Research Letters

Disease Mapping and Public Health Decision-Making: Report of a WHO Meeting

The European Initiative in Disease Mapping and Risk Assessment and the World Health Organization's (WHO's) European Center for Environment and Health, Rome Division, organized an international workshop with the aim of reviewing the current development of methods for geographic epidemiological studies to reach consensus on the use of the techniques that are most appropriate for orienting public health policy decisions. Specific areas of interest were disease mapping and its role in health surveillance and public health resource allocation; ecological analyses; disease cluster detection; and the analysis of risk around putative sources, with special emphasis on environmental causes of diseases. The workshop took place in Rome, Italy, October 2–4, 1997. Thirty-seven temporary advisers, 9 observers, and 4 WHO officers from 13 countries participated. A total of 36 working papers were presented and discussed in 5 sessions; the topics were disease mapping, disease clustering, ecological analyses, risk assessment around putative sources, and health surveillance. In a conclusive plenary session, the workshop's conclusions and recommendations were finalized. The complete report is available on request from the authors of this letter. A summary of the conclusions and recommendations is reported here.

Geographic analyses of the distribution of risk factors can be useful in public health decision-making and in prioritizing preventive measures. Disease mapping is useful for health service provision and targeting interventions if avoidable risk factors are known. Geographic studies of disease and environmental exposures may in some cases be sufficient by themselves to justify action; for example, if the exposure–disease association is specific, the latency is short, and the exposure is spatially defined.

The reporting of any disease cluster, even in the absence of a hypothesis defined a priori, should never be ignored but should be critically evaluated. The process of decision-making following cluster detection should be informed by considerations concerning the plausibility of any post hoc hypothesis, its relevance in terms of public health, the feasibility of possible preventive measures, and the resources needed for further investigation. Simple statistical evidence of a localized excess is not sufficient to warrant intervention.

Traditional methods for investigating spatial patterns of disease/exposure can be valuable in some circumstances for guiding public health action, provided the data are valid, accurate, and complete. However, recently developed methods of analysis, designed to deal with the spatial component of the data, have the potential to provide results that improve or correct those obtained by conventional methods, especially with small area or individual case location data.

Geographic analyses with no information at the individual level are vulnerable to bias. While individually based epidemiological studies are in general needed, however, to demonstrate the causal nature of an exposure–disease association, geographic analyses can help strengthen the available evidence. For some spatially distributed exposures such as environmental pollution, geographic studies are appropriate designs and can provide useful evidence in assessing causality, especially when the appropriate time scale is accounted for.

Providing public health decision-makers with results of geographic analyses without addressing the underlying assumptions and discussing the implications should be avoided. It is important that overall evaluations of the findings and conclusions be given. □

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Fertility Implications of Reduced Breast-Feeding by HIV/AIDS-Infected Mothers in Developing Countries

The recent controversial announcement by the United Nations that mothers infected with HIV/AIDS should not breast-feed their children signals a major reversal in health policy. This reversal follows several years of research indicating that breast-feeding increases the risk of vertical transmission of HIV/AIDS by about 14%, above and beyond the roughly 15% risk associated with transmission before birth.[1] While research has primarily focused on the need to consider the impact of reduced breast-feeding on the increase in mortality from diarrhea and other non-HIV/AIDS-related causes, scant attention has been paid to the impact of reduced breast-feeding on subsequent fertility levels of HIV/AIDS-infected mothers.

Breast-feeding plays 2 vital roles in high-mortality, high-fertility populations. The first is in reducing infant susceptibility to many illnesses, particularly diarrhea and infectious diseases. Studies suggest that in high-mortality settings, non-breast-fed children

are at least twice as likely to die from causes other than HIV/AIDS as children that have been breast-fed.[2] Proponents of the argument that HIV/AIDS-infected mothers should not breast-feed, however, conclude that the overall infant and child mortality rate will likely be lower because the increase in mortality from other causes does not compensate for the impact of higher rates of HIV/AIDS infection among breast-fed children.

Breast-feeding's second role is in lowering fertility by delaying the return of menses and lengthening the time interval between births. Thapa et al.[3] have estimated that breast-feeding alone is responsible for reducing the total fertility rate in sub-Saharan Africa by about 4 births per woman from its biological potential. Without intervention, policies intended to reduce breast-feeding will inevitably lead to higher fertility levels for HIV/AIDS-infected women. These additional children born to infected mothers will undoubtedly experience elevated mortality risks and severe familial stress.

There is an urgent need to address the HIV/AIDS epidemic among children in developing countries. It is critically important, however, to consider the fertility as well as the mortality implications of reduced breast-feeding before any policy changes take effect, particularly in high-fertility settings such as sub-Saharan Africa. Women who are infected with HIV/AIDS should receive proper counseling in the use of alternative infant feeding and be provided with the means to control their future reproduction before they are advised to avoid breast-feeding.

How much contraception would be required to avert the additional childbearing resulting from reduced breast-feeding? According to the proximate determinants of fertility model, rates of contraceptive use among the infected population must rise from roughly 10% to about 45% to compensate for the decline in breast-feeding in a high-fertility setting such as sub-Saharan Africa.[4] Years of effort by family-planning agencies and governments in many countries have failed to yield such results in most of sub-Saharan Africa. Raising the prevalence of contraceptive use from 10% to 45% would require dramatic success in addressing the existing unmet need for family planning and stimulating further declines in desired family sizes in these countries. Such success is unlikely, at least in the short term. □

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