Strengthening the Science of Public Health Delivery: Complexities in Implementation, Inference & Translation

Glen P. Mays, University of Kentucky

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Glen Mays, PhD, MPH
University of Kentucky

glen.mays@uky.edu

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Problems in health system performance

The graph illustrates the relationship between life expectancy and per capita spending in various countries. The x-axis represents different countries, including Japan, San Marino, Switzerland, Sweden, Iceland, Andorra, and more. The y-axis shows average life expectancy, while the graph also displays per capita spending in international dollars. The United States stands out with a significantly high life expectancy and per capita spending, indicating a notable variance in performance when compared to other nations.
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

<5% of national health spending is allocated to public health and prevention

CDC 2008 and CMS 2011
What does the public health delivery system do?

Organized programs, policies, and laws to prevent disease and injury and promote health on a population-wide basis

- Epidemiologic surveillance & investigation
- Community health assessment & planning
- Communicable disease control
- Chronic disease and injury prevention
- Health education and communication
- Environmental health monitoring and assessment
- Enforcement of health laws and regulations
- Inspection and licensing
- Inform, advise, and assist school-based, worksite-based, and community-based health programming

...and roles in assuring access to medical care
Public health delivery systems

Complexity in public health delivery

**Public Health System**
- Scale of operations
- Scope of activity
- Divison of responsibility
- Compatibility of missions
- Participation incentives
- Distribution of effort
- Nature & intensity of relationships
- Breadth of organizations

**Public Health Agency**
- Scope of services
- Staffing levels & mix
- Intergovernmental relationships
- Legal authority
- Funding levels & mix
- Governing structure
- Leadership

**Population & Environment**
- Needs
- Preferences
- Risks
- Threats
- Resources
- Perceptions

**Decision Support**
- Accreditation
- Performance measures
- Practice guidelines

**Strategic Decisions**

**Outputs and Outcomes**
- Reach
- Effectiveness
- Timeliness
- Adherence to EBPs
- Efficiency
- Equity

Mays et al 2009
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

Variable productivity and efficiency

Resources incongruent with preventable disease burden

Gaps in reach & implementation of efficacious strategies

Difficulties demonstrating impact, value & ROI

Translate evidence for policy and administrative decisions & advocacy

Discover causes & consequences of variation in public health delivery
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
Why study public health delivery?

“The Committee had hoped to provide specific guidance elaborating on the types and levels of workforce, infrastructure, related resources, and financial investments necessary to ensure the availability of essential public health services to all of the nation’s communities. However, such evidence is limited, and there is no agenda or support for this type of research, despite the critical need for such data to promote and protect the nation’s health.”

—Institute of Medicine, 2003
Subtitle D—Support for Prevention and Public Health Innovation

Patient Protection and Affordable Care Act of 2010

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.
Failing to connect

- Why do medical care and public health delivery systems often fail to connect?
- What are the causes and consequences of this failure?
- Where are the opportunities for connection to improve population health?
Failing to connect

Medical Care Delivery
- Fragmentation
- Duplication
- Variability in practice
- Limited accessibility
- Episodic and reactive care
- Insensitivity to consumer values & preferences
- Limited targeting of resources to community needs

Public Health Delivery
- Fragmentation
- Variability in practice
- Resource constrained
- Limited reach
- Insufficient scale
- Limited public visibility & understanding
- Limited evidence base
- Slow to innovate & adapt

Inefficient delivery

Inequitable outcomes

Limited population health impact
How Does the Public Health System Perform?

Delivery of recommended activities

Variation in Public Health Delivery
Delivery of recommended public health activities, 2012

Organizations engaged in public health delivery
Delivery of recommended public health activities, 2012

% Change 2006-2012

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

Scope of Activity 2012

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

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

<table>
<thead>
<tr>
<th>Disease</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant mortality</td>
<td>-9</td>
</tr>
<tr>
<td>Heart disease</td>
<td>-8</td>
</tr>
<tr>
<td>Diabetes</td>
<td>-7</td>
</tr>
<tr>
<td>Cancer</td>
<td>-6</td>
</tr>
<tr>
<td>Influenza</td>
<td>-5</td>
</tr>
<tr>
<td>All-cause</td>
<td>-4</td>
</tr>
<tr>
<td>Alzheimers</td>
<td>-3</td>
</tr>
</tbody>
</table>

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

Mays et al. 2011
Factors driving growth in medical spending

Roehrig et al. Health Affairs 2011
Medical cost offsets attributable to local public health spending, 1993-2008

For every $10 of public health spending, ≈$9 are recovered in lower medical care spending over 15 years

Bridging the Gap: Why Now?

Integrated Medical Care & Public Health Delivery

- Hospital community benefit regs
- Funding constraints
- Payment reform
- Accountable care organizations
- Patient centered medical homes
- Employer wellness incentives
- Health insurance expansions
- Health information exchange
- Public Health Accreditation
Some Leading Examples

Hennepin Health ACO

- Partnership of county health department, community hospital, and FQHC
- Accepts full risk payment for all medical care, public health, and social service needs for Medicaid enrollees
- Fully integrated electronic health information exchange
- Heavy investment in care coordinators and community health workers
- Savings from avoided medical care reinvested in public health initiatives
  - Nutrition/food environment
  - Physical activity
Some Leading Examples

Akron Accountable Care Community

- Partnership of multiple hospital systems, county health department, FQHCs, schools, libraries and CBOs
- Targets community-wide population at risk for diabetes
- Invests in primary prevention, screening, and active disease management
- Savings from avoided medical care reinvested in prevention initiatives
  - Nutrition/food environment
  - Physical activity
**Some Leading Examples**

**Massachusetts Prevention & Wellness Trust Fund**

- $60 million invested from nonprofit insurers and hospital systems
- Funds community coalitions of health systems, municipalities, businesses and schools
- Invests in community-wide, evidence-based prevention strategies with a focus on reducing health disparities
- Savings from avoided medical care are expected to be reinvested in the Trust Fund activities
Toward next generation public health

Public health as a chief health strategist for the community

- Articulate population health needs & priorities
- Engage community stakeholders
- Plan with clear roles & responsibilities
- Recruit & leverage resources
- Develop and implement policies
- Ensure coordination
- Promote evidence-based practices
- Monitor and feed back results
- Mobilize performance improvement
- Ensure transparency & accountability: resources, results, ROI
Evidence gaps: 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.

Adjust
Use evidence to influence continual improvement.

Implement
Apply the plan in pilot and control settings.

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

Disseminate
Share results to improve care for everyone.

Internal and External Scan
Identify problems and potentially innovative solutions.

Internal
External
Public Health Practice-Based Research Networks (PBRNs)

- First cohort (December 2008 start-up)
- Second cohort (January 2010 start-up)
- Affiliate/Emerging PBRNs (2011-13)
Conclusions: getting inside the box

- Engagement of practice and research partners
- Better measures and data sources
- Research designs in real-world settings
- What works best in which settings and why
- Informed public health decisions
- Smarter investments and greater value
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Glen P. Mays, Ph.D., M.P.H.
glen.mays@uky.edu

Email: publichealthPBRN@uky.edu
Web: www.publichealthsystems.org
Journal: www.FrontiersinPHSSR.org
Archive: works.bepress.com/glen_mays
Blog: publichealththeconomics.org

University of Kentucky College of Public Health
Lexington, KY