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The Status of Public Health Services & Systems Research in the US: Implications for British Columbia

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The Status of Public Health Services & Systems Research in the US: Implications for British Columbia

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British Columbia Public Health Systems Research Think Tank • Vancouver, CA • 13 February 2014
Vicious cycles in public health delivery

Limited public understanding & political support

Incoherence in missions, responsibilities & expectations
Complex, fragmented, variable financing & delivery systems

Large inequities in resources & capabilities
Variable productivity and efficiency

Resources incongruent with preventable disease burden

Gaps in reach & implementation of efficacious strategies
Difficulties demonstrating impact, value & ROI
Vicious cycles to learning systems

Limited public understanding & political support

Incoherence in missions, Complex, fragmented, variable responsibilities & expectations, financing & delivery systems

Large inequities in resources & capabilities

Resources incongruent with preventable disease burden

Gaps in reach & implementation of efficacious strategies

Variable productivity and efficiency

Difficulties demonstrating impact, value & ROI

Translate evidence for policy and administrative decisions & advocacy

Discover causes & consequences of variation in public health delivery
What is 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

Mays, Halverson, and Scutchfield. 2003
Subtitle D—Support for Prevention and Public Health Innovation

SEC. 4301. RESEARCH ON OPTIMIZING THE DELIVERY OF PUBLIC HEALTH SERVICES.

(a) IN GENERAL.—The Secretary of Health and Human Services (referred to in this section as the “Secretary”), acting through the Director of the Centers for Disease Control and Prevention, shall provide funding for research in the area of public health services and systems.

(b) REQUIREMENTS OF RESEARCH.—Research supported under this section shall include—

(1) examining evidence-based practices relating to prevention, with a particular focus on high priority areas as identified by the Secretary in the National Prevention Strategy or Healthy People 2020, and including comparing community-based public health interventions in terms of effectiveness and cost;

(2) analyzing the translation of interventions from academic settings to real world settings; and

(3) identifying effective strategies for organizing, financing, or delivering public health services in real world community settings, including comparing State and local health department structures and systems in terms of effectiveness and cost.
A national research agenda

- Public health system organization and structure
- Public health financing and economics
- Public health workforce
- Public health information and technology
- Cross-cutting elements
  - Quality
  - Law and policy
  - Equity and disparities
  - Metrics and data
  - Analytic methods

http://www.publichealthsystems.org/research-agenda.aspx
National Coordinating Center

- **Intramural research activities**
  - **Public Health Value**: Cost estimation & economic evaluation
  - **Public Health Reform**: Effects of ACA on public health delivery

- **Extramural research programs**
  - Quick Strike studies
  - Natural Experiments in Public Health Delivery
  - Predoctoral and Postdoctoral Awards
  - Mentored Research Scientist Awards
National Coordinating Center

Data Development
- Periodic census surveys of local and state agencies
- National Longitudinal Survey of Public Health Systems
- Public Health Activities and Services Tracking (PHAST): compiling existing administrative data across states

Dissemination & Translation
- Weekly Work in Progress Webinars
- Open-access journal: *Frontiers in PHSSR*
- Newsletters, Podcasts, Blogs
- Briefings with policy stakeholders
What is Practice-Based Research in Public Health?

- Research that tests effectiveness & impact of public health practices in real-world *public health settings*
- Research designed to address uncertainties and information needs of real-world public health *decision-makers*
- Research that evaluates the implementation and impact of *innovations in practice*
- Research that uses *observations generated through public health practice* to produce new knowledge
The Logic of Public Health PBRNs

Identify Common questions of interest

Translation & application

Analysis & interpretation

Data exchange

Engaged practice settings

Research partner

Apply Rigorous research methods
### Local Health Departments Engaged in Research Implementation & Translation Activities During Past 12 months

<table>
<thead>
<tr>
<th>Activity</th>
<th>PBRN Agencies Percent/Mean</th>
<th>National Sample Percent/Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying research topics</td>
<td>94.1%</td>
<td>27.5% (***)</td>
</tr>
<tr>
<td>Planning/designing studies</td>
<td>81.6%</td>
<td>15.8% (***)</td>
</tr>
<tr>
<td>Recruitment, data collection &amp; analysis</td>
<td>79.6%</td>
<td>50.3% (***)</td>
</tr>
<tr>
<td>Disseminating study results</td>
<td>84.5%</td>
<td>36.6% (***)</td>
</tr>
<tr>
<td>Applying findings in own organization</td>
<td>87.4%</td>
<td>32.1% (***)</td>
</tr>
<tr>
<td>Helping others apply findings</td>
<td>76.5%</td>
<td>18.0% (***)</td>
</tr>
<tr>
<td>Research implementation composite</td>
<td>84.04 (27.38)</td>
<td>30.20 (31.38) (***)</td>
</tr>
<tr>
<td>N</td>
<td>209</td>
<td>505</td>
</tr>
</tbody>
</table>
Ongoing research: organization and structure

- Who contributes to public health delivery?
- How are roles and responsibilities divided?
- How and why do delivery systems vary and change over time?
- How do system structures affect public health delivery and outcomes?
Delivery of recommended public health activities

Variation in Scope of Public Health Delivery

Delivery of recommended public health activities, 2012

Organizations contributing to local public health production

% Change 2006-2012  Scope of Production 2012

-50%  -30%  -10%  10%  30%  50%

Local health agency
Other local government
State health agency
Other state government
Hospitals
Physician practices
Community health centers
Health insurers
Employers/business
Schools
CBOs

Inter-organizational relationships in public health delivery systems

Do other organizations complement or substitute for local public health agency effort?

Results from Multivariate GLLAMM Models

Note: GLLAMM estimates, holding all other variables constant in the model
Estimated crowd-out in hospital contributions to public health activities

Note: GLLAMM estimates, holding all other variables constant in the model
A typology of public health delivery systems

Scope                High       High         High          Mod           Mod         Low          Low
Centralization   Mod        Low         High          High           Low         High         Low
Integration        High       High         Low           Mod           Mod         Low          Mod

Source: Mays et al. 2010; 2012

% of communities

Comprehensive

Conventional

Limited

Source: Mays et al. 2010; 2012
Changes in health associated with delivery system

Percent Changes in Preventable Mortality Rates by System Typology (cluster)

Fixed-effects models control for population size, density, age composition, poverty status, racial composition, and physician supply
Ongoing research: financing, costs and economics

- How does *public health* spending vary across communities and change over time?
- What are the health effects attributable to changes in public health spending?
- What are the medical cost effects attributable to changes in public health spending?
- What are the opportunities for improving efficiency in public health delivery?
Public health’s share of national health spending

Governmental Public Health Expenditures

- Total spending (x108, $constant)
- Percent state/local sources (x10)
- Percent of NHE (%)
- Percent of GDP (x0.01)
- Per capita (x100 $constant)

Factors driving growth in medical spending

Health spending growth rate 1996-2006

Growth rate due to cost per case

Growth rate due to prevalence

Roehrig et al. Health Affairs 2011
Variation in Local Public Health Spending

Expenditures per capita, 2010

Gini = 0.485
Changes in Local Public Health Spending
1993-2010

62% growth
38% decline
Determinants of Local Public Health Spending Levels

- Delivery system size & structure
- Service mix
- Population needs and risks
- Efficiency & uncertainty

Mays et al. 2009
Mortality reductions attributable to local public health spending, 1993-2008

Hierarchical regression estimates with instrumental variables to correct for selection and unmeasured confounding

Mays et al. 2011
How public health spending relates to medical care spending

Spending estimates adjusted for age, comorbidities, and service mix

Mays et al. Health Services Research 2009
### Effects of public health spending on medical care spending 1993-2008

Change in Medical Care Spending Per Capita Attributable to 1% Increase in Public Health Spending Per Capita

<table>
<thead>
<tr>
<th>Model</th>
<th>N</th>
<th>Elasticity</th>
<th>S.E.</th>
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</thead>
<tbody>
<tr>
<td>One year lag</td>
<td>8532</td>
<td>-0.088</td>
<td>0.013***</td>
</tr>
<tr>
<td>Five year lag</td>
<td>6492</td>
<td>-0.112</td>
<td>0.053**</td>
</tr>
<tr>
<td>Ten year lag</td>
<td>4387</td>
<td>-0.179</td>
<td>0.112</td>
</tr>
</tbody>
</table>

log regression estimates controlling for community-level and state-level characteristics

*p<0.10   **p<0.05   ***p<0.01
Estimated value of public health spending

- 10% increase in public health spending in average community:

  Public health cost $594,291
  Medical cost offset -$515,114 (Medicare only)
  LY gained 148
  Net cost/LY $534
Economies of scale and scope in public health delivery systems

Source: 2010 NACCHO National Profile of Local Health Departments Survey
Economies of scale and scope in public health delivery

Mays et al. 2013
## Gains from regionalizing public health delivery

<table>
<thead>
<tr>
<th>Regionalization Thresholds</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25,000</td>
<td>-20%</td>
</tr>
<tr>
<td>&lt;50,000</td>
<td>-15%</td>
</tr>
<tr>
<td>&lt;100,000</td>
<td>-10%</td>
</tr>
<tr>
<td>&lt;150,000</td>
<td>-5%</td>
</tr>
<tr>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>&gt;200,000</td>
<td>5%</td>
</tr>
</tbody>
</table>

### Per Capita Cost

- Mays et al. 2013
2012 Institute of Medicine Recommendations

- Double current federal spending on public health
- Allow greater flexibility in how states and localities use federal public health funds
- Identify components and costs of a minimum package of public health services
- Implement national chart of accounts for tracking spending & funds flow
- Expand research on costs and effects of public health delivery

**PBRNs: Economic Shocks and Decisions**

- **Washington**: Variation in LHD budget reductions during the 2009-10 economic downturn, and how the reductions have affected service delivery and use of evidence-based practices

- **Nebraska**: Estimating program-specific workforce shortages

- **North Carolina**: LHD responses to Medicaid maternity case management funding cut, and impact on service delivery

- **Connecticut**: Responses to elimination of state subsidies to small LHDs

- **Ohio**: LHD enforcement of smoke-free workplace act (magnitude & frequency) in response to economic downturn

- **Wisconsin & Florida**: Changes in LHD spending, funding sources and resource allocation during economic recession
PBRNs: Regionalized Service Delivery

- **Massachusetts**: Local variation in decision-making and implementation regarding regional delivery models

- **Connecticut**: How do state-mandated services and funding reductions influence decision-making regarding regional models

- **Colorado**: Impact of state public health law reform on regional approaches to service delivery; variation in local legal instruments and approaches to regionalization

- **Georgia**: Effectiveness of regional district structures as quality improvement collaboratives

- **Wisconsin**: Prevalence and scope of shared service arrangements among local health departments

- **Ohio**: Costs and financial effects of consolidation
New frontiers through PBRN research

- **MPROVE**: Effects of public health delivery system characteristics on the delivery of evidence-based programs

- **DACS**: Effects of public health delivery system characteristics on costs of delivering evidence-based programs and policies
  - Chronic disease prevention
  - Communicable disease control
  - Environmental health protection
Informing practice and policy decisions

- Align spending with preventable disease burden
- Identify and address inequities in resources
- Improve productivity and efficiency
- Demonstrate value: linking spending to outcomes
- Strengthen fiscal policy: financing mechanisms
Conclusions: getting inside the box

- Engagement of practice and research partners
- Sensitive and specific measures
- Research designs in real-world settings
- What works best in which settings and why
- Informed public health decisions
- Smarter investments and greater value
Toward a “rapid-learning system” in public health

In a learning health care system, research influences practice and practice influences research.

**Evaluate**
Collected data and analyze results to show what does and does not work.

**Implement**
Apply the plan in pilot and control settings.

**Design**
Design care and evaluation based on evidence generated here and elsewhere.

**Adjust**
Use evidence to influence continual improvement.

**Disseminate**
Share results to improve care for everyone.

**Internal and External Scan**
Identify problems and potentially innovative solutions.

For More Information

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