Bridging Research and Practice to Implement Strategic Public Health Science

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The COVID-19 pandemic has revealed a series of "fault lines" in our public health system, which include health inequities, disinformation, and insufficient surveillance systems.[1] This once-in-a-century crisis also presents significant opportunities to take stock of organizational capacities (including strengths and gaps), identify innovations to address challenges, and mobilize multiple sectors for action. In this issue of *AJPH*, Bunnell et al. (p. 1489) make the case for a new strategic public health science that seeks to fill the many gaps uncovered during the COVID-19 pandemic. In their insightful and timely article, the authors delineate six domains in need of urgent attention: health equity science, climate science, data science and modernization, communication science, policy analysis and translation, and scientific collaboration.

This scientific playbook, crafted by a team of scientists and public health leaders from the Centers for Disease Control and Prevention (CDC), builds on decades of advances in applied public health science from the CDC. For example, the Epidemic Intelligence Service, established in 1951, is the largest training program of its kind in the world and via its officers has investigated hundreds of disease outbreaks and epidemics and formalized many of the concepts of field epidemiology.[2] In seminal work published in 1963,[3] Langmuir laid the foundation for public health surveillance in the United States and globally. Since the 1960s, the CDC has developed innovations in biostatistics, ranging from mathematical modeling for infectious diseases to methods for evaluating surveillance systems.[4] The CDC has also led in the development of the "Guide to Community Preventive Services" (the Community Guide), a systematic review that makes recommendations for the use of public health programs and policies based on scientific evidence.[5]

Building on this scientific history, there is a persuasive rationale for a strategic public health science, particularly a vision that corresponds closely with the competencies for the next generation of public health practitioners.[6] For example, we need a greater entrepreneurial orientation among practitioners—with this, we can build on research from business and economics to identify and carry out innovative approaches to organizational change, resulting in a higher likelihood of evidence-based practice.

The challenges ahead involve how to implement this scientific roadmap: What will make strategic public health science a reality? Do we have the political will to comprehensively fund and carry out this ambitious agenda? What will increase the reach, relevance, and impact of future research for public health practice? How might this plan for public health science place a central focus on health equity?

STRATEGIC PUBLIC HEALTH SCIENCE

A useful framework for implementing strategic public health science is the push–pull–capacity model (Figure 1). This model posits that for science to affect practice, there must be a combination of the push (a basis in science and technology), the pull (a market demand from practitioners), and the capacity (the delivery ability of public health and health care systems).[7] The text that follows presents examples of activities to move a science-based agenda for public health forward, not an exhaustive list.

Push Imperatives

Multiple elements need attention if we are to address the push of science. First, more studies need to follow principles of designing for dissemination, which is "an active process that helps to ensure that public health interventions, often evaluated by researchers, are developed in
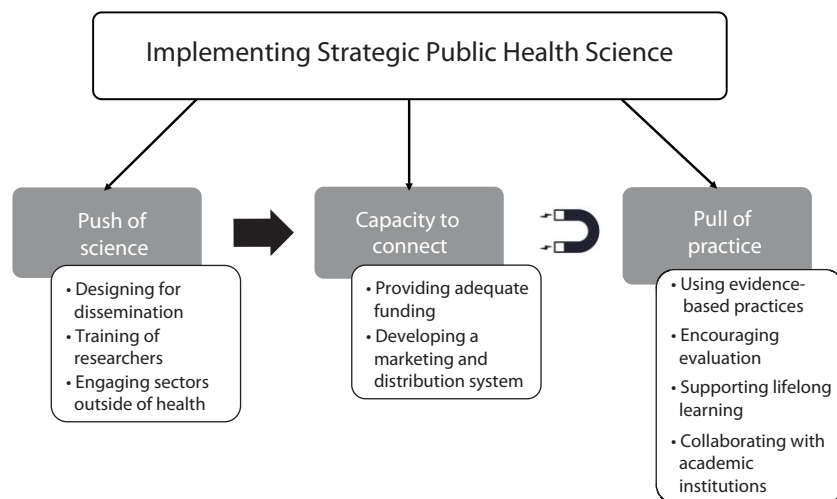
FIGURE 1— Implementing Strategic Public Health Science in a Push–Pull–Capacity Framework

ways that match well with adopters' needs, assets, and time frames."[8(p1695)] In particular, designing for dissemination requires the early, meaningful, and frequent engagement of multiple stakeholders in the scientific process. A second push element involves the training of public health researchers based on competencies in strategic public health science with a focus on the needs and priorities of practice. This should involve partners such as the Association of Schools and Programs in Public Health, which has a significant focus on public health competencies and educational approaches. Finally, progress in strategic public health science will require innovative approaches for engaging sectors outside health (e.g., communication, political science, environmental science). Principles of transdisciplinary team science are likely to speed up the process of multisector collaboration and research.[9]

Pull Imperatives

For strategic public health science to have the intended impacts—improving public health practice, population health, and health equity—there needs to be a stronger pull from practice. There is room for improvement. For example, in the Community Guide, only 54% of studies reviewed were practice based, which was defined mainly by whether participants were allocated to intervention and comparison conditions in their natural settings.[10] The pull from practice can be enhanced by engaged and enlightened public health leaders who (1) place a high priority on using evidence-based practices; (2) encourage routine program evaluation, resulting in more practice-based evidence; (3) support a culture of lifelong learning; and (4) develop formal collaborations with academic institutions.

Capacity Imperatives

Capacity building—the connectors between the push and the pull—is a process that results in higher levels of skills and abilities to carry out and disseminate high-quality research to address the needs of public health practice. Capacity-building efforts are often aimed at improving the use of scientific evidence in day-to-day public health practice. Capacity begins with adequate resources. For the research community, addressing the elements of strategic public health science will involve strong commitments from major funders of research (e.g., National Institutes of Health, CDC). Public health agencies have seen significant declines in per capita spending since 2010, with a 16% decline for state health departments and an 18% decline for local health departments.[11] As the implementers of the products of public health research, this gap in resources must be addressed. There is also a need for a marketing and distribution system that connects research generators with research users. Elements of such a system involve audience segmentation, how research is packaged, how research is promoted, and the evaluation of the process.[12]

IMPLEMENTATION AND HEALTH EQUITY

After priorities are refined and research–practice connections are established, the next stage for strategic public health science should involve a plan for implementation. This blueprint might describe the specific activities to accomplish pieces of the agenda, how to fund the new approaches to science, key partners, who is accountable for implementation, the time frame, and a plan for measuring progress.

Throughout implementation, a strong focus is needed on health equity. Although health equity science is one of the six domains of the approach outlined by Bunnell et al., it should also be a cross-cutting theme for implementation across all of the domains. This will require science to do things differently

than in the past—ranging from the questions we pose, who defines these questions, the partners involved during implementation, how power is shared during the research process, and how findings are disseminated and applied.

The COVID-19 experience has shown us that we need to conduct science differently than in the past; this provides opportunities for practice-based research that is more innovative and equitable, resulting in approaches that place a higher value on prevention and social justice. We need to harness the recent attention on public health from the public and policymakers to reimagine our approaches to strategic public health science. AJPH

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CONFLICTS OF INTEREST

The author has no conflicts of interest to declare.

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