Strengthening the Science of Public Health Delivery through Services & Systems Research

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Strengthening the Science of Public Health Delivery through Public Health Services Research

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Confronting fundamental gaps in health system performance

1. Or latest year available.
Source: OECD Health Data 2010.

WHO 2010
Preventable disease burden and national health spending

>75% of national health spending is attributable to conditions that are largely preventable

- Cardiovascular disease
- Diabetes
- Lung diseases
- Cancer
- Injuries
- Vaccine-preventable diseases and sexually transmitted infections

CDC 2008 and CMS 2011
The public health challenge

- Delivering the right health protections
- For the right people/communities/settings
- At the right time
- At an acceptable financial, economic, and social cost
The public health challenge

Expanding toolbox of research-tested strategies
- Disease & injury prevention interventions
- Screening and early detection
- Vaccination & communicable disease control
- Health information and education campaigns
- Inspection and licensing
- Policy, law and regulatory enforcement
- Design and engineering approaches

BUT these strategies can be ineffective, intrusive, wasteful and counter-productive if not implemented well
- Targeting/reach
- Fidelity/tailoring
- Volume/intensity
- Timeliness
Meeting the challenge: implementation

- Delivery occurs through complex, variable, loosely connected organizations in the public and private sectors
- Success requires strong implementation support functions
  - Epidemiologic surveillance & investigation
  - Environmental health monitoring and assessment
  - Community health assessment & planning
  - Performance measurement and reporting
  - Coordination mechanisms: schools, worksites, health care, community-based and faith-based settings
PHSSR’s place in the continuum

**Intervention Research**
- What works – proof of efficacy
- Controlled trials
- *Guide to Community Preventive Services*

**Services/Systems Research**
- How to organize, implement and sustain in the real-world
  - Reach
  - Quality/Effectiveness
  - Cost/Efficiency
  - Equity/Disparities
- Impact on population health
- Comparative effectiveness & efficiency
What the research tells us

- Wide variation exists in public health delivery across U.S. communities
- Variation reveals gaps in effectiveness, timeliness, and efficiency
- Variation in public health delivery has important health and economic consequences

Feasible solutions exist:
- Regionalization and service sharing
- Performance standards and accreditation
- Workforce development & training
- New funding and payment models
By the numbers: illustrative research findings

- **68%** – proportion of recommended public health practices delivered in the average U.S. community in 2012
- **5%** – reduction in recommended public health practices delivered in the average U.S. community between 2006-2012
- **64%** – proportion of practices contributed by nongovernmental organizations in 2012 (up from 59% in 2006)
- **2.9%** – proportion of total U.S. health spending in 2011 ($2.7T) allocated to governmental public health activities (0.5%↓ from 2010)
- **86%** – proportion of governmental public health spending contributed by state and local governments in 2011
- **7%** – reduction in preventable mortality between 1993-2008 attributable a 10% increase in local public health spending
- **89%** – proportion of local public health spending during 1993-2008 offset by lower medical care spending in U.S. communities
Variation in public health practice

Mixed Results In Tracking Food Scares

Minnesota health officials investigate all reports of food-borne illness, but officials in many states do not. From 1990 to 2006, Minnesota reported 548 outbreaks, while Kentucky reported 18.

Reported outbreaks of food-related illness
Per 100,000 people, 1990 to 2006

Source: Centers for Disease Control and Prevention

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Variation in adoption of evidence-based practices

Missed Opportunities
Local Health Departments as Providers of Obesity Prevention Programs for Adolescents
Sandy J. Slater, PhD, Lisa M. Powell, PhD, Frank J. Chaloupka, PhD

Percent of local health departments offering evidence-based obesity programs

Slater et al. 2007
Estimated Effects of Smoke-free Policies on AMI admissions

<table>
<thead>
<tr>
<th>Study</th>
<th>ES (95% CI)</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Helena Montana</td>
<td>0.60 (0.21, 0.99)</td>
<td>1.76</td>
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<tr>
<td>Pueblo Colorado</td>
<td>0.73 (0.63, 0.85)</td>
<td>10.13</td>
</tr>
<tr>
<td>Piedmont Italy</td>
<td>0.89 (0.81, 0.98)</td>
<td>12.14</td>
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<tr>
<td>Bowling Green Ohio</td>
<td>0.61 (0.55, 0.67)</td>
<td>14.24</td>
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<tr>
<td>New York State</td>
<td>0.80 (0.80, 0.80)</td>
<td>17.20</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.89 (0.81, 0.97)</td>
<td>12.56</td>
</tr>
<tr>
<td>Saskatoon Canada</td>
<td>0.87 (0.84, 0.90)</td>
<td>16.35</td>
</tr>
<tr>
<td>Rome Italy</td>
<td>0.89 (0.85, 0.93)</td>
<td>15.61</td>
</tr>
<tr>
<td>Overall</td>
<td>0.81 (0.76, 0.86)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

NOTE: Weights are from random effects analysis

Glantz 2008
Changes in public health delivery over time

Delivery of recommended public health activities

- **Assurance**
- **Policy**
- **Assessment**

% of activities

<table>
<thead>
<tr>
<th>Year</th>
<th>1998</th>
<th>2006</th>
<th>2012</th>
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</thead>
<tbody>
<tr>
<td>100%</td>
<td>50%</td>
<td>60%</td>
<td>55%</td>
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<td>90%</td>
<td>40%</td>
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<td>80%</td>
<td>30%</td>
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<td>70%</td>
<td>20%</td>
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<td>60%</td>
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</tr>
<tr>
<td>50%</td>
<td>0%</td>
<td>10%</td>
<td>10%</td>
</tr>
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</table>

↑ 10%  ↓ 5%

Organizations engaged in local public health delivery

% Change 2006-2012

-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

Scope of Delivery 2012

Economies of scale and scope in public health delivery systems

Source: 2010 NACCHO National Profile of Local Health Departments Survey
Effects of regionalization strategies

Regionalization strategies under study

- Agency consolidation (Ohio)
- Regional districts (MA, NE, GA)
- Cross-jurisdictional service-sharing (WI, MN)

Source: 2012 Public Health Practice-Based Research Networks (PBRN) Program
Scope and Timing of H1N1 Response Activities: by Agency Accreditation Status

Financing public health activity

Governmental Expenditures for Public Health Activity, USDHHS National Health Expenditure Accounts

- Percent of NHE (x100)
- Percent of GDP (x1000)
- Per capita ($100s nominal)
- Per capita ($100s constant)

U.S. Centers for Medicare and Medicaid Services, Office of the Chief Actuary
Factors driving growth in medical spending

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

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

- 62% growth
- 38% decline
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
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

Mays et al. forthcoming
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

Mays et al. forthcoming
Conclusions: Toward a rapid-learning system

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

**Evaluate**
Collect 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

Internal

External

For More Information

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