Introduction

The Economics of Public Health: Missing Pieces to the Puzzle of Health System Reform

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The United States continues to experiment with health care delivery and financing innovations, but relatively little attention is given to the public health system and its capacity for improving health status in the U.S. population at large. The public health system operates as a multisector enterprise in which government agencies work in conjunction with private and voluntary organizations to identify health risks in the population and to mobilize community-wide actions that prevent and contain these risks. The Affordable Care Act and related health reform initiatives are generating new interest in the question of how best to expand and integrate public health approaches into the larger U.S. health system. The research articles featured in this issue of *Health Services Research* cluster around two broad topics: how public health agencies can deliver services efficiently and how public health agencies can interact productively with other elements of the health system. The results suggest promising avenues for aligning medical care and public health practices.

Key Words. Public health services, health economics, health system reform

The American pursuit of health system reform seeks to close the yawning gap between the resources consumed by our health system and the health outcomes experienced in the U.S. population. The fact that the United States ranks first among high-income countries in health spending per capita but near the bottom in life expectancy, infant mortality, and other measures of population health and health equity is now widely understood as a public health problem and economic burden in need of remedy. The Affordable Care Act (ACA) and related federal and state reform initiatives have focused attention and resources on expanding health insurance coverage and, to a

lesser extent, improving the delivery of high-value medical care. Recent research indicates that these reforms are achieving some of their most important intended effects on coverage and care (Courtemanche et al. 2017; Duggan, Goda, and Jackson 2017; Sommers et al. 2017). Much less policy and scientific attention, however, focuses explicitly on the larger health reform objective of improving health outcomes in the U.S. population at large.

HEALTH REFORM AND POPULATION HEALTH

Over time, some population-wide improvements in health status are likely to accrue from successful efforts to expand health insurance coverage and extend high-value medical care delivery to larger shares of the U.S. population (Sommers, Gwande, and Baicker 2017). Accountable care organizations, patient-centered medical homes, care transition initiatives, and value-based payment arrangements for medical providers are all ACA-supported strategies that have the potential to improve health outcomes for patients, and some may simultaneously help to constrain costs (Rajkumar, Press, and Conway 2015). These strategies by themselves, however, are unlikely to intervene strongly on social, economic, and environmental conditions, along with health behaviors, that collectively exert powerful influences on health status and health disparities in the U.S. population. Similarly, current health reform strategies may have limited ability to address these health determinants far enough upstream in order to prevent disease and injury before they occur.

Fortunately, the ACA includes significant but less visible policy and program components designed to strengthen the nation's public health system—the constellation of organizations that focus on reducing disease and injury risks in the U.S. population at large. The most prominent of these components include (1) creation of the Public Health and Prevention Fund that expands federal funding for public health programs and infrastructure, and (2) implementation of new requirements for nonprofit hospitals to assess health needs in the communities they serve and to develop plans for addressing these needs

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through community benefit activities that hospitals undertake as a condition of their federal tax-exempt status (Rosenbaum 2011). The ACA also creates new incentives for health insurers and employers to invest in health promotion and wellness programs for their covered populations. In addition, the transition to value-based health care payment arrangements under ACA and related federal and state reforms may create stronger incentives for medical providers to implement public health approaches for their patient populations and to partner with others in supporting community-wide public health initiatives.

These nonmedical components of health reform offer important opportunities for research and learning about the implementation and impact of public health strategies and for investigating how ACA's medical and public health components interact in shaping health systems and health outcomes. Historically, the health services research field has focused relatively little attention on the organization, financing, and delivery of public health programs and their impact on health outcomes. Kerr White, a founding father of health services research in the United States, famously eschewed research on public health practice in favor of the study of medical practice for its more clearly defined purposes, providers, and processes (Berkowitz 2003). Until recently, the demand for research focused on the public health system has been driven principally by health professionals working in local, state, and federal public health agencies, who represent a small niche within the vast collection of U.S. health system stakeholders. After all, governmental public health expenditures constitute <3 percent of national health spending in the United States (Martin, Hartman, and Washington 2017). Health reform and the ACA have begun to stimulate new demand for this type of research as hospitals, health systems, insurers, ACOs, and other stakeholders contemplate new ways of engaging with the public health system (McClellan 2014). Many health care organizations recently have created divisions focused on population health, and the market for consultants, educational offerings, and training programs devoted to population health continues to expand. The evidence base on how best to expand and integrate public health approaches into the larger U.S. health system, however, remains surprisingly thin.

UNDERSTANDING PUBLIC HEALTH AS A MULTISECTOR ENTERPRISE

Like the medical care system, the public health system consists of a heterogeneous set of actors facing a mix of different incentives and constraints on their

actions while pursuing a shared aim of improving health status (Mays et al. 2010). One class of public health actions involves the direct delivery of health services to individuals, which is familiar territory for health services researchers who study medical practice. However, the personal health services delivered through the public health system tend to be those that (1) entail significant spillover effects (externalities) on the health risks of entire populations of people, such as vaccinations and treatments for communicable diseases, and (2) are incompletely delivered to the population at large through the mainstream medical care system. A second class of public health actions involves the implementation of policies, laws, and regulations designed to shape the health-related behaviors and risks of large populations of people and organizations, as in the typical subjects of health policy research. These actions commonly focus on reducing environmental health risks in food, water, air, soil, and the built environment.

A third class of public health interventions—perhaps the least understood—focuses on stimulating and supporting collective action in society to improve health and reduce risks. These actions aim to make organizations from different sectors in the community more aware of health issues that they might affect and to enlist their cooperation in pursuing solutions to these issues. Public health agencies collect and analyze data on health needs and risks within their communities, educate the public and community leaders about community health needs and potential remedies, convene community stakeholders to develop shared priorities and plans for addressing health needs, advocate for needed health policy solutions, and recruit community resources to support the implementation of health programs and policies. These actions often target social, economic, and environmental determinants of health that require engagement from nonhealth sectors such as housing, education, transportation, social services, and business. This approach is attracting increased attention in health policy and medical care practice as evidence emerges about how unmet social and economic needs influence medical care utilization and outcomes (Alley et al. 2016).

Much of the responsibility for initiating and coordinating public health actions falls to agencies of government—particularly state and local government—working in partnership with an array of community organizations, including medical care providers. The division of labor between local and state agencies varies widely across the United States as do the roles played by the private sector. The combinations of health programs and policies implemented by public health agencies also vary widely across the United States, driven by policy priorities of state and local elected officials and their

constituents, fiscal capacities of state and local governments, and the interest of the private and philanthropic sectors in contributing to these activities. The federal government plays a much more limited role in financing activities within the public health system than it does for medical care. These structural and fiscal realities of the public health system result in wide geographical variation in the practice of public health—another familiar circumstance for health services researchers.

RESEARCH ON THE ECONOMICS OF PUBLIC HEALTH PRACTICE

The challenge this poses to health services researchers is to adapt the theories and methods honed in the study of medical practice in order to uncover the causes and consequences of variation in public health practice. Such research promises to point the way toward solutions that improve population health by reducing harmful, wasteful, and inequitable variations, and by scaling up beneficial innovations. Doing so can provide critical missing pieces to the puzzle of U.S. health system reform.

Building this type of evidence requires answering some fundamental questions about the economics of the public health system, such as the following:

- What factors determine the mix of public health actions that are implemented in a community and the concordance of these actions with available scientific knowledge and evidence-based guidelines?
- What resources are required to implement beneficial public health practices, and how do resource requirements vary based on community needs and risks (IOM 2012)?
- What types of organizations and professionals are needed to implement beneficial practices, and what incentives and constraints do they face in engaging productively in this work?
- How do public health practices influence demand for and utilization of medical care and other social services?
- What financing mechanisms and regional delivery models are most effective and efficient for supporting beneficial public health practices, and how do they vary across state and community contexts in the United States?
- What decision tools and processes help communities to optimize their mix of public health practices, consistent with available resources and the distribution of health needs and risks in the community?

The Robert Wood Johnson Foundation (RWJF) has supported research on these issues through a series of related programs implemented over more than a decade. The Public Health Practice-based Research Networks Program,

launched in 2007, and the Public Health Services and Systems Research Program, launched shortly thereafter, have fostered the development of influential early studies on these topics, while also helping to refine data sources, methods, and research-practice collaborations required for successful lines of inquiry (Mays and Scutchfield 2015). In 2016, these programs combined to form supporting pillars for a new Systems for Action Research Program, launched as part of RWJF's efforts to increase scientific knowledge on building a culture of health across the United States (Lavizzo-Morey 2017). Systems for Action expands the scope of scientific research on these topics by focusing attention on how medical, public health, and social services delivery systems interact, or fail to do so, in supporting health improvements across the United States (Mays et al. 2016).

NEW CONTRIBUTIONS AND NEW DIRECTIONS FOR RESEARCH

The research articles featured in this issue of *Health Services Research* constitute proofs of concept for the feasibility and utility of applying the methods and tools of health services research and health economics to the study of public health systems. The articles in this special issue cluster around two broad topics: how public health agencies can deliver services efficiently and how the public health system interacts with other pieces of the health care delivery system.

The first four articles look at questions of short-run economic efficiency and cost in different services: environmental health inspections (Cohen and Checko), delivery of immunizations (Basurto-Davila et al.), and sexually transmitted disease (STD) partner services (Johnson et al.), and communicable disease surveillance (Atherly et al.).

Cohen and Checko used a longitudinal dataset to examine the possibility of economies of scale and scope in environmental health inspections in Connecticut. The authors find that there are substantial economies of scale and scope in the delivery of services. In particular, full-time municipal health departments and regional health districts are closer to minimum efficient scale than part-time health departments, suggesting that costs could be reduced if smaller agencies were combined. Further, four different types of inspections (water and septic, food and septic, food and lead, and lead and septic) have economies of scope, suggesting total costs are reduced when the inspections are performed together.

Basurto-Davila et al. investigated the economic gain from more efficient distribution of vaccinations through Maine's school-based influenza vaccination (SIV) program. Using a difference-in-difference-in-differences analysis, coupled with a Markov microsimulation model, the authors found that the SIV program in Maine increased immunization among children—the target population—and lowered immunization among adults aged 18–49 years and 65 and older. On net, the more efficient targeting of immunizations was estimated to have prevented 4,600 influenza infections and generated \$4.9 million in net economic benefits.

Johnson et al. examined the cost of STD partner services for HIV, syphilis, gonorrhea, and chlamydial infections. Delivery of partner services varied across reported disease, ranging from 96 percent for HIV cases to 17 percent for chlamydia cases. Similarly, the cost per case varied by disease type, from a high of more than \$20,000 for HIV to a low of \$1,700 for syphilis. Yet more than half of the budget for partner services was devoted to chlamydial infections. This highlights the need to understand costs of services to effectively prioritize public health spending.

On the question of public health interactions with the broader medical care system, the article by Mays examined how local expenditures for public health activities influence area-level medical spending for Medicare beneficiaries. Using national data on public health and Medicare expenditures in local communities over a 20-year period, the study found that adjusted Medicare expenditures per beneficiary fell by 0.8–1.1 percent for each 10 percent increase in public health spending per capita. The results suggest that public health agencies could become helpful partners to medical providers participating in Medicare's value-based payment models and accountable health community initiatives.

Finally, Singh and Young look at the funding question through a different lens: partnerships between public health agencies and hospitals. Hospitals are required under the Affordable Care Act to spend more on community benefits and to develop community health assessments. Given these requirements, partnerships with public health agencies would seem to be a natural fit. However, Singh and Young find no relationship between public health spending and spending on community benefits by hospitals. Further, there was little relationship between measures of community need (broadly defined) and spending by hospitals. The potential remains for a partnership between hospitals and public health agencies, but it is just that—a potential.

CONCLUSIONS

These studies add substantively to our understanding of costs and resource use within public health systems, the availability and quality of practices supported by these systems, and the impact of these systems on important health and economic outcomes. Several of the articles included in this issue derive from RWJF's pioneering research programs devoted to these topics. We hope the work profiled in this issue will collectively help to expand awareness of and interest in these topics in both the research and health policy communities, leading to important new avenues of inquiry and continued experimentation with innovations in public health policy and practice.

Public health proved its value during the 20th century by producing as many as 25 of the 30 additional years of life gained by the average American (Bunker, Frazier, and Mosteller 1994). The long-term success of 21st-century health reform initiatives may depend in part on our ability to harness the power of modern public health strategies to produce better health at lower cost for the U.S. population as a whole.

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SUPPORTING INFORMATION

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Appendix SA1: Author Matrix.