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COMMENTARY

Psychiatric epidemiology: interactions with mainstream epidemiology as it undergoes transition

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Commentary on: Cooper C. (2013). Epidemiology in a changing world: implications for population-based research on mental disorders. *Epidemiology and Psychiatric Sciences*

The timely paper by Brian Cooper (*Epidemiology in a Changing World: Implications for Population-Based Research on Mental Disorders*) serves two important purposes. First, it strives to connect the ideas and methods of psychiatric epidemiology with the broader stream of epidemiological research, thereby adding value and visibility to its own research content and capacities. Second, it offers further leavening to that parent discipline which, over several recent decades, has foundered on the rocks of reductionism, Cochrane clinical criteria, and high-flying statistical methodology that exceeds the needs of practising epidemiologists. Modern epidemiology has developed a narcissism based on academic methodological sophistication and has, commensurately, lost much of its soul as hand-maiden to the greater public health effort to protect and improve, equitably, the health of whole communities (McMichael, 1999; Pearce, 2007).

As Cooper observes, recent years have proved contentious for epidemiologists. This reflects the turbulence caused by convergence of four strong undercurrents.

The recent rise of molecular biology and the possibilities of high-tech genetic epidemiology have proved seductive, of course. Indeed, some extra leverage in elucidating disease causation at individual level has resulted – although less than was foreseen during the 1990s when there was an uncritical surge of newly-created Chairs of Molecular Epidemiology (McMichael, 1994).

The 'evidence-based' mantra from the clinical medical arena, reinforced by the Cochrane review criteria, has beset much of the practice of epidemiology such that randomised controlled trials are the Holy Grail for many purists – despite much of the best epidemiological research needing to sift through the evidence *after* the critical events have occurred, when RCTs are irrelevant. Could John Snow have done an RCT to confirm the exposure source of cholera?

Third, there has been the 'social epidemiology' counter-revolution, exploring the upstream, more structural, causes of the occurrence and distribution of disease within populations. Its major public manifestation has been the work of WHO's International Commission on the Social Determinants of Health (Marmot *et al.* 2008). This thrust has been further enriched by the additional efforts, particularly, of Nancy Krieger (2011) and several others (including Steven Kunitz, Johann Mackenbach, Michael Marmot and Fran Baum) to develop a *theory* of population health, a way of understanding why and how adverse health arises and differs between populations, between sub-groups, and over time. This recognises that much about human health and disease reflects collectively shared history, living conditions and experiences – a perspective familiar to farmers in managing the health of their 'herd'.

The fourth current extends the 'social determinants' thrust. It recognises that, in today's globalised and complex world, epidemiological research, understanding and engagement in Big Policy must be reframed *ecologically*. The world around us is changing mightily, mostly via our own actions – spanning increases in physical, financial, cultural and electronic connectivity between populations; demographic growth, ageing and urbanisation; and our excessive collective 'ecological footprint' that is disrupting nature's life-supporting systems (including the climate) and hence the prospects for human health. In the mid-1990s research that entailed synthesis across the biological, ecological and health sciences was labelled 'eco-epidemiology' (Martens, 1997; March & Susser, 2006). Other terms (e.g. 'eco-social health') have been suggested. Human urban ecology is becoming a focus for systems-based

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epidemiological studies of complexes of influences on, for example, the rise of obesity and diabetes, and the increasing prevalence of mental depression, alienation and social disengagement in young adults.

In relation to that fourth current, Cooper provides a useful historical summary of changing trends and research foci in epidemiological research over the past one and half centuries, and its recent culmination in the concepts of 'eco-epidemiology' and systems thinking. He writes:

> "In view of [recent conceptual] weaknesses, the notion of an all-embracing multi-factorial causation has failed to gain wide acceptance. Nonetheless, there is growing awareness of the need to apply a more pragmatic concept of eco-epidemiology, in which the study of individual risk-factors is combined with analysis of macro-environmental systems – whether natural or man-made – that mediate population levels of health and sickness."

This sensible, portfolio, approach allows the importance of influences on health at multiple levels. But, warns Cooper, multi-level modelling can mislead, and is often misused. Less explicitly, he alludes to the need for an approach that does not necessarily require identification of discrete 'risk factors' and their 'effects'. Rather, we need to reorient much of our thinking to identify key pathways and influences on health *within* interacting dynamic social–environmental systems. We can thus better understand the complex real world, and identify apparent optimal points of intervention – without artificially reducing the system to an itemised list of 'causes'.

Cooper, properly, endorses the current emphasis on 'translational research'. Even so, enthusiasm for this entails a fundamental irony. The historical role, the social function, of epidemiological research is, *already*, to translate findings into the prevention of disease in populations. Why have many modern epidemiologists eschewed the hands-on conversion of new research knowledge into public health advocacy and evaluation? Most have little sense of the discipline's history; their 'epidemiology' is seen through a one-dimensional textbook lens.

Public health activities in mid-19th century, responding to basic epidemiological observations, achieved advances in population health via environmental remediation: sanitation, factory smoke legislation, civic hygiene and safer food. These sought to rectify the unhealthy, widely shared and ambient conditions of living; this was a predominantly *ecological*, whole-of-population, approach.

Meanwhile, formal epidemiological concepts and research methods were evolving simultaneously on two fronts, both critical to the discipline's future as the basic science of public health.

First, John Snow in London and Ignaz Semmelweiss in Vienna were concerned clinicians who observed major differences in rates of lethal diseases between distinctive groups. They conducted careful *empirical* studies of the causes of those differences. Here were the foundations of critical thinking and comparative methods in modern epidemiology. Each then pressed on, seeking the application of their findings to health protection.

Second, in the 'social determinants' realm, two names stand out in the socio-political study of health differentials between groups. In England, Friederich Engels documented death rate gradients in different suburbs according to indices of housing quality, hygiene and poverty levels. In Germany, the great cell pathologist and polymath Rudolf Virchow was a passionate public health advocate and socio-ecological theorist. In 1848, the Prussian government asked him to investigate a typhus epidemic in impoverished Upper Silesia. His *Report on the Typhus Outbreak of Upper Silesia* concluded that the outbreak could not be resolved by individual treatments with drugs or minor changes in food or housing. Only radical action to reduce exploitation and promote the entire population's welfare and advancement would solve the problem. The government was hugely discomforted.

Then, during the 1860s–1880s, a distinctive advance in public health occurred. The microbiological world and its contribution to many serious population health scourges was elucidated, principally by Louis Pasteur (France) and Robert Koch (Germany). The Germ Theory ushered in a shift to a more individualised approach to prevention and treatment of disease; and the influential 'biomedical model' became embedded in public health and epidemiological thinking. Inexorably, the individual became the main unit of interest for study by epidemiologists: perhaps disease occurrence within a population could be explained by differences in individual choices, behaviours, biomedical indicators (e.g. blood lipids) and, later, genes? Thus the 'modern' preoccupation with high-resolution risk factor quantification came to predominate. The forest could no longer be seen because of the trees.

Cooper's paper recognizes that epidemiology must rise above that individual-level preoccupation; it must redefine its role in a world where, increasingly, the influences on the health of communities occur at unprecedentedly large scales – including regional and even truly global scales (as with stratospheric ozone depletion and climate change). Huge, worldwide, demographic, cultural and economic shifts are also afoot.

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The opportunities for psychiatric epidemiology to enrich this transition process are great. Two examples help make the point. Within the military there is growing recognition of the profound, lasting, often devastating mental health disorders in those returning from combat zones. War has become depersonalised, mechanistic and hugely destructive. Many epidemiological studies have now begun in that realm. In relation to climate change, there are also many situations in which mental health disorders will be prominent problems – e.g., displaced communities, failing farm communities, survivors of extreme weather events, and the apprehensions and confusions of young children about the future. Much of the challenge will be to understand the determinants and dynamics of coping, or collapse, by communities-at-large, incorporating the study of social capital, resilience and community-wide support schemes (Berry *et al.* 2011). This foreshadows a 'psychiatric eco-epidemiology'.

Cooper notes the need for enhanced international research collaborations in our interconnected world. I question his reference to this as 'global health'. In reality, this is old wine in larger and better bottles; it is really 'international health', typically done on a bilateral basis. There is now, though, an *extra* layer of transboundary influences on the health of populations. These arise from the truly 'global' phenomena of today's world – world trading and capital-flow patterns, the diffusion of western consumer culture, the impacts of human-induced climate change, the pervasive spread of persistent organic pollutants throughout the biosphere and poisoning vulnerable ecosystems. Those issues and their physical, mental and social health consequences will require research, understanding and, then, policy responses at an even higher level.

The landscape is changing; situations are fluid. Hopefully, the maturation of psychiatric epidemiological research ideas, priorities and methods will become an integral and active part of the necessary transitional process. We will all gain.

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Conflict of Interest

None.

Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

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