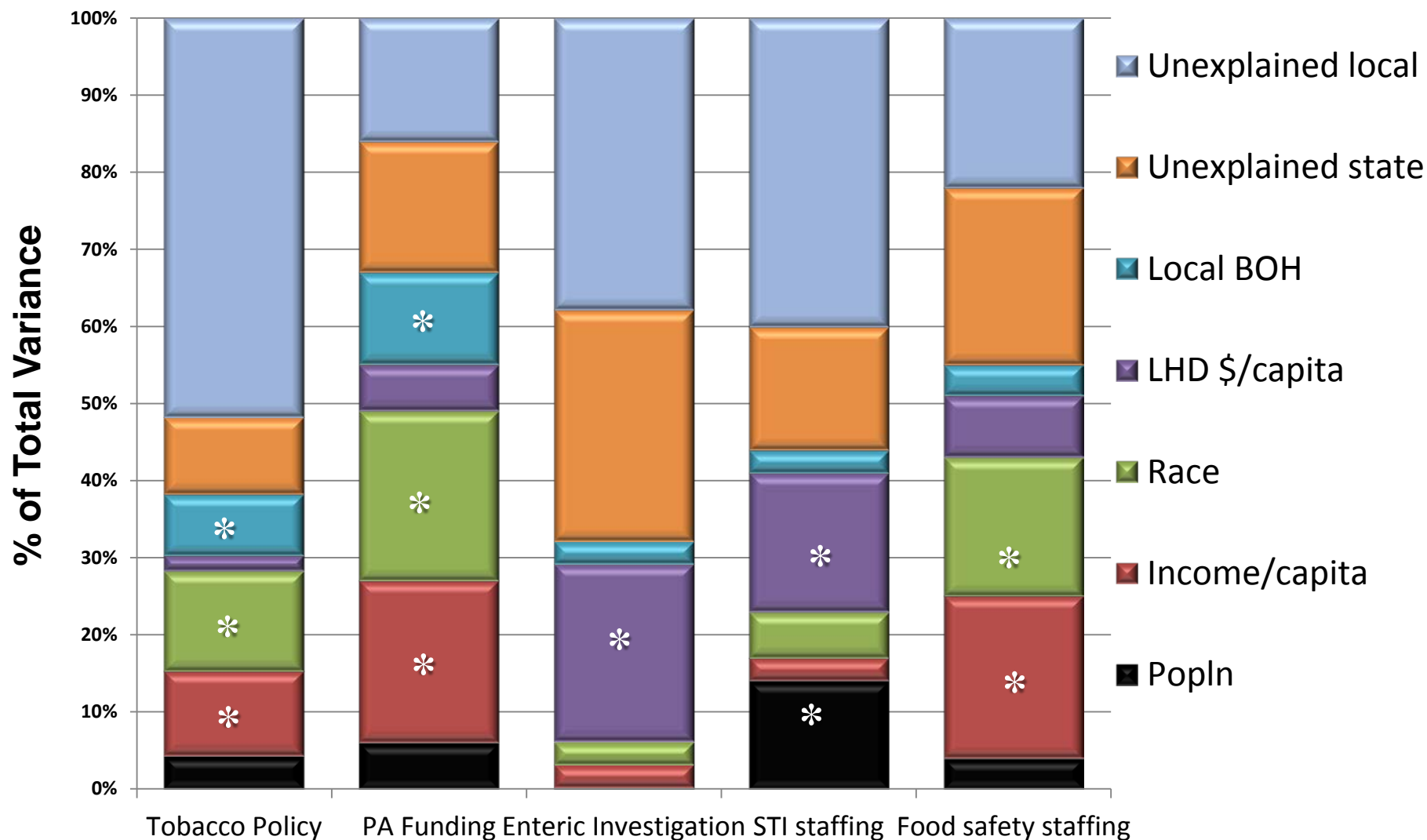
Estimates from state fixed-effects regression models   *p<0.05

Conclusions

- All measures have strengths and limitations

- No single measure will fulfill all attributes perfectly

- Use multiple measures to ensure that measurement system provides desirable attributes

- Multiple measures are less vulnerable to gaming and unintended consequences

MPROVE Measure Resources

- **MPROVE Final Measure Set**
  http://works.bepress.com/glen_mays/82/

- **MPROVE Research Protocol**
  http://works.bepress.com/glen_mays/154/

- **MPROVE Measure Specifications & Compilation Template**
  http://works.bepress.com/glen_mays/94/

- **MPROVE Data Acquisition Plan**
  http://works.bepress.com/glen_mays/66/

- **MPROVE Measure Selection: Delphi Results**
  http://works.bepress.com/glen_mays/49/

- **MPROVE Candidate Measure Inventory**
  http://works.bepress.com/glen_mays/51/

- **MPROVE Measure Selection Criteria**
  http://works.bepress.com/glen_mays/27/

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For More Information

Supported by The Robert Wood Johnson Foundation

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