

Infectious diseases in Europe

A fresh look



World Health Organization
Regional Office for Europe
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Preface

Europe has achieved remarkable success in both the surveillance and the control of a number of infectious diseases (a term the authors prefer to communicable diseases, for reasons set out in the book). It is widely believed that the vast improvements in the living conditions of people in general and the immense strides that medical science has made in this century have reduced infectious diseases to a problem of minor importance. This belief is helped by the method of classifying infectious diseases in a way that obscures their importance.

In fact, as the book shows very clearly, infectious diseases are as prevalent and as important as ever. Except for influenza, they do not on the whole manifest themselves in great epidemics, nor do they cause such high mortality as they used to, because of the medical advances referred to above. But they cause an immense amount of morbidity and economic loss and play a role in the health care systems of countries that is seriously underestimated at present. Furthermore medical science is constantly turning up new evidence to show what consequences long-past infection may have on health in later life.

In this volume some examples of the notification systems, and the information obtained from them and elsewhere, have been collected to present, albeit incompletely, a picture of facts, figures, trends and achievements, as well as of the problems encountered with selected infectious diseases in the European Region.

Epidemiological surveillance is the cornerstone of work on the control of infectious diseases, and their prompt reporting at the national level and to WHO might put the focus on problem areas, old and new. Under-reporting, particularly at the primary health care level, is an area where more effort is needed. Increased surveillance, as part of better epidemiological services, and better control efforts can only be to the advantage of the countries themselves. It is timely today to realize, 100 years after the first effective bacterial vaccine was developed, that the current effort in surveillance and control by immunization is still not commensurate with the needs and possibilities we have.

The time is therefore ripe for a fresh look at infectious diseases in Europe, and this volume seems to me to provide ample food for thought in health administrations and among health personnel of all kinds. Nor is its value limited to the European Region; the problems it describes are prob-

lems that other regions in the world are faced with, however different their conditions may be. It is to be hoped that this volume will meet with the acclaim it deserves, not only in Europe but also further afield. It is also to be hoped that it will encourage countries to improve the gathering of data on infectious diseases and cooperate internationally in dealing with them.

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Does Europe have a communicable disease problem?

B. Velimirovic

The aim of this publication is to survey the situation of communicable diseases in Europe. The most recent surveys are more than a decade old and, because of delay in the consolidation and publication of statistics, usually deal with the situation 15–20 years ago. Moreover, information on communicable diseases, even from countries that have comprehensive health services, does not provide a picture of the situation in Europe as a whole.

To avoid duplicating other WHO publications, *subjects discussed by Regional Office working groups during the period 1979–1981 have been omitted*, even though they are particularly important and would have given additional emphasis to the field under discussion. These are: the classical and second-generation sexually transmitted diseases, acute respiratory infections, hospital-acquired infections, echinococcosis, yersiniosis and Legionnaires' disease. Also omitted are subjects in the 1982/83 programme of the Regional Office: prenatal and perinatal infections, the role of molecular biology in infectious diseases, the immunization of certain high-risk groups, and mycotic infections. It is anticipated that WHO publications will be issued on all these subjects in the near future.

Most of WHO's efforts in the past decade towards controlling communicable diseases have been devoted to the developing countries, where communicable diseases are major health problems and furnish half or more of the principal causes of death. WHO has sought to help countries to make use of existing knowledge to reduce mortality and morbidity and to foster research into treatment and the development of control strategies. Examples of its efforts are the Expanded Programme on Immunization, the global diarrhoeal diseases control programme, and the tropical diseases research programme.

In Europe the sharp decline of most of the major classical communicable diseases, particularly those for which immunization is available,

shifts in the demographic structure, changes in the environment, advances in technology, and rising living standards have led to changes in the pattern of mortality, an increasing proportion of deaths from chronic degenerative diseases, cardiovascular diseases, malignant neoplasms, and such external causes as accidents, violence, and suicide. The treatment and prevention of the latter have directed attention away from communicable diseases, which until very recently were considered almost on the verge of extinction and were relatively neglected. As a consequence it is difficult to obtain a comprehensive picture of their present importance. This volume, on problems of communicable diseases, is a status inventory, a plea for better surveillance, and hopefully also a new point of departure in the reorientation of our approach to infections. In any effort to understand what lies ahead, as much as what lies in the past, the role of infections and their changes cannot be left out of consideration. McNeill (1) has said:

Ingenuity, knowledge and organization alter but cannot cancel humanity's vulnerability to invasion by parasitic forms of life. Infectious disease which antedated the emergence of humankind will last as long as humanity itself, and will surely remain, as it has been hitherto, one of the fundamental parameters and determinants of human history.

Medical professionals, particularly after the Second World War and in the euphoric 1950s, were more than optimistic about the future. Sir MacFarlane Burnet (2) wrote in 1953 about the changing problems of medicine:

Infectious disease will always be with us, and there will always be room for further refinement in prevention and treatment; but as a major cause of death in the years of youth and maturity it is becoming relatively unimportant. Though it may seem an inappropriate remark for one whose whole professional life has been concerned with infectious disease, I believe that, provided the established mechanism of preventive medicine, medical care and drug production continued to function, fundamental work on the nature of micro-organisms and on the diseases they produce could stop today without influencing the current process by which all the main infectious diseases except poliomyelitis are disappearing. This is of course an overstatement: as long as the human race exists there will be long-term changes and sudden new episodes of infectious disease that will need intelligent investigation and appropriate action to counter them. My point is only that it is extremely unlikely that any new principles will be needed to maintain our present very effective control of infectious disease: in that sense fundamental research is not called for by an expressed human need.

Here it should be stated that not everybody shares Sir MacFarlane Burnet's opinion about the reasons for the decline of infections. Many agree with McKeown (3–5) who in all his writings, but particularly in *The role of medicine: dream, mirage or nemesis?* (6), assigns a rather modest role to medical science. McKeown's views have implications not only for the infectious diseases field but also for health policy generally, as reflected, for example, in some national health programmes (7) that have influenced WHO. However, McKeown's arguments have flaws "which

make full acceptance of this conclusion unlikely" (8), and have been justly criticized. Although large parts are now viewed rather as a philosophy of medical care than as epidemiologically valid inferences, his influence has been and will still be felt.

McKeown's argument is as follows: "Many medical scientists believe that the control of bacterial infections is based on knowledge of infectious diseases derived from basic research and applied largely, although by no means exclusively, through immunization and therapy". He arrives at a quite different conclusion, namely, "that these measures had little effect on the [mortality] rates before 1935 and since that time have been less important than other influences". On the basis of evidence from England and Wales, he concluded that BCG vaccination had little or no influence on the decline of mortality in tuberculosis. In pneumonia, chemotherapy had a moderate effect on morbidity in the age groups 0-14 and 45-64 years, but the effect on deaths at all ages was not large and was certainly not the main reason for the continued decline of the death rate, which was well established from the beginning of the century. Mortality from measles and pertussis fell to a low level without effective immunization or treatment. "The usefulness of immunization is now being assessed by the effect on morbidity ... the results so far are not very impressive". His conclusion is not "that immunization or treatment were of no value; on the contrary they are probably effective in all the diseases listed above. But their impact on mortality and associated morbidity was small in relation to other influences". Diphtheria and smallpox were the only common infections in which a specific measure, immunization, may have been the main reason for their decline. "In the other common ones, tuberculosis, pneumonia, measles, whooping cough, typhoid and typhus (and scarlet fever may be added), mortality had fallen to a relatively low level before effective medical intervention was possible. In other diseases — smallpox, syphilis, poliomyelitis and tetanus, in which specific measures are generally regarded as the main reason for their decline ... taken singly or collectively [they] made only a small reduction in infectious deaths".

McKeown pointed out that the decline in deaths from infectious diseases preceded by more than a hundred years the discovery of micro-organisms. The trends in the last two centuries indicated that deaths were declining before effective procedures became available, falling to a small fraction of their earlier level without medical intervention, and they suggest that had none been available they would have continued to decline, if not quite so rapidly in some diseases. In a number of infectious diseases there have been considerable advances in immunization and therapy, but their mortality was decreasing prior to the introduction of such treatment, which in the present century had little observable impact on the continuing downward trends. The exceptions to this, he considers, are streptomycin therapy for tuberculosis and poliomyelitis vaccine.

Among the causes of the decline in mortality from infectious diseases he places nutrition as the most important: increased food production, the use of fertilizers, the provision of safer water, food refrigeration, better hygiene, behavioural influences, and other scientific developments of a

non-personal kind that owe little or nothing to the biomedical sciences and would have been introduced even if health was not brought forward as an argument in their favour. The reduction in exposure to infection had some effect on mortality in the nineteenth century and the impact of the medical procedures of immunization and therapy was delayed until the twentieth century.

McKeown is less categorical about and more appreciative of medical science and laboratory research when it comes to the present day. In his view about three quarters of the decline in morbidity is associated with the control of infectious diseases, the remainder with conditions not attributable to microorganisms. In his last book, admitting that medical sciences contributed to the "extension and refinement of methods of preventing the spread of infectious diseases" he suggests that, without abandoning the laboratory sciences, medical research should pay greater attention to health intelligence and epidemiology. With this last point we are all in agreement. As for his main thesis, however, *audi partem alteram* and his prominent contemporaries have other views.

Perhaps because McKeown has not been actively engaged in patient care during most of the past four decades, during which clinical medicine has altered beyond recognition (9), he is unfamiliar with present-day therapy, downgrades antimicrobial therapy, regards the evaluation of therapeutic procedures from a curious perspective, and pays insufficient attention to the importance of advances in the caring and curing services that enable individuals to receive a high level of care and treatment during illness (10). He does not mention the highly successful vaccination against yellow fever, tetanus and diphtheria. He is sceptical about the value of vaccines against whooping cough and measles, although his data seem in keeping with the conclusion that their introduction coincided with a decline in the incidence of both diseases (9). More important are the methodological objections raised against his views. What is the point of calculating the effect of specific anti-tuberculosis therapy on the number of deaths from tuberculosis since 1898, when the first effective drug came into use long afterwards (9)? The death rate from tuberculosis has been reduced by 51% since the introduction of specific chemotherapy. McKeown seems to have been victim of "the fallacy of the stretched abscissa" (9, 11); tracing mortality from a particular cause further back than unreliable diagnoses should permit and extrapolating, for example in tuberculosis, must be suspect (8).

Foremost among the problems that have drawn criticism is his use of mortality figures as the principal index of health and his virtual neglect of morbidity (12-14). "This narrow focus seems to indicate McKeown's basic contention that personal medical diagnosis and treatment has played a relatively small part in the improvement of 'health'. For health certainly means more than prolonged life, and in the public mind, at least, many of the most striking achievements of modern medicine have to do not only with saving life, but with the relief of serious suffering. The impact of antibiotics on painful and disabling infectious diseases is a case in point" (14). The assumption that standardized mortality ratios can be a measure

of morbidity and thus of the need for health care leads to the neglect of infections that affect people without always causing death, for example sexually transmitted diseases and influenza. "McKeown seems to give some credence to a widely held and fallacious belief that expenditure could be reduced in the short term by prevention of chronic degenerative disease" (8). Emphasis on mortality alone tends to obscure the importance of lengthening survival in an incurable or recurrent disease such as diabetes or pneumonia, where the age at death is significant (12). "Few persons would disparage medicine's ability to provide years of additional productive life to individuals who may eventually succumb to a disease they have borne" (14).

While the already well recognized influence of external, environmental and social factors on health has been rightly emphasized, it has been used by a number of non-medical writers for often very readable attacks on medicine which have been taken up by the media and also adopted by some institutions. They say that modern medicine concentrates on disease to the exclusion of the wholeness of the sick person. The malady is seen as somehow separate from the sufferer. The treatment of the disease as apart from the patient is widespread, and this is taken as a crime. "It is clearly bad science to conceive of illness in terms of specific diseases caused by specific agents; ...the notion of disease comes from those who have a vested interest in the continued viability of the notion of specific disease entities. By concentrating on diseases a form of medicine has developed, which beside being mechanical, is conceived as a rescue or repair service ... by thinking of illness in terms of diseases one has been led to believe that diagnosis leads to cure. The whirligig of disease identification goes round on and no one seems anxious to stop it, or get off" (15).

The critics of modern scientific medicine usually give ambiguous examples that lend themselves to various interpretations and are not necessarily accepted as disease entities in the strict sense; among them are mental conditions, dissatisfaction, frustration, barrenness, homosexuality, stress from overwork, depressive moods, the consequences of social isolation or alcoholism, and diet-related habits. There is, however, very little vagueness in the term infectious illness, although it can manifest itself in various forms or even reach an equilibrium with the organism. Since the discovery of the tuberculosis bacillus a century ago, the importance of such factors as the susceptibility of the host has been well recognized and the concept of human ecology has entered medical science.

Infectious diseases are nosological entities, caused by invasion of the body by various pathogenic microorganisms. The diseases may be affected by stress, nutrition, fatigue, and social and environmental factors, but without the pathogens there would be no infectious disease at all. This does not mean that the ill person as such, with his fears, feelings, perceptions and reactions, is not to be considered as a whole. Obviously it is necessary to create economic and social conditions conducive not only to the absence of disease but also to maximum wellbeing. Physicians concerned with infectious diseases do not dissociate themselves from political and social action to improve health. They were the first to promote prevention, first

to think about solving problems before they occurred as against the emphasis on curative medicine alone, and also first to realize the need for international cooperation; it was for infections that this started years before WHO was created.

Beginnings of a reappraisal

In *Man adapting* Dubos (16), under the heading “the so-called conquest of microbial diseases”, says about the optimistic 1950s:

A very large percentage of the microbial agents of disease had been isolated, identified, and cultivated in artificial media or in tissue cultures; bacteriological cleanliness of the food and water supplies had been improved through technological advances; practical procedures had been worked out for the large-scale production of killed or attenuated bacterial and viral vaccines; highly effective drugs had become available for the treatment of bacterial and parasitic infections; a variety of pesticides had been synthesized and had proven their usefulness for the control of insect vectors.

In many places, economic prosperity and social organization have now made it possible to translate into practice the scientific achievements of the microbiological era. As a result, the mortality rates of infectious diseases have been brought down to a very low level, particularly among children and young adults, and the life expectancy at birth has soared to unprecedented high levels.

Most clinicians, public health officers, epidemiologists and microbiologists felt justified therefore in proclaiming during the 1950s that the conquest of infectious diseases had finally been achieved (see Fig. 1).

Surprisingly enough, this euphoria has not yet been dampened by the fact that the morbidity rates of infection have not decreased significantly, and in some cases have actually increased. Despite so much oratory on the conquest of microbial diseases, the paradox is that the percentage of hospital beds occupied by patients suffering from infection is now as high as it was fifty years ago. Today, as in the past, moreover, disorders of the respiratory and digestive tracts with a microbial etiology constitute the most frequent causes of absenteeism from school, office, factory, or from training in the armed forces.

The same applies in Europe and other developed regions.

One of the first sobering warnings came from Sabin (17) in 1969, showing that in the United States the problem of infectious diseases is still present and that it produces many deaths and illnesses, and is a considerable cost to the economy. In the special volume as tribute on his 80th birthday to the Nobel prizewinner in immunology Sir MacFarlane Burnet, whose contribution to infectious disease research is inestimable, one of his closest collaborators, Fenner (18), himself one of the world's leading microbiologists, commented on Burnet's upsetting many of his colleagues from about the mid-fifties by playing down the importance of research on infectious diseases and later by his attack on molecular biology in terms of its value to society (19). “The events since suggest that he overstated the case in considering the ‘conquest’ of infectious diseases by considering only mortality and not morbidity and by not recognizing the enormous potential of DNA recombinant research for understanding nature, and for its potential contribution to human wellbeing”.