

To Boldly Go . . .

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ABSTRACT

The threshold of the new millennium offers an opportunity to celebrate remarkable past achievements and to reflect on promising new directions for the field of public health. Despite historic achievements, much will always remain to be done (this is the intrinsic nature of public health). While every epoch has its own distinct health challenges, those confronting us today are unlike those plaguing public health a century ago. The perspectives and methods developed during the infectious and chronic disease eras have limited utility in the face of newly emerging challenges to public health.

In this paper, we take stock of the state of public health in the United States by (1) describing limitations of conventional US public health, (2) identifying different social philosophies and conceptions of health that produce divergent approaches to public health, (3) discussing institutional resistance to change and the subordination of public health to the authority of medicine, (4) urging a move from risk factorology to multilevel explanations that offer different types of intervention, (5) noting the rise of the new "right state" with its laissez-faire attitude and antipathy toward public interventions, (6) arguing for a more ecumenical approach to research methods, and (7) challenging the myth of a value-free public health. (*Am J Public Health*. 2000;90:25-33)

"Cheshire Pass," Alice began rather timidly, "Would you tell me, please, which way I ought to go from here?" "That depends a good deal on where you want to get to," said the Cat. "I don't much care where," said Alice. "Then it doesn't matter which way you go," said the Cat. "-so long as I get somewhere," Alice added as an explanation. "Oh, you're sure to do that," said the Cat. "if you only walk long enough."

Lewis Carroll. *Alice in Wonderland*

No one should question the remarkable contribution of public health to understanding the causes and consequences of illness, disability, and death in our society. From early public health activities in the 17th and 18th century to initiatives at the beginning of the 21st century, the range of problems tackled, the ever more exquisite methods developed, and the programs and policies attributed to specific findings justify use of the term "remarkable." While much has been accomplished—many (but not all) infectious diseases have been controlled, infant mortality is dramatically reduced, and most people are living longer than ever before—much will always remain to be done. That is the intrinsic nature of our public health enterprise.

Every epoch has its own unique health challenges. The effective solutions of one epoch are not necessarily transferable to another. Challenges confronting US public health at the beginning of the new millennium—such as global environmental threats, ecosystem disruption, overpopulation, and increasing social inequalities in health and access to effective medical care—are unlike anything encountered 100 or even 50 years ago. We are among an increasing number who, while acknowledging remarkable progress, question the dominant perspective and direction of US public health. The field appears ill equipped to tackle the emerging challenges of the 21st century, in that public health practice remains resistant to alternative approaches and preoccupied with methods to the exclusion of philosophical orientation and theory development.

In this article we tackle 7 interrelated issues: (1) some limitations of conventional public health; (2) philosophical obstacles to change; (3) institutional resistance to change; (4) the promise of multilevel explanations; (5) the changing role of the state, with its implications for public health; (6) appropriate research methods for the new millennium; and (7) the myth of a value-free public health.

Some Limitations of Conventional Public Health

As an illustration, consider one discipline within public health, epidemiology, which has much to offer health policy (other equally good illustrations might be economics, biostatistics, sociology, or toxicology). In marked contrast to its origins, the established epidemiology that is shaping public health today appears hamstrung by its adherence to an individualist/medical natural science paradigm.^{1,2} Conventional epidemiology is limited by the following:

1. *Biophysiological reductionism.* Most phenomena, whether primarily physical or behavioral, are explained by tracing their "causes" back to some bacteriological, genetic, or molecular origin. Even sociologic phenomena such as widening health inequalities and racial and gender differences in diseases (e.g., heart disease and diabetes) are reduced to biophysiological explanations.³ While some see an exciting prospect in genetic epidemiology and the search for molecular biomarkers, others see a return to the germ-theory approach in public health.^{4,5}

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Plausible structural explanations based on social deprivation as well as biases in treatment are displaced by the search for physiologic risk factors and individual-level biomedical interventions.³

2. *Absorption by biomedicine.* Epidemiology in the United States has moved away from its origins in public health and its status as an independent discipline and is becoming an adjunct to clinical medicine. Some reduce it to a body of expertise that is useful only for improving clinical decision making among practicing physicians (to check that they are being good Bayesians). We can understand why some consider the term "clinical epidemiology" an oxymoron.

3. *Lack of theory development.* Established epidemiology can actually explain very little, because in epidemiology, unlike most disciplines, there is little interest in developing theories that can be tested.^{6,7} Lamenting the absence of theory development, Smith likened the product of today's epidemiology to "a vast stock-pile of almost surgically clean data untouched by human thought."⁸ Krieger, among others, has called for theory development in public health so as to understand and improve by planned actions the health of the public.^{9,13}

4. *Limitations of dichotomous thinking.* Even though it is now widely accepted that the response curve is continuous and smooth for most risk factors and conditions, dichotomous thinking nonetheless prevails and still determines our actions.¹¹ Using hypertension as one example, Rose^{12,13} described the different activities that logically follow from dichotomous thinking and from continuous thinking. He observed, "Paradoxically, it is epidemiologic research which has now repeatedly demonstrated that in fact disease is nearly always a quantitative rather than a categorical or qualitative phenomenon, and hence it has no natural definitions."^{13(pxx)} Whole-population approaches to public health that follow from acceptance of the continuous nature of risk are precluded "because it is a departure from the ordinary process of binary thought to which they are brought up."^{13(p9)}

5. *Risk factorology.* Established epidemiology is analogous to a maze (in this case, a maze of risk factors) with no opening or exit in sight. Researchers enter this maze with great enthusiasm. They are quickly diverted to the left or to the right; every new turn produces promising openings, but the researchers find themselves involved in disputes over which among the numerous possibilities is the "correct" direction. Often, after expending large amounts of time, effort, and resources, the researchers return to their starting point, but without the added knowledge

base that is required for action. McMichael puts risk factorology in perspective: "Modern epidemiology is thus oriented to explaining and quantifying the bobbing of corks on the surface waters, while largely disregarding the stronger undercurrents that determine where, on average the cluster of corks ends up along the shoreline of risk."^{14(p103)}

6. *The continual confusion of observational associations with causality.* Even when randomized controlled trials, which are inferentially superior, are feasible, there is a preference for weaker observational studies. When simple associations are elevated to causal status, as occurs in most risk factor epidemiology, important qualifications for membership in the causal club are disregarded. Hill listed 5 criteria, all of which must be fulfilled before observed associations can even begin to qualify for consideration as cause-and-effect variables and hence as candidates for interventions.¹⁵ The criteria are magnitude, consistency, specificity, dose-response, and biological plausibility. According to these criteria, what proportion of observational reports qualify for membership in the causal club?

7. *Dogmatism by design.* There is a belief among the epidemiologic faithful that certain designs are purer than others—for example, that cohort studies are inherently superior to case-control studies. Of course, each of these observational designs has its strengths and weaknesses, but both are observational sinners. One may be superior to the other under specific circumstances, but neither has an intrinsic advantage.^{16,17} An insistence that one method is inherently and always superior to other methods betrays a shallow understanding of research methodology, as opposed to research techniques.¹⁸

Philosophical Obstacles to Change

Lurking behind every public health debate over approaches and methods are philosophical disagreements.¹⁹ Nijhuis and van der Maesen suggest that "most theoretical debates about the pros and cons of public health approaches are confined to the methodological scientific level. Philosophical foundations such as underlying ontological notions are rarely part of public health discussions, but these are always implicit and lie behind the arguments and reasoning of different viewpoints or traditions."^{20(p1)}

Nijhuis and van der Maesen make distinctions that facilitate an understanding of the consequences of different social philosophies for public health activities. They identify 2 major types of social philosophy. In

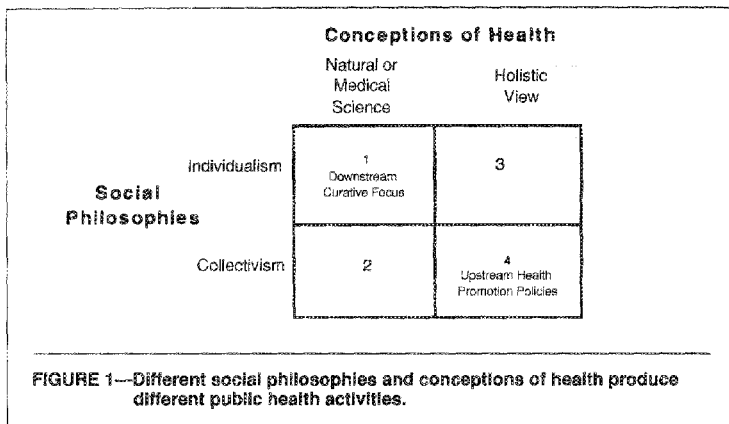
individualism (or "individualistically oriented social philosophy"), the emphasis is on *people*. Following, for example, Pareto²¹ and Weber,²² "the total (the Gestalt) is considered to be the outcome of the actions and motives of distinct individuals."^{20(p2)} Individualism is a dominant orientation in the United States and profoundly restricts the content of public health programs.

In *collectivism* (or "collectivistically oriented social philosophy"), the focus is on *categories* (age, sex, social class, race/ethnicity) or *places and social positions in society*. Following the views of, for example, Marx²³ and Durkheim,²⁴ "the Gestalt . . . is primarily the social constellations of which individuals are part."^{20(p2)} This is a more dominant theme in Europe and makes possible a different range of public health activities. Macintyre and her colleagues have asked, "[S]hould we be focusing on people or places?"²⁵ We extend their approach by emphasizing social position.¹¹

With regard to different conceptions of health, 2 general types can be identified. The *medical science (mechanistic) view*, which is the dominant orientation of US public health, focuses on disease states and on factors that predispose people to, are associated with, or increase the chances of entering into a disease state. This pathogenic view treats people as biopsychosocial and neurophysiologic systems, in which disease produces disequilibrium and dysfunction. Apart from its mechanistic approach, this view presumes health to be a "non-disease"—an exclusionary state—or a disease that is "intrinsically residual in nature."^{20(p2)} Accordingly, "because health is seen as non-disease it can only be viewed as a condition brought into being through causal mechanisms."^{20(p2)}

The *holistic view* of health, associated with the goddess Hygieia in classical Greek thought, appears to be undergoing a renaissance in the public health and upstream health promotion strategies of today.²⁶ This salutogenic view considers health "an expression of the degree to which an individual is capable of achieving an existential equilibrium. This equilibrium is not static but constantly in motion."^{27(p2)} Ecologism is a modern expression of this classical approach.²⁷

Combining these dimensions into a 2 × 2 array (Figure 1) enables us to locate the origins of different public health approaches in different social philosophies and conceptions of health. Discussion can advance from a consideration of the advantages and disadvantages of different approaches, or from futile discussion of the "best" approach, to appreciation of the underlying philosophies and views of health that manifest themselves in everyday health programs and the measurement of their effectiveness and efficiency.^{28,29}



This typological differentiation invites several observations. First, it permits us to understand international differences in types of public health studies and activities. In Europe, for example, where a more collectivist, holistic orientation is evident, there is interest in upstream public health policies, or the "new" public health.³⁰ In the United States, with its more individualistic, medical science orientation, there is heavy investment in individual knowledge and behavior change and also in the reduction of disease in identifiable categories (high-risk individuals).

Second, typological differentiation enables us to understand the dominance of different methodologies in different national settings. In the United States and Great Britain, Popperian logical positivism prevails.^{31,32} In other settings (e.g., among some groups in Canada, Europe, and Australia), there is a refreshing interest in qualitative, interpretative methodologies that are more appropriate to the programs suggested by a collectivist, holistic orientation. These 2 approaches have their origins not in dissatisfaction with the limitations of positivist methods, or in the inherent superiority of one approach over the other according to some standard of science, but rather in the collectivist, holistic philosophies of their proponents.

Third, the erudite debates among devotees *within* a particular orientation have little appeal to the proponents of divergent philosophical views. Popperian views and the new, derivative falsificationist criteria for deciding causes,³³ while important contributions within the scientific materialist tradition,³⁴ hold very little appeal for those who are collectivist-ally oriented. This is not to disparage the vital contributions of Greenland,³⁵ Pettit,³⁶ or Susser,^{37,38} but to emphasize the irrelevance of these contributions to those who are driven by

a fundamentally different social philosophy and conception of health. These 2 groups are as dissimilar as 2 farmers with divergent views on crop production: one applies chemical sprays and pesticides to kill weeds and harmful insects, the other applies natural organic methods and crop rotation. Depending on one's philosophy, either approach may be considered appropriate and will produce acceptable yields.

There are signs of change in public health, and there is some recognition that business as usual cannot continue. The unique health challenges of our new epoch call for different levels of activity and more appropriate research methods. The impending 21st-century health threats presented by global environmental change,³⁹ dangers to ecosystems,⁴⁰ and planetary overload^{18,41} will affect whole populations, not just selected individuals.⁴² Susser recognizes the limited utility of the black-box approach in public health and has suggested that it is well suited neither to address the prevailing threats to the public health nor to take advantage of emerging technology. He offers "ecologism" as an appropriate paradigm and foresees a new era of global epidemiology.²⁷

Institutional Resistance to Change

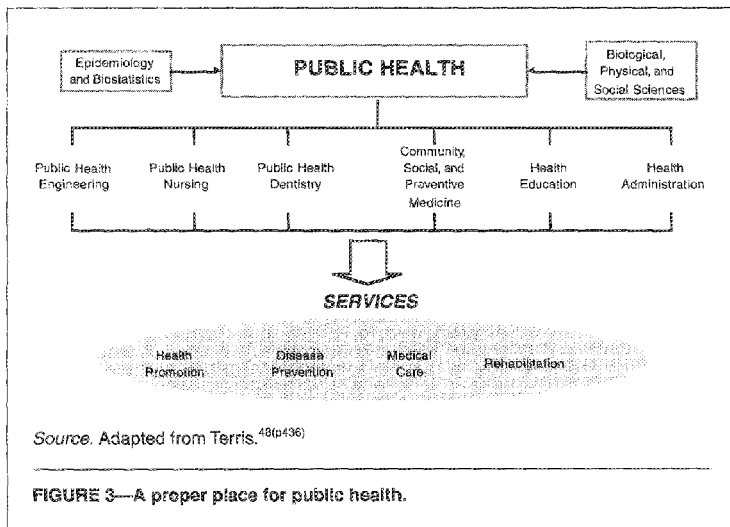
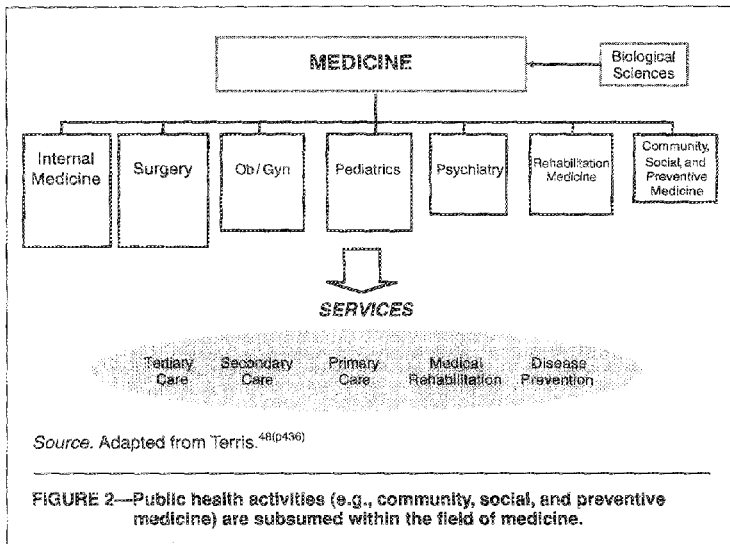
Not only is the prevailing medicine-based public health paradigm outmoded, it remains highly resistant to change. Kuhn, in *The Structure of Scientific Revolutions*,⁴³ described the history of science as a chronicle of the rise and fall of paradigms, which are overarching viewpoints or prevailing conceptions that, for some time, dominate a discipline or field of inquiry. A paradigm serves as a guide for all activity in a particular field.

It determines what topics of inquiry are appropriate, what methods are most desirable, the way things ought to be done, and, finally, how support and recognition are awarded. Scientific revolutions and change result from a breakdown of the prevailing paradigm—internal inconsistencies emerge, anomalous findings persist, and alternative viewpoints promise greater explanatory utility. From this viewpoint, science is essentially conservative and resistant to change, while new views and methods are ordered and institutionalized by the system supporting the prevailing paradigm.^{44,45} Some believe that a new paradigm may be emerging in public health, a paradigm fostered by the recognized limitations of the prevailing paradigm, including misfocused interventions and outcomes and ethical quandaries.^{46,47}

The institutional structure of public health in the United States, not surprisingly, reflects the prevailing paradigm (the medical model of disease), and powerful interests resist most change. Terris has suggested that while terms such as "public health," "community medicine," and "preventive medicine" are often used interchangeably, "the direction of policy has been molded, for better or for worse, by the theoretical orientation inherent in these terms' use. The common denominator of all three of these terms is 'medicine.' This is the key word; community, social and preventive medicine are considered to be, and in fact are, a subdivision of the overall discipline."^{48(p435,436)}

Figure 2 depicts the organizational location of most public health activities (e.g., community, social, and preventive medicine) as we begin the 21st century. Given the underlying paradigm that informs the public health enterprise, it is not surprising that some (but not all) US schools of public health are subsumed by traditional schools of medicine. The recently departed director of the National Institutes of Health (a Nobel prize-winning geneticist) will be replaced by an unquestionably talented biomedical scientist, never by an economist, a medical sociologist, or a psychologist. The prevailing organizational structure speaks volumes.

An alternative view of public health considers it a sociopolitical activity, multidisciplinary in nature and extending into all aspects and levels of society (Figure 3). As Terris puts it, "[H]ere the key word is 'health,' not 'medicine'; the universe of concern is the health of the public, not the discipline of medicine."^{48(p436)} We concur with his view that "the two concepts—community, social and preventive medicine on the one hand, and public health on the other—are clearly contradictory. One considers public health to be a subdivision of medicine; the other consid-



ers medicine to be a subdivision of public health.^{48(p437)}

Obviously, words have meaning. The issues discussed here are not simply arcane linguistic quibbles. To realize its potential in the new millennium, public health must be released from the asphyxiating orthodoxy of medicine. Current organizational arrangements and professional training in public health reflect the underlying biomedical paradigm, not the other way round. Moving beyond the prevailing medical paradigm is a necessary but not sufficient condition for the

field of public health in the United States to increase its contribution.

The Promise of Multilevel Explanations

Public health in the United States has been challenged for its preoccupation with individual risk factors. Researchers often analyze extant databases and report statistically significant associations between a disease and some "new" variable. There are ill-

nesses (e.g., coronary heart disease, prostate cancer, and diabetes) for which dozens, even hundreds, of "independent risk factors" have been reported; these studies are now so common we have characterized them as reporting the risk factor du jour. Risk factor epidemiology generally focuses on the somewhat isolated contribution of a single factor, while overlooking competing influences from other levels of analysis or causality.⁴⁹⁻⁵² More often than not, these new risk factors turn out to be Roman candles, producing a brief but quickly dissipating flash. The "discovery" of new risk factors creates an illusion of scientific progress. Numerous risk factors have been implicated (by different studies) in the etiology of many diseases in the United States; how much these factors explain in total and their relative contribution to prevalent cases remain uncertain. In other words, if individuals at risk for, say, coronary heart disease, diabetes, or cancer adopted a healthy lifestyle or avoided the reportedly harmful behaviors, would such changes alter the likely development of the disease?

Prostate cancer, a leading cause of mortality in US males, provides a good example. Some 60 risk factors for prostate cancer have been identified in the professional literature. Unfortunately, the data on a particular risk factor available in one study are often not available in other data sets reporting on other risk factors. Consequently, it is impossible to precisely estimate the relative weight of particular factors and their combined contribution to the explanation of disease. Our ongoing Massachusetts Male Aging Study has data not on all 60 risk factors for prostate cancer, but on 36 of them. Figure 4 depicts the likely contribution of these 36 risk factors to the total explanation of prostate cancer: only 18% of the variance is explained (an average of 0.5% per risk factor). Assuming (optimistically) that the remaining 24 factors also contribute 0.5% each, a grand total of only 30% of the variation is accounted for. In other words, after many decades of risk factorology, more than two thirds of the contributors to (causes of) prostate cancer remain unidentified. A similar situation exists for other major diseases, such as coronary heart disease, diabetes, and stroke.

Risk factorology pursues the causes of or contributors to disease at a particular level of explanation; although it encompasses a larger number of factors and pushes further outward, the effort remains on the same explanatory plane.⁵³ We term this the problem of *laterality*. A new type of hierarchical thinking is evident in the profound question asked by Potter:

What gets cancer—the genes, the cell, the organism, or perhaps even the population?

THE COMBINED CONTRIBUTION OF 36 MAJOR RISK FACTORS TO PROSTATE CANCER

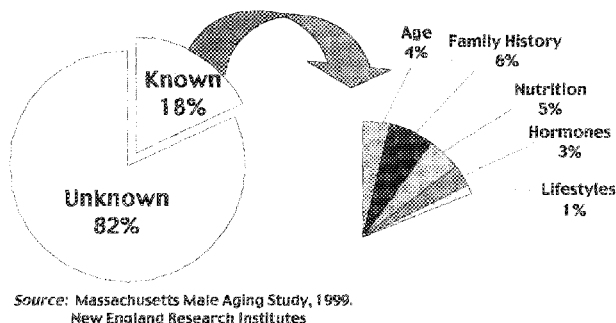


FIGURE 4—The combined contribution of 36 major risk factors to prostate cancer.

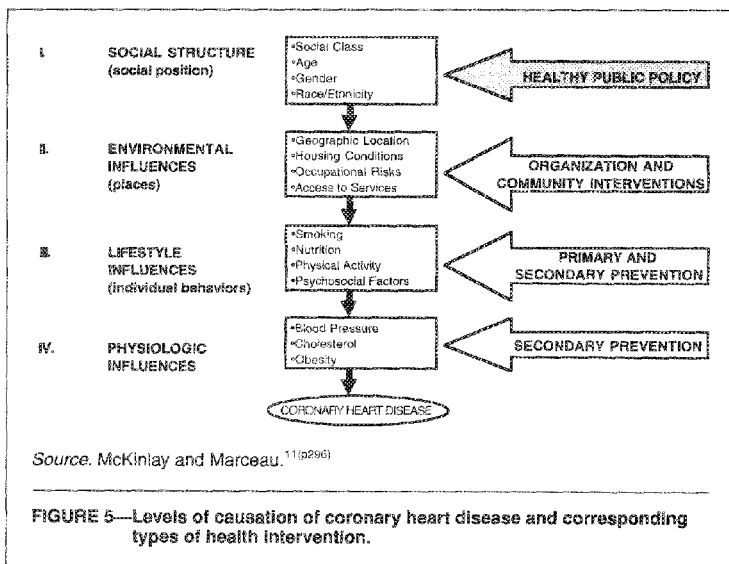


FIGURE 5—Levels of causation of coronary heart disease and corresponding types of health intervention.

The potential answers are not necessarily exclusive, even given reductionist tendencies and the genuine and justified excitement over discoveries in the molecular biology of cancer. Rather these are levels of explanation that may be more or less coherent within themselves but provide even more information when they exist in a framework provided by all of the explanatory modes.^{5(p157)}

Levels of explanation suggest a hierarchical (as opposed to lateral) approach to disease causation. As Figure 5 illustrates, coronary heart disease is a product of now

more completely understood biophysiologic processes (the level of the body), but individual characteristics and behaviors (the level of people) also contribute, and these occur in particular socioeconomic environments (the level of places), which in turn are influenced by the location of groups in the social structure (the level of social position). The same is true of other chronic diseases. Elsewhere we have provided a more detailed discussion of this multilevel explanation.¹¹ Exciting new work using multilevel statistical modeling is estimating the contributions of different levels of disease explanation. Robert⁵⁴ shows

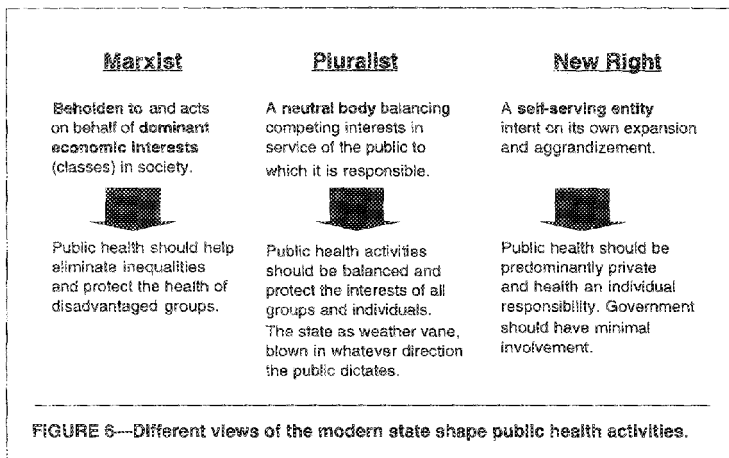
that socioeconomic characteristics of communities have an influence on adult health over and above the socioeconomic characteristics of individual residents.^{25,55}

This hierarchical approach to explanation in public health has distinct advantages: (1) it encourages multidisciplinary approaches; (2) it permits the integration of different levels of analysis (from social determinants, geographic and environmental variations, and health care access and utilization to the behavior and lifestyles of individuals and the influence of biophysiologic and family history); and (3) it suggests that profoundly different actions are required, depending on which level of explanation one focuses on. With respect to diabetes, for example (the prevalence of diabetes is increasing dramatically, and the condition will likely be a worldwide public health challenge in the new millennium), the level of biophysiologic (the body) suggests clinical interventions (glycemic control) to correct metabolic imbalances. The level of individual behavior (people) suggests primary and secondary preventive interventions encouraging at-risk patients to modify their diet and physical activity. The level of the environment (places) could involve community-based and worksite interventions (e.g., screening) and improvements in access to, the quality of, and compliance with medical care. At the level of social structure (position), more fundamental reform through healthy public policy (e.g., health insurance reform) may be indicated.

We view multilevel work as a response to the call for an upstream focus on the real or underlying determinants of the social patterning of disease.⁵² Although the field of research into social determinants is flourishing in Europe, it is only just beginning in North America, with notable researchers at Ann Arbor, Columbia, and Harvard. An innovative new program in Houston is focusing on factors affecting health "that are outside the skin of human beings."⁵⁶

The Changing Role of the State

The success of public health in the 21st century, especially interventions at the level of social policy, will depend in large part on the role of the state. While there is extensive debate in the social sciences over the structure, functioning, and power of the state, this debate has yet to penetrate the public health establishment, despite the state's crucial influence on all health activities (the nature of our health care system, the power of medical professionals, and the level of support for public health activities). The state has been a pivotal support for the medical and public health establishments in the United States



and many other countries during most of the 20th century. Although there are competing definitions, "the state" can be viewed organizationally as the "apparatus of government in its broadest sense, that is, as that set of institutions that are recognizably 'public' in that they are responsible for the collective organization of social existence and are funded at the public's expense."^{57(p84)}

As far as the United States is concerned, the state has lost some of its ability, or willingness, to act on behalf of and protect the public health. This was evidenced by both the dismal attempt at health care reform in 1994 and the defeat of the proposed tobacco control bill in 1998. Rather insidiously, perhaps, the state in the United States appears to have shifted its primary allegiance from the public interest to often conflicting private interests. Such a shift will shape the content and sociopolitical context of public health during the millennium we are entering.

The New Right perspective is a powerful reaction to the view of the state as Leviathan, a self-serving monster intent on its own expansion and aggrandizement. Two alternative perspectives (pluralism and Marxism) have been termed "society centered"; according to these views, the state and its actions are shaped by external forces in society as a whole (Figure 6). Pluralism views the state's actions as determined by the democratic will of the people; Marxist theory sees the state's actions as shaped by the interests of a small group of powerful institutions and individuals. Clearly, society can and does influence the structure and functioning of the state, but obviously the reverse can also occur. This possibility has given rise to what are termed "state-centered" approaches to the theory of power in modern

society. These approaches (and the New Right is but one of them) view the state as acting independently, or autonomously, to shape social behavior.

The New Right perspective, which appears to be ascendant in the United States, is distinguished by its strong laissez faire attitude and its antipathy toward state intervention in economic and social life (even in medical care and public health). According to this view, the state should retreat from its commitment to public health and let market forces prevail. Rooted in a radical form of the individualism discussed above and exemplified in the writings of Nozick,⁵⁸ the New Right considers the state a parasitic growth that threatens individual liberty and even economic development.

The 3 perspectives on the modern state identified here represent a gross simplification of a complex debate that has lasted several decades. Personal values and ideology determine which particular view of the state is most compatible. The appropriateness of any theory of the state probably varies between countries, although with recent developments that situation may be changing. The role of the state may also change over time within a particular country: in the United States there is a movement from pluralism to a New Right state. New social programs (e.g., Medicare and Medicaid) were formulated and implemented during a liberal pluralist era, when the role of the state made the implementation of such programs possible. Efforts at health care reform in the United States during the last decade of the 20th century failed in large part because of a well-orchestrated New Right assault on the leviathan state (as Big Government, increased taxation, public dependency, and

curtailed freedoms).⁵⁹ Likewise, the ability of the New Right to portray anti-tobacco legislation as reflecting leviathan tendencies was undoubtedly a major reason for the legislation's defeat.⁶⁰ The success of public health activities in the 21st century, especially upstream healthy public policy, will depend not on the increasing effectiveness of our interventions or on the sophistication of our research methods (although these are obviously vital), but on what an ever-changing US state will countenance.

Appropriate Research Methods for the New Millennium

The term "appropriate" denotes something that is "specifically fitting or suitable" or "proper." Depending on the problem of concern, so-called low technology may be appropriate or inappropriate (as may so-called high technology). "Appropriate" health technology does not conform to some idealized standard, nor is it necessarily optimal or even "simple."⁶¹ Instead, it serves as a suitable approach for some purpose at a particular point in time, taking into account the nature and magnitude of the problem as well as the available resources. Obviously, what is appropriate in one setting may be quite inappropriate in another setting. Moreover, even within a particular setting there are often differences over time in what is deemed appropriate. As a result, appropriateness is a Heraclitan notion: it connotes fluidity. Just as every epoch has its own health challenges, so too must each epoch develop research methods appropriate to its problems.

It is useful to view different methodologies in the same manner as different types of intervention technologies. The concept of "appropriate methodology" refers to the most suitable research approach associated with different points across a broad spectrum of methodological strategies. Just as it is inappropriate to distinguish high from low interventions, it is also inappropriate to dichotomize evaluation methods as quantitative vs qualitative, hard vs soft, deductive vs inductive, or objective vs subjective. The appropriateness of any research methodology depends on the phenomenon under study as well as its magnitude, the setting, the current state of theory and knowledge, the availability of valid measurement tools, and the proposed uses of the information to be gathered. The utility of a particular methodological approach is, in large part, a function of the load it is carrying and the population to whom it is being delivered. Therefore, the appropriateness of a research method is determined not by an

abstract norm or idealized Popperian conception of science, but rather by the nature of the problem under consideration, the community resources or skills available, and the prevailing norms and values at the national, regional, or local level.

Acceptance of the notion of "appropriate methodologies" requires adaptation and refinement of traditional quantitative research methods, such as social surveys and conventional experimental designs, for these methods to remain applicable to the perspective of the "new public health." Moreover, well-designed and carefully conducted qualitative studies, including ethnographic interviewing, participant observation, case studies, and focus group activities, are now required to complement quantitative approaches and to fill gaps where quantitative techniques are sub-optimal or even inappropriate. Unfortunately, quantitative and qualitative methods are viewed by their respective rigid adherents as incompatible rather than as mutually enriching partners in a common enterprise. Most quantitative researchers view qualitative approaches as inductive, subjective, unreliable, and "soft." These advocates of quantitative methods constitute the dominant force in public health and biomedical research, and they control the purse strings. Many of those engaged in qualitative research see quantitative researchers as positivistic, mindless data dredgers who suffer from hardening of the categories.

Any reorientation of our efforts upstream—to organizations, communities, and national policies—requires the development of measurements and indicators appropriate to that level of focus. In contrast to interventions with individuals (say, patients with a specific condition or subjects with particular risk factors), systemic interventions must be assessed through the use of systemic outcomes—indicators of improvement in the community, independent of individuals and their risky behaviors. In other words, "quality of life" as a criterion is replaced by "quality of community" or "quality of organizational environment." The interest is not in whether an individual quits smoking or lowers his or her cholesterol level, but in whether there is improvement in the quality of the organizational environment. In the given area, how many workplaces are designated no-smoking? How many restaurants add heart-healthy items to their menus? What proportion of schools change the way school meals are prepared? What added revenues are generated from the imposition of taxes on harmful products? Is there a reduction in the overall rate of avoidable death? The list of systemic outcomes is extensive, and the appropriateness of any one of them

is largely a function of the problem being addressed.

US public health in the new millennium must move from the level of individuals, personal risk factors, and lateral research to other levels of explanation (causation) and intervention. Healthy public policy could be a useful starting point. Although tried-and-true quantitative methods generally work when the focus is downstream (e.g., when the outcome of interest is voluntary lifestyle changes at the individual level), they are not always useful or appropriate when the emphasis shifts to the level of the social system. Some techniques are misapplied, and others are inherently inappropriate. The notion of "appropriate methodology" emphasizes the match between the level of analysis and the most suitable research approach, which is contingent on the problem, the state of knowledge, the availability of resources, the audience, and so forth. There is no right or wrong methodological approach; rather, appropriateness, given the purpose of the study, must be the central concern.

The Myth of a Value-Free Public Health

There is a move within public health to divorce the results of scientific inquiry from subsequent social action: for some, it is sufficient to conduct research and publish the findings. Such researchers feel that by sticking to the science and eschewing sociopolitical action, they somehow enhance the credibility and standing of public health. According to this view, the putative father of epidemiology, John Snow, made an egregious mistake when he removed the handle from the Broad Street pump.⁶² Faced with his profound findings on the spread of cholera, he should instead have returned to his office and written memos to valued professional colleagues (in other words, he should have submitted his findings to peer review). Some in our field (thankfully, an ever smaller minority) feel that we in the United States have no business getting involved in tobacco control activities—epidemiologically informed, sociopolitical, upstream public health actions likely to save more lives, in a cost-effective manner, than all of the downstream smoking intervention programs over the past 50 years combined.⁶⁰

Rigid adherence to an arcane view of science and false consciousness about the purported objectivity of the public health enterprise are likely to promote narrow disciplinary sectarianism at a time when an even more multidisciplinary ecumenical approach

to public health challenges is required. Despite several decades of debate concerning the absurdity of the notion of objectivity in science, some observers still don't get it.⁶³ The futility of the belief in objective science for public health provides the most elegant argument for embracing the social science disciplines, especially medical sociology. In sociology, for example, early positivists such as Auguste Comte and Emile Durkheim (and even Max Weber and Karl Marx) believed that research should be objective and value-free. In "Anti-Minotaur: The Myth of a Value Free Sociology," Gouldner has argued that just as the bull and the man in the mythical creature cannot be separated, so facts and values cannot be separated in scientific research.⁶⁴ He asserted that all scientists make "domain assumptions"—basic assumptions about the nature of social life, the reasons for individual behaviors, what is an acceptable research approach, who is a legitimate source of research support, where it is appropriate to publish results, and so forth. While these assumptions are often unstated, they strongly influence what is actually studied and the way research is conducted, the sources of data used, the means of the data's statistical manipulation, and any action that is recommended. Simply by selecting a particular public health problem for investigation, public health scientists reveal what aspects of society they believe to be important and perhaps amenable to social action and beneficial change. Becker⁶⁵ observed that value neutrality is *not* a neutral stance: a purportedly "objective" position is itself an ideological position.

Summary

The threshold of the new millennium offers an opportunity to celebrate remarkable past achievements and to reflect on promising new directions for the exciting field of public health. Despite historic achievements, much will always remain to be done—that is the nature of the public health enterprise. We argue that every epoch has its own distinct health challenges, and those confronting us today are unlike those plaguing public health a century ago. Global environmental threats, the disruption of vital ecosystems, planetary overload, persistent and widening social injustice and health inequalities, and lack of access to effective health care will be among our major challenges in the future. The perspectives and methods that were developed and that served so well during the infectious and chronic disease eras will have limited utility in the face of these newly emerging challenges to public health. Some observers

believe that public health is at a crossroads⁶⁶ and that critical choices are now required: Should we simply continue traveling on the traditional road ("You're sure to get somewhere if you only walk long enough"), or should we go in some other direction or adopt different approaches to reach newly agreed-upon objectives? Public health workers, motivated by humanism and utilitarianism, deserve to get somewhere by design, not just by perseverance.

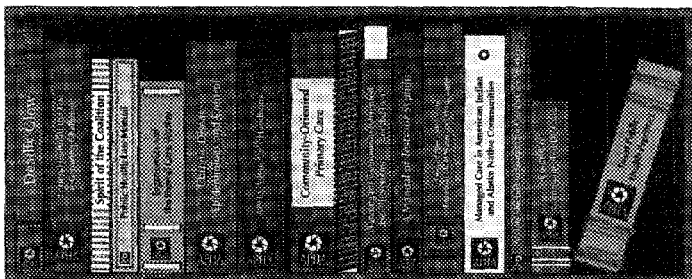
We have attempted to provide a forthright stocktaking of the state of public health in the United States. Our intention is to offer, as insiders and practitioners, constructive commentary: such is a necessary but not sufficient condition for positive change. Because of space limitations, we have omitted discussion of many important areas (e.g., health services research, occupational health and safety, children and families at risk, public health education, the aging population, new epidemics such as HIV and violence). However, we believe that many of the arguments presented here have implications for most of these areas of public health as well. []

References

- Rothman KJ. *Modern Epidemiology*. Boston, Mass: Little Brown & Co Inc; 1986:11.
- Miettinen OS. *Theoretical Epidemiology: Principles of Occurrence Research*. New York, NY: John Wiley & Sons Inc; 1985.
- McKinlay JB. Some contributions from the social system to gender inequalities in heart disease. *J Health Soc Behav*. 1996;37:1-26.
- Loomis D, Wing S. Is molecular epidemiology a germ theory for the end of the twentieth century? *Int J Epidemiol*. 1990;19:1-3.
- McMichael AJ. "Molecular epidemiology": new pathway or new traveling companion? *Am J Epidemiol*. 1994;140:1-11.
- Sly CM. The failure of academic epidemiology: witness for the prosecution. *Am J Epidemiol*. 1997;145:479-484.
- Savitz D. The alternative to epidemiologic theory: whatever works. *Epidemiology*. 1997; 8:210-212.
- Smith A. The epidemiological basis of community medicine. In: Smith A, ed. *Recent Advances in Community Medicine*. J. Edinburgh, Scotland: Churchill Livingstone; 1985:1-10.
- Krieger N. Epidemiology and the web of causation: has anyone seen the spider? *Soc Sci Med*. 1994;39:887-903.
- Krieger N, Zierler S. What explains the public's health—a call for epidemiologic theory. *Epidemiology*. 1996;7:107-109.
- McKinlay JB, Marcoux LD. A tale of 3 tails. *Am J Public Health*. 1999;89:295-298.
- Rose G. Sick individuals and sick populations. *Int J Epidemiol*. 1985;14:32-38.
- Rose G. *The Strategy of Preventive Medicine*. Oxford, England: Oxford University Press; 1992.
- McMichael AJ. The health of persons, populations, and planets: epidemiology comes full circle. *Epidemiology*. 1995;6:633-636.
- Hill AB. Environment and disease: association or causation? *Proc R Soc Med*. 1965;58:295-300.
- Schlesselman JJ. *Case Control Studies: Design, Conduct, Analysis*. New York, NY: Oxford University Press; 1982.
- Kelsey JL, Thompson WD, Evans AS. *Methods in Observational Epidemiology*. New York, NY: Oxford University Press; 1986. Monographs in Epidemiology and Biostatistics, vol 10.
- Susser M. Ilipepidemiology in the United States after World War II: the evolution of technique. *Epidemiol Rev*. 1985;7:147-177.
- Tosh SN. *Hidden Arguments: Political Ideology and Disease Prevention Policy*. New Brunswick, NJ: Rutgers University Press; 1988.
- Nijhuis HGG, van der Maesen L.J.G. The philosophical foundations of public health: an invitation to debate. *J Epidemiol Community Health*. 1994;48:1-3.
- Pareto V. *The Mind and Society*. New York, NY: Dover; 1963.
- Weber M. *The Theory of Social and Economic Organization*. New York, NY: Oxford University Press; 1947.
- Marx K. *Selected Writings in Sociology and Social Philosophy*. New York, NY: McGraw-Hill; 1964.
- Durkheim E. *Rules of Sociological Method*. Chicago, Ill: University of Chicago Press; 1938.
- Macintyre S, MacIver S, Sooman A. Area, class and health: should we be focusing on places or people? *J Soc Policy*. 1993;22:213-234.
- Susser M, Susser E. Choosing a future for epidemiology, II: from black box to Chinese boxes and eco-epidemiology. *Am J Public Health*. 1996;86:674-677.
- Susser M. The logic in ecological, II: the logic of design. *Am J Public Health*. 1994;84: 830-835.
- Gori GB. Epidemiology and public health: is a new paradigm needed or a new ethic? *J Clin Epidemiol*. 1998;51:637-641.
- Pearce N, McKinlay JB. Back to the future in epidemiology and public health: response to Dr. Gori. *J Clin Epidemiol*. 1998;51:643-646.
- Ashton J, Seymour H. *The New Public Health*. Buckingham, England: Open University Press; 1988.
- Popper KR. *The Logic of Scientific Discovery*. New York, NY: Harper & Row; 1968:276-281.
- Popper K. *Conjectures and Refutations*. London, England: Routledge & Kegan Paul; 1974:339.
- Weed DL. Causal criteria and Popperian refutation. In: Rothman KJ, ed. *Causal Inference*. Chestnut Hill, Mass: Epidemiology Resources; 1988:15-32.
- Whitehead AN. *Science and the Modern World*. London, England: Free Association Books; 1985:22.
- Greenland S. Probability versus Popper: an elaboration of the insufficiency of current Popperian approaches for epidemiologic analysis. In: Rothman KJ, ed. *Causal Inference*. Chestnut Hill, Mass: Epidemiology Resources; 1988: 95-104.
- Pettiti DB. Associations are not effects. *Am J Epidemiol*. 1991;133:101-102.
- Susser M. Falsification, verification and causal inference in epidemiology: reconsideration in the light of the philosophy of Sir Karl Popper. In: Rothman KJ, ed. *Causal Inference*. Chestnut Hill, Mass: Epidemiology Resources; 1988: 33-58.
- Susser M. What is a cause and how do we know one? A grammar for pragmatic epidemiology. *Am J Epidemiol*. 1991;7:635-648.
- Last JM. Global change: ozone depletion, global warming and public health. *Annu Rev Public Health*. 1993;14:115-136.
- Epstein PR. Emerging diseases and ecosystem instability: new threats to public health. *Am J Public Health*. 1995;85:168-172.
- McMichael AJ. *Planetary Overload: Global Environmental Change and the Health of the Human Species*. Cambridge, England: Cambridge University Press; 1993.
- Mackenbach JP. Public health epidemiology. *J Epidemiol Community Health*. 1995;49: 333-334.
- Kuhn TS. *The Structure of Scientific Revolutions*. Chicago, Ill: University of Chicago Press; 1962.
- Watson RI. Psychology: a prescriptive science. In: Henle M, Jaynes J, Sullivan J, eds. *Historical Conceptions of Psychology*. New York, NY: Springer; 1973.
- Gholson B, Barker P. Applications in the history of physics and psychology. *Am Psychol*. 1985; 40:755-769.
- Evans RG. Introduction. In: Evans RG, Barer ML, Marmor TR, eds. *Why Are Some People Healthy and Others Not? The Determinants of Health of Populations*. New York, NY: Aldine de Gruyter; 1994:3-26.
- Long AF. *Understanding Health and Disease: Towards a Knowledge Base for Public Health Action*. Leeds, England: Nuffield Institute for Health, University of Leeds; 1993.
- Terris M. The distinction between public health and community/social/preventive medicine. *J Public Health Policy*. 1985;6:435-439.
- Krieger N. Sticky webs, hungry spiders, buzzing flies, and fractal metaphors: on the misleading juxtaposition of "risk factors" versus "social epidemiology." *J Epidemiol Community Health*. 1999;53:678-680.
- Susser M. Does risk factor epidemiology put epidemiology at risk? Peering into the future. *J Epidemiol Community Health*. 1998;52: 608-611.
- Potter JD. Reconciling the epidemiology, physiology, and molecular biology of colon cancer. *Alba*. 1992;268:1573-1577.
- McKinlay J. A case for refocusing upstream—the political economy of sickness. In: Benfante A et al., eds. *Behavioral Aspects of Prevention*. Houston, TX: American Heart Association; 1975.
- McKinlay JB, Marcoux LD. Building a bridge for US public health to the 21st century: the case of diabetes. *Lancet*. In press.
- Robert SA. Community-level socioeconomic status effects on adult health. *J Health Soc Behav*. 1998;39:18-37.
- Diaz-Roux AV, Nieto FJ, Munoz C, et al. Neighborhood environments and coronary heart disease: a multilevel analysis. *Am J Epidemiol*. 1997;146:48-63.
- Public announcement. Joint Program on Social Determinants. Houston: Rice University, Media Relations; April 8, 1999.
- Heywood A. *Politics*. London, England: Macmillan; 1997.

58. Nozick R. *Anarchy, State and Utopia*. Oxford, England: Basil Blackwell; 1974.
59. Skocpol T. *Boomerang: Health Care Reform and the Turn Against Government*. New York, NY: North & Co; 1997.
60. McKinlay JR, Marceau LD. Upstream healthy public policy: lessons from the Battle of Tobacco. *Int J Health Serv*. In press.
61. Nowell KW. Research for an appropriate health technology. Annual address presented at: Annual Conference of Australian and New Zealand Society for Epidemiologic Research and Community Health; 1977; Wellington, New Zealand.
62. Snow J. *On the Mode of Communication of Cholera*. 2nd ed. London, England: Churchill; 1855.
63. Chalmers A. *What is This Thing Called Science?* Milton Keynes, England: Open University Press; 1982.
64. Gouldner A. Anti-minotaur: the myth of a value free sociology. In: *For Sociology: Renewal and Critique in Sociology Today*. London, England: Allen Lane; 1973.
65. Becker HS. Whose side are we on? *Soc Probl*. 1967;14:239-247.
66. Beaglehole R, Bonita R. *Public Health at the Crossroads*. Cambridge, England: Cambridge University Press; 1997.

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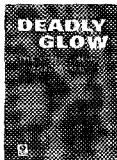


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