

Second Thoughts

CLINICAL AND POPULATION EPIDEMIOLOGY: BEYOND SIBLING RIVALRY?

C. DAVID NAYLOR,^{1,3,5,7,*} ANTONI BASINSKI,^{1,4,6} HOWARD B. ABRAMS^{2,3}
and ALLAN S. DETSKY^{2,3,5}

Clinical Epidemiology Units, ¹Sunnybrook Health Science Centre and ²Toronto Hospital and
Departments of ³Medicine, ⁴Family & Community Medicine, ⁵Health Administration,
⁶Preventive Medicine & Biostatistics and ⁷Behavioural Science, University of Toronto Faculty
of Medicine, Toronto, Ontario, Canada

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Twenty years ago, the *American Journal of Epidemiology* published David Sackett's brief description of clinical epidemiology and its practitioners [1]. This commentary was a useful focal point for an emerging discipline. By 1983, with clinical epidemiology already thriving in many academic medical centres, Walter Holland called into question both the term, "clinical epidemiology", and the nature of the discipline [2]. More recently, clinical epidemiology has drawn strong criticism from John Last, a noted academician whose contributions include the editorship of the *Maxcy-Rosenau Textbook of Public Health*. Writing in the *Journal of Public Health Policy* in 1988 [3], Last referred to the "uncritical enthusiasm" for clinical epidemiology in medical schools as "a danger to health", and staked a claim to the term "epidemiology" as appropriate only to the description of what classical or population epidemiologists do.

Faced with such views, practitioners and proponents of clinical epidemiology can respond in three ways. They can ignore the criticism, and go on about their business. They can reaffirm their differences and resort to defensive rhetoric. Or, the critique can become an opportunity for reflection about the nature of clinical epidemiology and its relations with sister disciplines in modern medical schools. The latter course is followed here by four physicians who—despite diverse backgrounds and interests—all consider their work to be in the field of clinical epidemiology.

I. TERMINOLOGY REVISITED

Walter Spitzer [4] has remarked that double designations such as clinical epidemiology are perfectly appropriate for the description of "bridge sciences". Indeed, the maturation and differentiation of any discipline is commonly attended by this pattern of terminology. For example, epidemiology already has established subdisciplines such as cancer epidemiology and cardiovascular epidemiology. By extension, clinical epidemiology is simply another specialty within a broad field.

Spitzer [4] has defined clinical epidemiology as the study of the determinants and effects of clinical decisions—a suggestion that, on the surface, lends credence to Last's contention that clinical epidemiology should be renamed, "clinical decision analysis" [3]. However, we raise two objections to the use of this term to describe clinical epidemiology, and to the narrower definition of activities that accompanies it. First, many will confuse this moniker with the specific topic of clinical decision analysis that has already emerged as an avenue of investigation

*Dr Naylor is a Career Scientist of the Ontario Ministry of Health. Dr Detsky is a National Health Research Scholar (Health and Welfare Canada).

within clinical epidemiology. Second, and more importantly, by retaining the term, "epidemiology", we emphasize that many of the techniques of clinical epidemiology are drawn from population or classical epidemiology, and that the tasks of the two disciplines overlap. The same logic leads one to prefer clinical epidemiology as an umbrella term encompassing specific areas of interest such as "clinimetrics" [5].

John Last, in contrast, believes clinical epidemiology to be an oxymoron. The term is "internally inconsistent because epidemiology refers to populations, and clinical epidemiology often refers to individual persons" [3]. In this vein, he cites "*N-of-1*" studies [6] as activities that are not "true" epidemiology. We note that "*N-of-1*" studies are not commonly used as a research tool in clinical epidemiology. Indeed, it is surely fairer to view "*N-of-1*" studies simply as one proposed way of tailoring patient care so as to individualize the insights gained from epidemiology, both classical and clinical.

Last's emphasis on "*N-of-1*" studies is nonetheless useful, for it suggests that some of the terminological imbroglia is grounded in broader questions of how individuals choose to approach semantics. Essentialists emphasize the importance of formally-defined terminology and its precise implications. Nominalists are more comfortable with the varying meanings of the same term in different contexts, and do not demand an ontological match between words and reality. However, even an essentialist viewpoint on epidemiology makes it difficult to exclude clinical epidemiology. Professor Last, the editor of *A Dictionary of Epidemiology*, writes that epidemiology "is concerned with the study of disease or health-related phenomena in a defined population, even if it is a population of patients rather than a community-based population with a numerator and denominator in the conventional epidemiologic sense" [3]. This description is obviously apt not just for population epidemiology, but also for clinical epidemiology and many other activities in clinical research.

II. DISCIPLINARY GROWTH AND COGNITIVE TERRITORIALITY

The question therefore arises: why should public health specialists or traditional epidemiologists object to the term—or terms of reference for—clinical epidemiology? Perhaps some friction between closely related disciplines is

inevitable given the intensified competition for resources in medical schools. As well, the conceptual paradigms that help us organize reality—be they academic disciplines, scientific and pseudo-scientific theories, ideologies, or religions—are not mere abstractions. They become part of the identities of their practitioners or proponents, create group loyalties, and at worst lead to aggressive delineation of cognitive territory.

There is accordingly a double-bind in which emerging academic subdisciplines may be caught. If the new discipline is too different from related ones, its claim to familial membership is challenged by academic siblings. If it is too similar, its claim to individuality is denied. Concern with the latter leads those championing a new subdiscipline to emphasize its unique features and advantages rather than its commonality with old patterns of thought and action, which may further strain family ties.

In this regard, one notes that in John Paul's pioneering definition from 1938 [7], and again in David Sackett's 1969 commentary [1], the distinct features of clinical epidemiology are demarcated most sharply with respect to population epidemiology. These two authors [1–7] differed in the extent to which they emphasized prevention, with Paul focusing primary attention on questions of etiology, risk factor delineation, and the prevention of disease within a family and community context. However, despite having appeared 30 years apart, the commentaries by Paul and Sackett shared two important features. Both focused less on the modern academic discipline of clinically-oriented epidemiology, and instead emphasized the potential for training epidemiologically-oriented clinicians. That is, they reflected a belief that day-to-day clinical care could be improved by bringing techniques from population epidemiology and biostatistics to the bedside. Both essays also indicated that these techniques should be used in the clinical research sphere to improve the basis of medical practice.

No inventory has been taken of how medical schols presently organize their clinical epidemiology initiatives. Such a stock-taking is arguably overdue, and we draw solely on our impressions of the research and teaching activities of colleagues in other centres. However, we perceive that clinical epidemiology as a field for research is still largely oriented to issues that will ultimately bear on clinical care; as a field for

teaching, its role—as Sackett and Paul envisaged—is mainly, albeit not exclusively, the training of epidemiologically-oriented clinicians. On the other hand, we believe that, far more often than not, clinical epidemiologists happily coexist and collaborate with public health professionals, community medicine specialists, and population epidemiologists. Contributions to the development of clinical epidemiology are also routinely made today by persons who may have little or no clinical training, be they health economists, population epidemiologists, biostatisticians, or social scientists. It therefore seems questionable to demarcate population from clinical epidemiology by making the latter a preserve of those who deliver actual patient care [1]. In sum, if a definition must be applied, a clinical epidemiologist is simply anyone who happens to apply epidemiological techniques to problems bearing on the care of patients.

III. ACTIVITIES AND INTERESTS AS BOUNDARY MARKERS

For the sake of argument, however, let us further consider what features divide and join population and clinical epidemiology. At one extreme of the spectrum of activities and interests, the traditional epidemiologist may be a non-clinician, concerned with vital statistics and other data for large populations and subpopulations, and employing primarily the tools of observational research. In contrast, at the other extreme, the clinical epidemiologist may be one who continues to care for individual patients, and who is primarily concerned with subpopulations of diseased individuals, studied with experimental methods such as randomized controlled trials. Furthermore, population epidemiologists have often been primarily concerned with the determinants of the health status of communities and nations, whereas clinical epidemiologists have tended to pose diagnostic and therapeutic questions pertinent to subpopulations and individuals.

There is, however, considerable overlap, and certain distinctions are, in part, epiphenomena governed by the size of the unit studied. To the extent that they study overall health status and its determinants in very large groups of persons, classical or population epidemiologists will tend to use descriptive and observational techniques, rather than resorting to the experimental method. Clinical epidemiologists, in contrast,

will be both more able and more likely to test active manoeuvres that modify health-related states.

Last [3] criticizes some of the current textbooks in clinical epidemiology for lack of attention to case-control studies and other analytic research tools commonly used by population epidemiologists. This is fair comment. Logistical and ethical constraints preclude putting many important questions to clinical trial. In such instances, compelling evidence has often been collected by meticulous observational study using analytical strategies aimed at minimizing the impact of deficiencies inherent in non-experimental designs. Examples range from the elucidation of modes of transmission of many infectious diseases, to the establishment of the association between smoking and lung cancer.

Knowledge of how to *appraise* these studies is important to the training of epidemiologically-oriented clinicians. An awareness of how to *do* them will also be useful for clinical epidemiologists, who not infrequently perform analytic research with the tools more commonly used by population epidemiologists. Furthermore, strategies to minimize threats to the validity of non-experimental research are often applicable to the same ends in experimental designs. To adopt an attitude of nihilism towards all observational studies is therefore to flout Voltaire's sage advice that the best should not become the enemy of the good, or, in this case, the best possible.

We note, however, that there has been two-way traffic on this particular avenue. Among the more conspicuous contributions by clinical epidemiologists to the furtherance of non-experimental methodology are Sackett's classic delineation of biases in analytic research [8], and the continuing work by Ralph Horwitz and Alvan Feinstein on methodologic standards and contradictory results in case-control studies [9–12]. Indeed, in Feinstein's view, the promulgation of higher standards for non-experimental research owes much to the methodological lessons learned in the development of randomized controlled trials over the past 25 years [12].

IV. CONFLICTING VALUES?

John Last's editorial [3] contains a second order critique, based on differences in goals or values. He suggests that clinical epidemiologists may not be attuned to community health issues, and focus on disease to the exclusion of preven-

tion and promotion. Similarly, by reinforcing the medical model, clinical epidemiology may contribute to social iatrogenesis [13], undermining self-help and personal responsibility in matters related to health and disease. For these reasons, Last concludes that clinical epidemiology is potentially "a danger to health".

We accept that clinician-epidemiologists may have an occupational predisposition to view society as a series of sick or potentially sick individuals. If clinical epidemiology thereby reinforces the current tendency to apply medical solutions to community-wide problems, it may divert resources away from preventive medicine and health promotion that have the capacity to do more good in the long run. Conversely, a failure to recognize the social and environmental determinants of many medical problems could result from an over-emphasis on the clinical side of epidemiology. This is particularly worrisome in the context of "developing" countries, where clinical epidemiology may be inappropriately used to legitimize the creation of expensive treatment facilities consuming resources that would be better allocated to public health measures. Similarly, within industrialized societies, it is important that public policy in the health sphere be determined by balancing the views of clinical and population epidemiologists.

On the other hand, the current interest in health promotion and preventive medicine owes much to clinical epidemiology. By critically appraising what clinicians do, and setting new evidentiary standards for the adoption of treatments, clinical epidemiologists have contributed to greater public and professional skepticism about modern medicine as a social institution. Indeed, pioneering evidence of the perils of "medicalization" was adduced by clinical epidemiologists studying the phenomenon of diagnostic "labelling" in the detection and treatment of hypertension [14].

Clinical epidemiology meanwhile is evolving to include a new generation of activity. As its practitioners move from randomized trials and bedside biometrics to broader issues of technology assessment, collaboration with public health specialists and population epidemiologists will doubtless increase. For example, the "measurement iterative loop", proposed by Peter Tugwell and associates [15], presents a framework for appraising the needs, benefits, and costs of health interventions. This framework includes: an assessment of the burden of

the disease to which an intervention applies; a review of its etiology; proof of the efficacy, effectiveness, and cost-effectiveness of the intervention; and in the event that the intervention is applied, a second assessment to determine whether the burden of illness has actually been reduced [15]. Such a framework clearly presupposes an interdisciplinary approach, melding information and insights from clinical and population epidemiology, not to mention health economics and public policy. Furthermore, in the process of applying the iterative loop, clinical epidemiologists are inevitably driven to look beyond a medical paradigm, and consider the competing merits of public health strategies or population-based approaches to reducing the burden of disease. (Two of the authors have recently been involved in a commissioned study of strategies for dealing with the problem of asymptomatic hypercholesterolemia, which has entailed all of these analytical elements [16] and was used to guide policy for the Canadian province of Ontario.)

V. CONCLUSION: COMPLEMENTARY ROLES

In discussing conflict and its resolution, the social theorist, Lewis Coser, has noted that apostates are more easily dealt with than heretics. Whereas apostates reject the basic values of their parent group, heretics lay claim to some or most of the same values, yet dissent on certain issues or means of attaining goals compatible with group values [17]. Perhaps population epidemiologists sharing Dr Last's viewpoints perceive their clinically-oriented counterparts as heretics—using many of the same analytical tools, and upholding many of the same values, but focusing primarily on applications of epidemiology that are most relevant to patient care.

Regardless of its genesis, academic sectarianism is almost always counter-productive. Indeed, even in Sackett's original commentary, and 15 years later in his rejoinder to Holland [18], the complementarity between clinical and population epidemiology was emphasized. We believe that most clinical epidemiologists of our generation have no stake in boundary disputes with sister disciplines, not least because our focus is increasingly inter-disciplinary.

To avoid future academic sectarianism, epidemiologists of any stripe will need to rise above arguments delineating heresy and orthodoxy. An essentialist attitude to terminology will ulti-

mately lead only to a restrictive retrenchment of positions. Epidemiology, in all its incarnations, is simply a rigorous and quantitatively-oriented approach to obtaining, analyzing, and applying data derived from studying the health states of human subjects—regardless of whether the unit of study is a country, a community, a subpopulation, or an individual. According to John Paul, the clinical epidemiologist is to the population epidemiologist “what a gardener is to a farmer” (quoted in Ref. [2]). By emphasizing what joins us, rather than what sets us apart, we can continue to cultivate common ground and ensure fruitful collaboration in the future.

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