SYMPOSIUM

The globalization of epidemiology: introductory remarks

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We are all living in the era of globalization, and like it or not, it is going to change the way we practice epidemiology, the kinds of questions we ask, and the methods we use to answer them. Increasingly, public health problems are being shifted from rich countries to poor countries and from rich to poor populations within Western countries. There is increasing interest and concern about the situation in non-Western populations on the part of Western epidemiologists, with regards to collaborative research, skills transfer, and ‘volunteerism’ to enable the ‘benefits’ of Western approaches to epidemiology to be shared by the non-Western world. However, most existing collaborations benefit Western epidemiologists rather than the countries in which the research is conducted. Even when research in non-Western populations is conducted as a genuine collaboration, it can too often ‘export failure’ from the West. On the other hand, non-Western epidemiologists are increasingly developing new and innovative approaches to health research that are more appropriate to the global public health issues they are addressing. These include recognition of the importance of context and the importance of diversity and local knowledge, and a problem-based approach to addressing the major public health problems using appropriate technology. These debates formed the background for a plenary session on ‘International Epidemiology and International Health’ at the recent International Epidemiological Association (IEA) meeting in Montreal, and the papers from this session are presented here. The development of a truly global epidemiology can not only better address the public health problems in non-Western populations, but can shed light on the current limitations of epidemiology in addressing the major public health problems in the West.

We are all living in the era of globalization, and like it or not, it is going to change the way we practice epidemiology, the kinds of questions we ask, and the methods we use to answer them. The last few decades have seen the occurrence of the ‘informational revolution’ which is having effects as great as the previous agricultural and industrial revolutions. These effects are not all deleterious, and in many parts of the world globalization is playing, or has the potential to play, a progressive role. However, the benefits and the hazards of globalization are not evenly distributed. In industrialized countries, the current changes are likely to prolong life expectancy for some, but not all, sections of the population. In developing countries the benefits have been even more mixed; the countries of Eastern Europe have experienced the largest sudden drop in life expectancy that has been observed in peacetime in recorded human history with a major rise in alcoholism and ‘forgotten’ diseases such as tuberculosis and cholera. The publication of Planetary Overload by Tony McMichael reminded us all of the necessity that epidemiologists play a major role in research and debates about global issues. There is nothing particularly surprising about all this, given the major public health impact of socioeconomic changes in the past, and in particular the role of socioeconomic change in the ‘epidemiologic transition’. However, the techniques necessary to answer such questions (and to ask them in the first place) are quite different from the standard epidemiological techniques that are taught in most textbooks and courses today. Thus, we have the choice of simply arguing that such global issues are ‘someone else’s problem’ or of developing our methodology to enable us to better address these major public health issues.

It should be acknowledged that not all epidemiologists share these concerns, and some have regarded such arguments as an attack on the field itself, rather than as an attempt to broaden its vision. Nevertheless, the debate has progressed and
there is an increasing recognition of the importance of taking a more global approach to epidemiological research and of the importance of maintaining an appropriate balance and interaction between population, individual, and micro-level research. Thus, Susser and Susser have written of the need for epidemiology to move from its ‘risk factor’ phase into the new phase of ‘eco-epidemiology’ or ‘global epidemiology’. Although the former term has been more frequently used, the latter term is perhaps more appropriate in the context of global public health problems. It should also be emphasized that global epidemiology may address both global and local health issues. The former include macro-level factors such as global warming which affect all countries in the world (although not equally). The latter include factors at the community and individual levels that, although being influenced by global changes, take specific forms because of the local context.

The globalization of epidemiology

These debates formed the background to the plenary session on ‘International Epidemiology and International Health’ which was chaired by Mauricio Barreto and myself at the recent IEA meeting in Montreal, and the three papers from this session are presented here. They represent no more than a fragment of the epidemiological activity occurring in non-Western populations, and do not aim to be comprehensive or representative (I recognize that there are many types of countries and populations, including low and middle-income countries, as well as indigenous populations within Western countries, and I also recognize that there are major social class differences within ‘Western’ countries; nevertheless, for want of a better term I will use ‘Western’ and ‘non-Western populations’ as summary terms). All three papers describe approaches to research which address local situations, but because of this (not in spite of it) they have common and universal themes and issues which are important not only for non-Western populations, but also to some extent show the future for the development of epidemiology in the West.

Exporting hazards

It is increasingly recognized that ‘Western’ epidemiologists now have global responsibilities. The limited success of legislative measures in industrialized countries has led the tobacco industry to shift its promotional activities to developing countries so that more people are exposed to tobacco smoke than ever before. Similar shifts have occurred for some occupational carcinogens and for other occupational hazards. Thus, on a global basis the ‘achievement’ of the public health movement has often been to move public health problems from rich countries to poor countries, and from rich to poor populations within ‘Western’ countries (I use quotation marks since I live in the most Southeastern country in the world, which is nevertheless regarded as part of ‘the West’ and also as part of ‘the North’). The major public health problems, perhaps more than ever before, occur in non-Western populations. Just as ‘the West’ represents a minority of the world’s population but uses the majority of the resources, only about 10% of the world’s health research funding is allocated to the 90% of the world’s health problems which occur predominantly in non-Western populations. There is therefore increasing interest and concern about the situation in non-Western populations on the part of Western epidemiologists, and there has been increasing enthusiasm for collaborative research, skills transfer, and ‘volunteerism’ to enable the ‘benefits’ of Western approaches to epidemiology to be shared by the non-Western world. However, it is not that simple.

Who is helping who?

Firstly, most existing collaborations benefit Western epidemiologists, rather than the countries in which the research is being conducted. This occurs not only because of the choice of research topic, but also because of the methodology that is used, and the ‘ownership’ and publication of the results. It is uncanny how these forms of ‘research colonialism’ follow the patterns of political colonialism of the last 200 years. This is not surprising since Western epidemiologists usually have the strongest links with colleagues in their former empires (or their new economic empires), and it is not surprising that scientific links too often reproduce these former colonial links. This situation not only applies to the former colonies of the ‘Third World’, as Barreto and Loewenson discuss, but also to what is sometimes termed the ‘Fourth World’, the indigenous people of countries such as the European settler colonies of New Zealand, Australia, Canada, and the US. In these countries, as Durie discusses, there is a long history of indigenous people being researched for the benefit of the European majority (and the European researchers), although things are now beginning to change for the better.

Exporting failure

Secondly, even when research in non-Western populations is conducted as a genuine collaboration, or by local epidemiologists, it can too often ‘export failure’ from the West. For example, Ebrahim and Davey Smith argue that the individual-focused methods of health promotion for coronary heart disease and stroke have had limited success in the West and that we are now ‘exporting our tired and failed models of health promotion to developing countries’. They argue that ‘it is essential that context-appropriate health research and health interventions take place in developing countries … the old models of using naive populations to test hypotheses of interest to developed countries are not acceptable’. Similarly, Loewenson argues that rather than ‘skills transfer’ from the West, epidemiology in non-Western populations requires the development of new epidemiological skills, and Durie discusses the interface between Western epidemiological methods and indigenous knowledge.

Who controls and owns the research?

For these, and many other reasons, non-Western epidemiologists are emphasizing the need for research to be conducted and/or controlled by local epidemiologists in order that the populations that are studied should suffer no harm and should in fact benefit from the research to the maximum extent possible. Where projects are conducted collaboratively then they should be jointly negotiated and agreed, and to the fullest extent possible, research funding should benefit the host country, and all projects should involve a training component for researchers from the host country. Furthermore, all other possible efforts should be made to assist the development of the research infrastructure in the host country to enable it to develop its own independent research capacity. These issues
have also been stressed by indigenous researchers and communities. For example, in Aotearoa/New Zealand there is an increasing emphasis on the need for Māori health research to be conducted ‘by Māori for Māori’.24 This is more than just a matter of changing the names and faces and then carrying on the research in the same old way. As the papers presented here indicate, non-Western researchers are increasingly developing new and innovative approaches (or reviving more traditional approaches) to health research that are more appropriate for the issues that they are addressing.

What are the key features of global epidemiology?

So what are the key features of a truly global epidemiology?

Who is it that is exotic?

One point should be emphasized from the start. If epidemiology is ‘the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control of health problems’,25 and if we recognize that the major burden of disease is currently occurring in non-Western populations, then the approaches to epidemiology illustrated here represent the mainstream, not an ‘exotic’ alternative. Such a perspective may sound surprising, and annoying, to Western epidemiologists, but it has been well discussed and well developed in other health research contexts. For example, in nursing research, the Western approach of ‘transcultural nursing’ has been challenged by the indigenous perspective of ‘cultural safety’ in nursing.26 The distinction is not trivial. The former approach takes Western culture as ‘normal’ and attempts to develop an understanding of ‘exotic’ cultures, and to develop a generic approach to nursing which is ‘culturally sensitive’ or ‘culturally appropriate’. The cultural safety approach (developed by indigenous researchers in New Zealand27) recognizes that there is no ‘normality’ and turns the spotlight back onto the nurse; it requires he/she not to study other cultures, but to understand their own culture and the way that it influences and inhibits interactions with patients. Perhaps it is time for Western epidemiologists to examine their own culture, and their own assumptions, and the way that they inhibit and limit their interactions with ‘exotic’ populations. Incidentally, this represents another problem with the term ‘non-Western populations’ since it defines these as being ‘other’ than the ‘normal’ Western populations, but I have nevertheless used the term here for want of a better alternative).

The importance of context

A further common theme of all three papers is the importance of context. Every population has its own history, culture, and economic and social divisions which influence how and why people are exposed to specific risk factors, and how they respond to such exposures. Barreto18 discusses the political and social context of conducting epidemiology in Latin America, and the response of epidemiologists to this situation. Similarly, Loewenson19 explores the implications for epidemiological work in Southern Africa through two case studies on occupational health and equity in health, both of which are strongly conditioned by the political and socioeconomic context of globalization. Durie20 discusses how studying indigenous health must inevitably take into account ‘the impacts of colonization, discrimination, marginalisation and the overt and covert policies that led to ethnocide and sometimes frank genocide’.

The point is that, even when focusing on a specific individual-level hypothesis, it is essential to understand the historical and social context. A ‘global’ approach should not ignore the importance of individual-level risk factors—ultimately, most of us die from easily identifiable proximal causes such as tobacco, occupational exposures, diet, car accidents, etc—but should indicate the importance of studying such proximate causes in their social and political context.28 This is particularly emphasized by Durie20 who argues that ‘concern about the health standards of indigenous peoples needs to take into account the broader perspective of a world view that has been seriously fractured’. Such a shift in approach is important, because of the need to emphasize the role of diversity and local knowledge;29 for example, Durie writes that ‘while analysis into smaller and smaller components is a standard scientific method, indigenous knowledge places greater emphasis on the construction of models where multiple strands can be accommodated’. The recognition of the limitations of the reductionist approach to epidemiology in Western countries has been particularly marked by increased interest in techniques such as multilevel modelling which allow individual lifestyle risk factors to be considered ‘in context’ and in parallel with macro-level determinants of health.30 This is consistent with more general moves within science to consider macro-level systems and processes31 rather than taking a solely reductionist approach.8 However, the increased interest in multi-level modelling has been a welcome trend, although there is the constant danger that technique may triumph over thought. In particular, a knowledge of appropriate methods of study design and data analysis is not a substitute for knowing how to choose the most appropriate hypothesis to study.30

The empire strikes back

In this context, I should stress that what we are arguing here is that not only are ‘modern’ approaches to epidemiology often inappropriate or non-optimal for non-Western populations; they are often not optimal for Western countries either. It has been striking to me, in the small amount of time I have spent working in non-Western populations, as to how inadequate my methods are, and how much I need to learn from epidemiologists working in those countries. Of course, there are certain ‘Western’ techniques that can, when appropriate, enhance the conduct of epidemiology in non-Western populations (e.g. the appropriate use of recently developed biomarkers of exposure, and advanced methods of statistical analysis). For example, Barreto18 describes the considerable training that Latin American epidemiologists have received in Western countries. However, there are also approaches to epidemiology in non-Western populations that represent theoretical and methodological advances on what is being done in the West. For example, Barreto’s paper18 describes the thriving epidemiology and public health movement in Latin America, and the emphasis on the social determination of disease, which is perhaps an example that Western epidemiologists can learn much from. Similarly, Loewenson19 discusses participatory forms of inquiry that strengthen the influence of poor communities and public
interest values in health policy, and Durie\textsuperscript{20} describes the development of Māori health research which is in some respects in advance of what Western epidemiologists in the same country (Aotearoa/New Zealand) are doing. More generally, all three papers emphasize the importance of theory and multidisciplinary approaches. This does not mean that there is nothing that non-Western epidemiologists can learn from the West; clearly there is a great deal. However, what is needed is a dialogue rather than a monologue.

**Problem-based epidemiology**

So how do we develop a ‘global epidemiology’ approach? As all three papers indicate, we need to start with the public health problem, rather than starting with the pre-packaged epidemiological techniques. A problem-based approach to teaching clinical medicine has been increasingly adopted in medical schools around the world. The value of this approach is that theories and methods are taught in the context of solving real-life problems. This places the methods into context, and helps ensure that the appropriate methods are chosen to fit the problem, rather than making the problem fit the methods. Perhaps problem-based epidemiology can help to restore the link to public health, and to the real world in which most public health problems involve a variety of levels of disease causation. In this context, I am not only advocating a problem-based approach to teaching epidemiology, but to the conduct of epidemiological studies themselves. Starting with ‘the problem’ at the population level provides a ‘reality check’ on existing aetiological theories and identifies the major public health problems which new theories must be able to explain. In particular, Barreto\textsuperscript{18} describes how epidemiology in Latin American has developed as part of the larger movement of social medicine and collective health, with a clear commitment to transforming the health conditions of the population. Durie describes how Māori health research is conducted in the broader context of Māori development.\textsuperscript{20}

**Appropriate technology**

As well as starting with the most important public health problems, and taking a problem-based approach, it is also important that we use ‘appropriate technology’ to address the resulting research questions. In particular, as attention moves ‘upstream’ to the population level,\textsuperscript{32} ‘modern’ epidemiological methods will become increasingly inappropriate, and new methods will need to be developed. There is nothing particularly unusual in this; all sciences develop new methods in response to new problems. As McMichael\textsuperscript{10} notes ‘who had of a case-control study or a multivariate personalised risk score this time last century?’ The appropriateness of any research methodology depends on the phenomenon under study: 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, as well as the community resources and skills available and the prevailing norms and values at the national, regional or local level.\textsuperscript{33} All three papers presented here show how the appropriate research methodology differs substantially depending on the sociopolitical context, and the public health problems that are being addressed.

**Global epidemiology: just do it!**

The globalization of epidemiology is going to occur as inevitably as economic globalization is occurring, and in both instances the issue is what form that globalization will take. Will we simply ‘export failure’ through our ‘volunteerism’, or will a truly global epidemiology address the major global public health problems using appropriate methodology while also addressing issues of power, ownership, equity, and dignity?\textsuperscript{34} Durie\textsuperscript{20} writes that ‘the interface between science and indigenous knowledge need not be a site of contest. Rather it can provide opportunities for the expansion of knowledge and understanding’. Analogously, the interface between reductionist Western approaches to epidemiology and those being developed by non-Western epidemiologists need not be a site of conflict, but can instead enhance the development of epidemiology both globally and locally. The papers published here represent some small fragments of the development of a truly global epidemiology, which can not only better address the public health problems in non-Western populations, but can also shed light on the current limitations of epidemiology in addressing the major public health problems in the West.

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