Drinking water and infectious disease — establishing the links

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In 1998, a workshop on safe drinking-water recommended "international coordination for improved surveillance and outbreak investigation". To start putting this into effect, the UK Government hosted an OECD expert group meeting in July 2000, entitled "Approaches for Establishing Links between Drinking Water and Infectious Disease". The book reviewed here is a product of that meeting. In the Foreword, the authors say that it complements a WHO book on guidelines and standards for drinking-water, waste-water reuse, and recreational water. In fact, however, the present book is not about guidelines; it is about how the link between drinking-water and infectious disease can be demonstrated.

The 18 chapters, by authors from a range of institutions in industrialized countries, are organized into three sections: surveillance; investigation and management of outbreaks of disease that may be linked to drinking-water; and methods for determining the contribution of drinking-water to sporadic disease incidence. Plentiful figures, tables and maps give life to the pages and will help readers who find visual information easier to take in than words. Some chapters are better written than others with regard to clarity and logical flow, and nearly all have a conclusion section. Throughout the book, the authors use numerous examples to show what they mean, but these are limited mostly to three countries: the US, the UK and Sweden. Information on a country's situation occasionally overlaps with that provided in the WHO book.

A number of local, national and international surveillance systems currently in use are described, and their strengths and weaknesses are discussed. Their limitations include low probability of detecting waterborne outbreaks because of shared clinical syndromes and underreporting, and lack of a system for submitting specimens for diagnostic microscopy. A general solution the authors suggest is to develop an integrated system for technical data on both health and water. This approach would be facilitated by the water industry's large and currently underutilized database.

Although the discussions on local and national surveillance do provide a general understanding of how important a functional surveillance system is for preventing and reducing infectious diseases, not enough attention is given to surveillance of waterborne diseases in the developing world. "If we are to improve the quality of water-related surveillance," say the authors of Chapter 6, "it is increasingly obvious that computers and sophisticated analytical algorithms will be needed to flag unusual events and supplement human judgement. It may also be useful to reconsider the choice of measures to be regularly collected and analysed, going beyond the traditional dependence on laboratory isolates." This may be feasible in most industrialized countries but not in many developing ones. There is a chapter on international surveillance, which might eventually provide the beginning of a solution, but it is rather thin, perhaps because this level of surveillance is underdeveloped.

All together, the generic title of the book is misleading, as the focus is on problems of OECD countries, where the prevalence of diarrhoeal diseases, for example, is incomparably lower than in developing countries. The realities in developing countries are quite different with regard to surveillance systems, water sources and many of the other water-related diseases as well. For practitioners and decision-makers involved in public health and water utility sectors in industrialized countries, however, the book is readable and useful.

Readers without specialized knowledge of the topic would have benefited from an introductory paragraph or two on enteric pathogens (bacteria, viruses and protozoa), the routes of exposure, and their similarities and differences. Also, a few words on other water contaminants such as chemicals would have placed water in its broader context.

The authors of the last chapter say that "In many ways, the methods described earlier in this book are all applicable in the setting of the developing world", but this is not self-evident. In the developing world, problems of public and personal hygiene contribute to high rates of mortality and are associated with incidence of diarrhoeal diseases. For example, the incidence of cholera is positively associated with poor housing and lack of clean water and sanitation. Therefore, in developing countries, actions to improve hygiene and sanitation, in addition to surveillance and investigation of waterborne infections, are needed to reduce infections from enteric pathogens. To reduce the global burden of diarrhoeal diseases, we have to tackle the whole set of underlying causes of the disease. This is of course, a complex issue which requires a wide range of collective efforts on the part of all sectors involved, and at each level of planning and policy-making.

In public health a vast body of knowledge already exists on the links between drinking-water and infectious diseases. The evidence has been accumulating at least since 1848, when John Snow deduced that infection was spread by the water supply, and helped to stop a cholera epidemic in London by famously recommending the removal of the handle of the Broad Street pump. Yet these authors strive to prove the link as if it were still debatable. Evidently, decision-makers in other sectors such as industry and agriculture need more and more irrefutable evidence if they are to be convinced that they are damaging public health when they contaminate the water supply, and so must share the cost of protecting it. Lack of coordination and collaboration between the health and other sectors then seems to be a major underlying problem.

The global burden of disease caused by water, sanitation, and hygiene problems has recently been estimated with regard to various disease outcomes, principally diarrhoeal diseases. The disability-adjusted life years (DALY) formula was used to combine numbers of deaths and amounts of disability in a single index. This made it possible to compare the burden attributable to water, sanitation and hygiene problems with those caused by other risk factors or diseases. The estimates were reported as summary measures of population health combining mortality and morbidity, expressed as DALYs. The results provide a useful contribution to the design and evaluation of multisectorial policies. They also help to put the links between water and infectious disease in their global context. ■

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