Public Health Asks of Systems Science: To Advance Our Evidence-Based Practice, Can You Help Us Get More Practice-Based Evidence?

Public health asks of systems science, as it did of sociology 40 years ago, that it help us unravel the complexity of causal forces in our varied populations and the ecologically layered community and societal circumstances of public health practice.

We seek a more evidence-based public health practice, but too much of our evidence comes from artificially controlled research that does not fit the realities of practice.

What can we learn from our experience with sociology in the past that might guide us in drawing effectively on systems science? (*Am J Public Health.* 2006;96:406–409. doi:10.2105/AJPH.2005.066035)

Lawrence W. Green, DrPH

THIS ISSUE OF THE JOURNAL offers examples and promise of an underutilized methodology and a theoretical approach to some of the complex problems of public health on which other methodologies and disciplines have foundered. A central question posed by this collection is whether systems approaches can fill the gap that is felt most acutely by public health as it strives to rise to the paradoxical challenge of evidence-based practice. The challenge is that *most of the evidence is not very practice-based.*

The evidence given greatest credence and therefore the most play in evidence-based guidelines comes from highly controlled trials, ideally controlled by random assignment, but in fact made more artificial or unrepresentative by whatever methods of control are used. These methods are ineffective for taking into consideration the large numbers of variables, the great variability within them, and the diverse circumstances of public health practice. Indeed, they seek to take these variables *out* of consideration by controlling them, equalizing them, or holding them constant rather than variable.

Systems thinking and modeling seems to offer, among other things, an alternative to the controlled trial with simulation rather than control as the major source of evidence. It treats the multiplicity of variables as a resource to be used for deeper analysis rather than as a nemesis to be controlled. This, then, is the hope we harbor and the plea we seem to be making to systems scientists: Bring your theoretical and methodological tools for network analysis, knowledge transfer approaches, and systems organizing methods (including participatory research) to help us get a handle on the multiplicity of influences at work in the real world of practice, so that the evidence from our study of interventions and programs can reflect that complex reality rather than mask it.

WHAT HAVE WE LEARNED FROM PAST EXPERIENCE?

To cast the challenge to systems science in historical public health context, I recall a similar plea by the late Edward S. Rogers, who had led the rebirth of ecological thinking in public health in the 1960s.[1] He challenged sociology 37 years ago in his essay in *Science,* "Public Health Asks of Sociology . . ."[2] to bring the theories and methods of sociology to the aid of a field that was faced with a growing need for social and behavioral sciences to cope with complexities of the newly emerging epidemics of chronic diseases. Today's plea to systems science has a strong echo of that early reaching out from public health. What can that history tell of the potential and pitfalls of harnessing other disciplines for our public health needs?

Most sociologists with any interest in health issues at that time (and still today) identified their subdiscipline as "medical sociology" and applied their health systems research mostly to the "sick role" of patients (from Talcott Parsons to David Mechanic)[3] and to *medical* care systems. Some overlap with public health occurred with behavioral studies of health care utilization that included preventive health services (e.g., Ronald Andersen),[4] access and socioeconomic studies that pertained to public health's growing responsibility for Medicaid and indigent clinical care programs (e.g., LuAnn Aday),[5] and the convergence of medical care, prevention, and self-care issues in the 1960s around mass immunization programs,[6] the demographic[7] and communications[8] aspects of family planning, and the chronic conditions of aging.

Notable exceptions to the standoff of medical sociology from public health systems needs were the work of Sol Levine and his Johns Hopkins colleagues on interorganizational exchange relationships[9]; the work of Gordon DeFriese and others at Chapel Hill; and Len Syme's work at Berkeley in evaluation of community programs and social determinants of health,[10] carried on notably at Harvard by Lisa Berkman and her colleagues in the tradition of social epidemiology.[11]

It is especially in these latter intersections of sociology and public health where the organizational and social webs of causation and community behavioral norms draw us to systems thinking and modeling. This is partly out of some frustration with the limits of epidemiological methods and conventions in coping with the complexities increasingly recognized by public health.[12–14]

A first lesson from this experience is that we must open our own public health sciences to the transdisciplinary blending of methods and theories, and we must open them to the findings from the application of methods foreign to our prior traditions. As Susser points out in tracing the history and future of epidemiology, the leadership of chronic disease epidemiology that accompanied the infusion of social sciences into public health resisted examining the dynamics of the "determinants of health" variables that sociology was pointing us toward. We were content to draw on sociology for ways to measure socioeconomic status, for example, so that we could control for its confounding,[15] but we were slow to use their socioeconomic variables to untangle the web of causation that such variables should have forced us to grapple with much sooner.

At the same time, medical care, the big-ticket item in health spending, has siphoned off resources from the newer disciplines we might seek to recruit to public health. Sociologists were understandably susceptible to accepting the more generous funding from the National Institutes of Health, the Agency for Healthcare Research and Quality, and other agencies of government to apply their skills to study medical services rather than public health services. A similar fate with systems sciences is to be avoided, or we will see few of the benefits it promises for public health application.

A second lesson from the sociological experience is that the debates within such a broad field as systems thinking and modeling can undermine the credibility of the very methods and theories we might need to encompass. One of the most important sociological contributions to public health, for example, was the sociologists' development of ecological analyses. Ironically, it was a sociologist, Warren Robinson, writing in a sociological journal, who became the most frequently cited authority for arguing the "fallacy of the ecological correlation" in epidemiological applications of ecological analyses to the understanding of what had become important to many chronic disease epidemiologists, namely, the risk-factor behaviors of individuals.[16] As we embrace systems scientists, we must be prepared for the inevitable debates among them, in which they are arguing over nuances of their theories and methods. To us, these debates could seem like damning blows to the credibility of their entire enterprise or of some of the very methods that could be most valuable to public health.

While we contemplate the influence of subdisciplines in systems sciences, we might also recall that most of the social and behavioral scientists attracted to public health by Mayhew Derryberry's recruitment to the Public Health Service in the 1950s (e.g., Hochbaum, Rosenstock, Leventhal) and the Russell Sage Foundation's behavioral science initiative to populate schools of public health with such scientists in the 1960s (e.g., Knutson, Kirscht, Kegeles, Bruvold) were psychologists rather than sociologists. For all the enrichment of critical scientific and theoretical thinking on behavioral issues in public health that psychologists brought, their domination of that thinking could be seen in retrospect as regression to the individualistic mean and to the reductionist methodologies of experimental psychology rather than the community and systems thinking that Edward Rogers appealed to sociology to bring.

Thanks in part to the exposure of psychologists to public health and other social service fields, new subdisciplines of community psychology in the 1960s and environmental psychology in the 1970s emerged. We owe these psychologists, together with social psychologists, for their noble efforts to fill the gap between the preoccupation of psychology with individual differences and the needs of public health for population and organizational levels of analysis and intervention.[17,18]

The third lesson for public health, then, is that our recruitment of systems scientists to our cause should be cautiously discriminating of the systems science subdisciplines most responsive to our call and those most needed to address our needs. Each recruitment and appointment effort in public health should be preceded by a careful consultation with independent systems scientists on what we seek and what type of systems scientists among their colleagues can best meet those needs. The blind alleys down which we might otherwise travel could cost us decades of unproductive, misguided effort for public health, as our past preoccupation with attitudes and beliefs as primary targets for population-based strategies to change behavior might be seen in retrospect today.[19]

The social and behavioral sciences continue to be falling short in the theories and methods they bring to the systems needs identified by public health today. They have enriched epidemiological understanding of causation with their inductive methods, and they have strengthened interventions by filling the gaps in evidence-based best practices with theory. Most of their methods and theories, however, dominated as they have been by psychology, have not dealt adequately with the broader ecological understanding of causal webs and systems interventions that we seek today. Systems science, suggests Axelrod, offers a third alternative to our past dependence on the either/or choices between inductive and deductive methods:

> Induction is the discovery of patterns in empirical data. For example, in the social sciences induction is widely used in the analysis of opinion surveys and the macro-economic data. Deduction, on the other hand, involves specifying a set of axioms and proving consequences that can be derived from those assumptions. . . . Simulation is a third way of doing science. Like deduction, it starts with a set of explicit assumptions. But unlike deduction, it does not prove theorems. Instead, a simulation generates data that can be analyzed inductively. Unlike typical induction, however, the simulated data comes from a rigorously specified set of rules rather than direct measurement of the real world. Whereas induction can be used to find patterns in data, and deduction can be used to find consequences of assumptions, simulation modeling can be used as an aid [to] intuition.[20(p24–25)]

The aid to intuition that the "evidence-based practices" movement has made us aware we need

to develop should make research responsive to the input and experience of practitioners and local planners. It should engage them as participants in the research process so that their intuition can be brought to bear on the specification of rules and on the interpretation of patterns. Systems thinking and modeling give ample attention to participatory approaches.

We turn today, with a similar motivation, to systems thinking and modeling to address the issues and needs invoked by Edward Rogers 40 years ago, but now with a more urgent beckoning by Congress and other financial forces to close the gap between what appears to be a backlog of research and its application in practice. The irony in this evolution is that some of the backlog of unapplied behavioral research in public health is because the research has missed the mark of public health needs,[21] largely as a consequence of the appointment and promotion of scientists in the faculties of public health who had little or no experience in the practice of public health.

A fourth lesson, then, is to seek a more systematic promotion and tenure process to engage systems scientists in public health. This will provide them with experience in public health settings that their academic preparation and research has not provided and will provide incentives to study those systems in real time with real public health practitioners and planners.

WHAT DO WE ASK OF SYSTEMS SCIENCE?

Overdetermined Systems

Can systems thinking and modeling help us unravel, or strategically reravel, the myriad mediating and moderating variables that come into play when an efficacy-tested intervention is taken to scale from its controlled experimental setting to large communities or populations? Will it achieve methodologically what "ecological" approaches have offered conceptually as a way of encompassing the multiple levels necessary to understand and harness the reciprocal relations among biology, behavior, and environments?

Recursive Feedback and Synergy

Can systems thinking and modeling help us break out of the singularly linear analyses that have offered limited temporal analytic power in getting at the order of cause and effect, the feedback loops, and the synergistic relations (beyond interaction effects in analysis of variance or multiple regressions).

Practice-Based Analysis

At the heart of the rhetorical title of this article is the suggestion that we could be drawn to systems thinking and modeling if it had the potential to provide an enhanced inductive assessment of the practice setting and circumstances and the fit of alternative interventions, rather than with the deduction of fit for interventions tested in more sterile (and often artificial) circumstances provided for randomized and other control over "extraneous" variables. Do systems thinking and modeling really do so? Or are their initial modeling, network analysis, and simulation based on idealized or abstract versions of the realities of practice?

Chaos

Is the association of systems science with chaos theory an incidental affinity of some systems scientists? Or is it so central that public health would have to come to grips with the adoption of a chaos theory perspective on its own organization and entities? The term itself is misunderstood by the public and is off-putting for some health professionals who cannot reconcile the notion of chaos as a starting point for their practice, despite their sometimes futile efforts at organization and management. The challenging question for public health is which aspects of their practice can be understood best with linear models, which with nonlinear, and which with simulation?

FROM SYSTEMS SCIENCE TO PUBLIC HEALTH APPLICATIONS

Which Concepts and Methods Will be Most Useful?

Among the many tools systems science has honed in other settings (mostly private sector?), which will have the greatest potential, and which will have the most immediate applicability and utility for public health policy and practice? Priorities need to be set because a dump of the entire array of concepts, methods, and data on public health will swamp the capacity of the field to absorb and use the concepts, methods, and findings of systems science. The priorities should be strategic, on either immediate needs, long-range potential, or both. How to weight these might depend on sponsorship and resources, which brings us to a second consideration.

Who Will Absorb, Adapt, and Apply Concepts and Methods?

Is the incorporation of systems science into public health to be a matter of recruiting and retooling existing systems scientists (as we tried to do with behavioral scientists 40 years ago) or an infusion of systems science into the curriculum of schools of public health and continuing education and (leadership?) training of more seasoned practitioners and policymakers? Or both? If we need to recruit systems scientists to public health, we need to learn from the prior experience with behavioral scientists that some will be more recruitable than others, but those most easily recruited will not necessarily be those most needed. We will have to be clear about public health needs and priorities and then recruit and incentivize accordingly.

If training new public health students and seasoned public health practitioners to incorporate systems thinking into their toolkit is the strategy of choice, we will still need to recruit some systems scientists, at least initially, to assist with the training.

If we must do some of both—recruiting systems scientists and training public health students in a new blend of practitioners—then would we do better to recruit systems scientists primarily through the academic public health door or through the policy and practice agency doors? The latter would seek to get the systems scientists acquainted with public health problems and settings before they attempt to teach public health students or conduct in schools of public health systems research that has little to do with public health needs.

Who Will Support This New Addition to Public Health?

Systems science is not a natural or easy sell to the National Institutes of Health. Support might be

a more probable fit for the Centers for Disease Control and Prevention, the Agency for Healthcare Research and Quality, and the Health Resources and Services Administration, but they have little money to spare for academic training or new research in public health. Can we entice a foundation to sponsor an initiative like the Russell Sage Foundation's behavioral science initiative in the 1960s, or the current Robert Wood Johnson Foundation's population health fellows program, or Kellogg's community researcher postdoctoral initiative? This would seem to be the next order of urgent business to advance what the articles in this issue seem to hold out as our hope for systems sciences in public health. ■

About the Author

At the time of preparing this article, Lawrence W. Green was with the University of Maryland, College Park, and the University of California, Berkeley.

Requests for reprints should be sent to Lawrence W. Green, DrPH, UCSF CCC Population Sciences, Box 0981, San Francisco, CA 94143–0981 (e-mail: lwgreen@comcast.net).

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Public Health Systems Research: Setting a National Agenda

The Institute of Medicine has recommended that policy decisions about improvement of national public health systems be guided by sound scientific evidence. However, to date there is no national research agenda to help guide public health systems.

The Centers for Disease Control and Prevention was called upon to lead a collaborative consensus-based process to define key research questions and establish a framework to create opportunities to better coordinate, leverage, and identify public health resources, which are increasingly scarce. The public health systems research agenda that emerged from this process has 14 overarching priority research themes. This national agenda should stimulate and guide research to meet the urgent need to improve the nation's public health systems. (*Am J Public Health.* 2006;96:410–413. doi:10.2105/AJPH.2004.046037)

Dennis Lenaway, PhD, MPH, Paul Halverson, DrPH, MHSA, Sergey Sotnikov, PhD, Hugh Tilson, MD, DrPH, Liza Corso, MPA, and Wayne Millington, BS

Centers for Disease Control and Prevention, in collaboration with the Council on Linkages Between Academia and Public Health Practice and other public health systems partners, should develop a research agenda and estimate funding needed to build the evidence base that will guide policymaking for public health practice.

—Institute of Medicine[1(p9)]

In its 2002 report, the Institute of Medicine (IOM) recommended that an investment be made in developing a research agenda to guide policy decisions that shape public health practice.[1] Similarly, the US Department of Health and Human Services, in *Healthy People 2010: Understanding and Improving Health,* recognized the need for a strong public health infrastructure that would provide the capacity to prepare for and respond to acute and chronic threats to the nation's health. *Healthy People 2010* developed a series of benchmark indicators for public health infrastructure that calls for a systematic approach to data gathering, analysis, and research.[2]

Since the publication of these 2 seminal reports, the pace of change in public health has been accelerating, owing in large measure to the environment resulting from the events of September 11, 2001; newly emerging threats (e.g., severe acute respiratory syndrome [SARS], the obesity epidemic); and dramatic shifts in funding for public health agencies. These new challenges have placed additional strains on already stressed services, programs, and staff. If we are to build the capacity needed to meet the ever-expanding list of threats to the public's health, it is essential that we first define public health systems, how they function, and what factors contribute to high performance. Mays et al. describe public health systems research as "a field of study that examines the organization, financing, and delivery of public health services within communities, and the impact of these services on public health."[3(p180)] To date, no public health systems research agenda exists.

The relatively new field of public health systems research is related to, but distinct from, more well-established areas such as health services research. It has emerged within the last decade primarily because of the need to better understand how the level of development of national public health infrastructure and the multiplicity of organizational arrangements in public health affect health outcomes. There is still a need to fully investigate the diversity of public health agency structures and functions, how resources are used at the state and local levels, how public health performance can affect health status outcomes, and myriad other issues. Early research and practice-based efforts represent the foundation upon which future research can be conducted.

Initial work in public health systems research generally focused on identifying the roles, functions, and resources of public health agencies.[4–11] Over time, research expanded beyond agency boundaries to explore partnerships within public health by investigating the concept of a public health system[12,13] and by focusing on collaborations between public health and sectors such as medicine[14] and managed care.[15] These activities were catalyzed, in great part, by a series of reports issued by the IOM. The 1988 IOM report urged a stronger focus on exploring and building the governmental public health role, as well as the role of other partners involved in public health.[16] The IOM reiterated this call to action in 1997[17] and again in 2002.[1] Other contributions to public health literature have echoed this need.[18–23] Concurrently with researchers, public health practitioners have begun to address these issues in the field; this is evidenced through efforts such as the National Public Health Performance Standards Program[24] and the Turning Point initiative.[25]

A public health systems research agenda will be instrumental in catalyzing new research and practice-based initiatives and raising awareness about the importance of such endeavors. A consensus-based

research agenda establishes a framework that not only creates opportunities to better coordinate, leverage, and identify resources and activities but also provides the scientific basis for policy decisions affecting our nation's health. Previous experiences in setting research agenda priorities in behavioral health,[26] clinical preventive services,[27] community design and land-use choices,[28] and public health workforce issues[29] have been taken into account in the process of developing a public health systems research agenda.

DEVELOPING A RESEARCH AGENDA: THE PROCESS

The Centers for Disease Control and Prevention's (CDC's) Public Health Practice Program Office, Division of Public Health Systems Development and Research, outlined a 4-step process with the stated goal of developing a consensus-based public health systems research agenda and disseminating the research agenda to the public health community. The National Public Health Performance Standards Program defines public health systems as "the collection of public, private and voluntary entities, as well as individuals and informal associations, that contribute to the public's health within a jurisdiction."[24]

The process was guided by several basic principles established to ensure that priority research themes would be defined without undue personal, economic, or political influence. First, the end users of public health systems research, represented by associations of public health practitioners, should have a strong voice in establishing the research agenda. Second, wide participation of interested parties should be ensured. Third, participants would be encouraged to propose research themes that were based on scientific need and the priorities of practitioners, without regard for perceived political or financial feasibility. Finally, to ensure a consensus-based outcome, the research themes should be prioritized through a nominal group process, in which each individual is given the opportunity to vote on prioritizing each research theme following extensive group discussion.

Step 1: Conduct a Brainstorming Session to Solicit Input From CDC Researchers

Staff from the Division of Public Health Systems Development and Research held a brainstorming session in April 2003 with the objective of generating a draft of key elements of a research agenda. The outcome of the session was a draft document outlining 4 broad research categories, each encompassing a list of research topics. The research categories were (1) public health system description and improvement; (2) public health agency role in the system; (3) resources and capacity assessment for the health system; and (4) performance and health outcomes. Performance in this context was understood to be how well a public health system provided the 10 essential public health services,[30] measured against model standards defined in the National Public Health Performance Standards.

TABLE 1—Participants in Setting Priorities for a National Public Health Systems Research Agenda, 2003

	No. Participants
Centers for Disease Control and Prevention (CDC)	15
American Public Health Association (APHA)	3
Association of State and Territorial Health Officials (ASTHO)	3
National Association of County and City Health Officials (NACCHO)	6
National Association of Local Boards of Health (NALBOH)	4
Public Health Foundation (PHF)	2
National Network of Public Health Institutes (NNPHI)	3
University of Kentucky	4
University of North Carolina School of Public Health	1
Emory University	1
Mathematica Policy Research, Inc	2
Total	44

Step 2: Engage National Partners to Refine the Draft of Broad Research Themes

To gather input and help refine the 4 broad research categories, the CDC conducted a conference call with representatives from 2 universities; Mathematica Policy Research, Inc; and national partner organizations representing public health practitioners (Table 1).

Step 3: Conduct an Agenda-Setting Meeting With National Partners, Researchers, and the CDC

In June 2003, a 2-day planning session was convened with the objective of arriving at a consensus-based research agenda. The first day of the meeting was open to all interested CDC researchers, as well as the external partners that had been invited. Approximately 100 people attended. The agenda consisted of presentations by selected researchers on current developments and results associated with public health systems research. All participants were asked to write down research ideas that came to mind during the presentations and submit these ideas to the facilitator (H.T.). Approximately 90 ideas were collected and sorted into the 4 research categories that had emerged from the CDC brainstorming session.

On the second day, 15 CDC staffers met with 29 senior representatives from national partner organizations (Table 1). Two sequential 45-minute breakout sessions, in which a facilitated discussion of one research category helped to define priorities, were held on each of the 4 research categories. Each participant was given an opportunity to take part in 2 breakout sessions.

After discussion and voting, the 90 research ideas had been narrowed down to 40, which were presented to the entire group for discussion. A nominal group process followed in which each participant was asked to vote for 10 research themes that he or she considered a priority. Although specific criteria were not established, participants were instructed to consider each theme's public health

impact, feasibility, and urgency, as well as whether existing research on the theme was lacking. Of 440 possible votes, 360 (82%) went to 14 of the 40 research themes. When these 14 themes were sorted into the 4 broad research categories previously described, the distribution of votes across the 4 categories was fairly uniform. After the votes were tallied, the group held a facilitated discussion and all participants readily agreed to the final list of 14 priority themes (box this page).

Research Priorities for the Public Health Systems Research Agenda

1. Determine how public health agency structure affects performance. (40)
2. Define and quantify dimensions of public health systems, including interorganizational relationships (including the role of the agency within the public health system). (33)
3. Explore the relationship between performance and health outcomes (and the chain of impacts that leads from improved performance to improved health outcomes). (30)
4. Define the characteristics of high-performing local, state, and federal public health agencies. (29)
5. Explore the relationship between social determinants of health and system performance. (28)
6. Evaluate the costs of achieving and maintaining acceptable/optimal levels of performance. (This activity includes exploring reasonable models to collect agency financial data.) (27)
7. Explore the relationship between public health infrastructure/performance and the design, implementation, and impact/outcomes of categorical programs (including the use of evidence-based interventions). (27)
8. Conceptualize a framework for high-performing public health systems that includes key elements. (26)
9. Identify, develop, and refine measures of health outcomes that are sensitive to public health systems capacity and performance. (26)
10. Explore models and outcomes of accreditation of public health agencies and/or public health systems as performance improvement methods. (21)
11. Evaluate how shifting policy and financial priorities affect performance of public health systems. (19)
12. Explore what factors and processes facilitate community involvement in using the National Public Health Performance Standards Program in system improvement activities (quality improvement). (19)
13. Evaluate how and to what extent a high-performing public health system is indicative of preparedness. (19)
14. Explore the effectiveness (within the agency and the system) of local and state governance structures. (16)

Note. Priorities were established by a group of 44 participants from the Centers for Disease Control and Prevention, national organizations representing public health practitioners, and academic and research institutions. Numbers in parentheses are numbers of votes received.

Step 4: Disseminate the Draft Research Agenda to Interested Public Health Partners for Discussion, Input, and Comment

The results of the 2-day session were presented at the AcademyHealth[31] annual conference in June 2003 and at a meeting of the Council on Linkages[32] during the joint annual conference of the Association of State and Territorial Health Officials and the National Association of County and City Health Officials in September 2003. The prioritized research themes were presented during 3 research-related sessions at the American Public Health Association annual meeting in November 2003. Comments and suggestions were invited at all these venues.

LESSONS LEARNED

After the agenda-setting meeting, an informal debriefing with key participants indicated a high level of satisfaction with both the process and outcome. The comments and suggestions received when the draft research agenda was presented at the AcademyHealth, Council on Linkages, and American Public Health Association meetings validated the results and encouraged the CDC to proceed with publishing the research agenda and working toward building the necessary infrastructure for public health systems research.

The research agenda points to 3 areas that need to be addressed. (1) There is an immediate need to accurately describe the dimensions of public health systems, including their structure, characteristics, costs, and funding mechanisms, as well as the influence of categorical programs and funding on system performance. (2) Additional research is needed to address the relationship between system performance and such core areas as social determinants of health, public policy, preparedness, and governance structures. (3) There is a need to explore the concepts of performance measurement. Ultimately, the body of knowledge derived from this research will challenge public health leaders, policy makers, and researchers to conceptualize a framework for high-performing public health systems and provide evidence of the impact of system performance on health outcomes.

The comments and feedback we received were similar to those received by others who have developed national research agendas.[26–29] What differentiated our efforts from others were the various opportunities for input from the general public health community. Although it is universally acknowledged that a national research agenda is necessary to prioritize and strategically approach public health systems research, we cannot overstate the importance of having gained consensus on this research agenda among national partner organizations, researchers, and the CDC.

THE BENEFITS OF A RESEARCH AGENDA

A comprehensive public health systems research agenda will help funding organizations make informed choices between competing research options. In a time of tightening resources, it is imperative that funders know how to use research dollars to maximum advantage and guide

researchers into areas of national interest and priority. A focused and strategic approach to researching public health systems will enable funding organizations to avoid duplication by understanding exactly how their particular efforts integrate with other similar research and how these efforts jointly contribute to developing systemwide knowledge and evidence of performance. A research agenda will give policymakers evidence they can use to make improvements to deteriorating public health systems that will ultimately result in a higher level of performance and, by extension, improved health in our communities.

The national public health systems research agenda is a consensus-based tool for achieving these goals. With the approach of local and state agency accreditation processes there will be increasing demands for public health systems research. What remains to be done is to develop the resources and infrastructure to support this agenda. Policymakers need to recognize the value of the agenda and provide the necessary resources to support it. We in the public health community need to support the agenda by advocating for resources and marketing the need for and importance of public health systems research. The CDC, Council on Linkages Between Academia and Public Health, AcademyHealth, and other partners must embrace this agenda and provide leadership in developing real and meaningful research funding and supporting infrastructure. Without adequate support and resources, the agenda will fail to achieve its purposes, to the detriment of the nation's public health system. ■

About the Authors

Dennis Lenaway, Sergey Sotnikov, Liza Corso, and Wayne Millington are with the Centers for Disease Control and Prevention, Atlanta, Ga. Paul Halverson is with the College of Public Health, University of Arkansas for Medical Sciences, Little Rock. Hugh Tilson is with the University of North Carolina, Chapel Hill.

Requests for reprints should be sent to Dennis Lenaway, PhD, MPH, Office of the Chief of Public Health Practice, Centers for Disease Control and Prevention, 1600 Clifton Rd, Mail Stop D-30, Atlanta, GA 30333 (e-mail: dlenaway@cdc.gov).

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Contributors

D. Lenaway originated and led the project jointly with P. Halverson. D. Lenaway drafted the original article and coordinated other authors' contributions. P. Halverson contributed to the writing. S. Sotnikov assisted in the design, implementation, and analysis of the project and in the writing and editing of the article. H. Tilson contributed to the design and implementation of the project, acted as the sole facilitator during the project, and contributed to the writing and editing of the article. L. Corso and W. Millington contributed to the design and implementation of the project and provided assistance in the editing of the article.

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