In this number

Epidemiology: bridges over (and across) roaring levels

When the journal received the critique on risk factor epidemiology from Mervyn Susser, six distinguished colleagues were invited to write brief comments. Globally, such papers make a persuasive case for this prediction: in the coming years we will see fewer and fewer epidemiologists confined to one single level of analysis, and, perhaps, of action. Rather, epidemiology will grow as an even stronger bridge across levels of reality, which also means across levels of causality. For the sake of simplicity, the authors of the papers mention three essential levels: the micro, the individual, and the population. With the waters of each level roaring, the seven papers create a feeling that epidemiology will continue: (a) to contribute knowledge to each level; (b) to be a bridge over and across levels and become a foundation for new bridges (that is, it will help enhance the integration across levels of knowledge); and (c) to be a major protagonist of the application of such knowledge not only at the population level, but also at the individual and at the micro levels. Epidemiology will become more integrative. Hence, epidemiological knowledge will become more intertwined with and diffused in other disciplines. At the same time, the "globalisation" of economy and trade will require public health practice to increase its own image, to gain a higher political profile. And the very essence of environmental health issues will encourage epidemiology to strengthen its links with the theory and practice of ecology.¹

In his opening essay Mervyn Susser renovates his proposal of a new paradigm: ecoepidemiology. He recently provided a suggestive metaphor: Chinese boxes. And, above all, he unmistakably makes us face a fundamental challenge: to integrate the multiple levels of causality inherent to most processes that affect human health. The need to cross boundaries both towards micro (biological) levels and towards macro (social) levels—if we want to be successful in the practice of public health and if we want epidemiology to contribute scientifically relevant knowledge—is emphasised by Paolo Vineis and Johan Mackenbach. Furthermore, Vineis will seduce many of us into getting acquainted with "middle range theories" and "overlapping interlevel models." Specific methodologies to "combine" individual level and group level variables are being developed.² Yet, Mackenbach calls for a better specification of the conditions, circumstances, and areas in which such combination of variables will be fruitful. In their contribution, Charles Poole and Kenneth Rothman show that a broad, unspecific agreement on the general virtues of "Susser's ecoepidemiology" is not enough: some fundamental features and implications of the paradigm (not "mere details") need to be assessed; complex problems await imaginative solutions. The journal will be particularly delighted to receive contributions along these lines.

Manolis Kogevinas reminds us that trendy disciplines such as molecular epidemiology are, none the less, still in a relatively "cross sectional" phase; so far, they have only been able to establish weak connections among many isolated components of complex systems. So called "mechanistic studies" seldom integrate more than a few of such components. The epidemiological reasoning, methodologies, and knowledge may help increase the scientific validity and significance of many studies conducted by "basic" (biological) scientists.³

A good deal of what is said in this exchange will be familiar to those of us who regularly resort to a book first published 25 years ago.⁴ Let us hence rejoice and say: "Happy birthday, causal thinking!" (For the fun of it, just take a look at chapter 5, "Systems and levels of organization," or at chapter 3, "Agent, host, and environment as an ecological system.")

Johan Mackenbach rightly points to the "lag time" between exposure to Susser's thinking and the corresponding studies and interventions. Indeed, reasons why the integrative or systemic epidemiological paradigm has often been eclipsed by unidimensional approaches should formally be sought. Some causes may lie in what Kogevinas calls "the external forces that drive the type of research promoted."

We need sociology of science to further enlighten us about factors shaping the theory and practice of epidemiology. And to analyse what is actually going on in epidemiology (for example, who's doing what, how much of this and that is being used, why). We need a "sociology of epidemiology." It would be nice if such an effort could also clarify the contour and texture of so called "risk factor epidemiology" and "black box epidemiology." Poole and Rothman warn that "battle lines have been drawn for a war among competing visions of epidemiology." Hopefully not but if that was the case, we would wish that a better qualitative and quantitative knowledge of the actual characteristics of epidemiological practice would blur the lines and heal the scars.

Similarly, further insights about our roots and future should continue to come from the history of epidemiology, as illustrated by the contributions of Alfredo Morabia and Susser himself. Along with Klim McPherson, let us also hope for wider methodological pluralism. The above mentioned sociological analysis should also help understand the problem of the medical domination of epidemiology that McPherson so poignantly criticises.

Finally, to tackle many of the issues that are implicit in Susser's ecoepidemiology, as well as the problems of power and control that are so often hidden in the epidemiological literature, we surely would benefit from a "political epidemiology": the scientific study of political factors, processes and conditions affecting (factors that influence the distribution of) the health of populations. Such a formal subdiscipline could yield tools useful for most of us, the now prevailing amateurs of the political and policy implications of epidemiological findings. Together with ecoepidemiology and all the other challenges outlined in the ensuing papers, a further exciting 25 years surely lie ahead! The future is wide open and the journal would welcome your contribution.

MIQUEL PORTA
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CARLOS ALVAREZ-DARDET
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