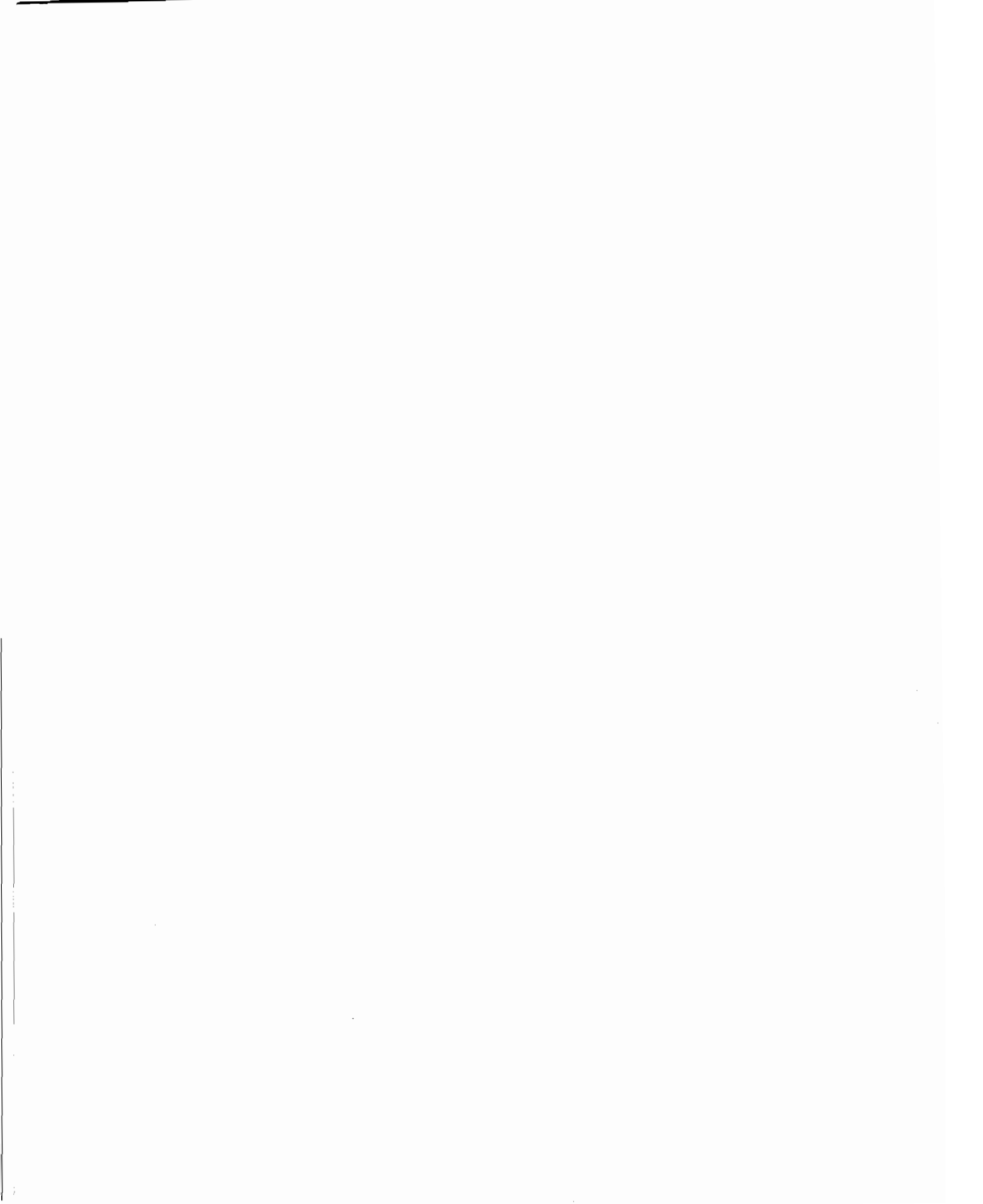


**Part Two**

**USES OF MORTALITY DATA**



### III. USES OF MORTALITY DATA FOR PLANNING AND RESEARCH\*

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The discussion of different approaches to the collection of mortality data needs to be conducted within the context of the uses to which such data can or will be put. The various available approaches to collection produce data with distinctive characteristics in terms of accuracy, detail (geographical, socio-economic, cause-of-death), the delay before results become available and the period to which the measures of mortality obtained refer. Similarly, the uses of mortality information attach different levels of importance to these characteristics. For some purposes, high accuracy is not the first essential, but speedy availability may be; whereas for other purposes, a combination of high accuracy and extensive detail may outweigh speed of availability. The clear conclusion to be drawn is that no one method of data collection is to be preferred to all others. The approach to select for a particular study will depend upon the objectives of the study; and the objectives should therefore be carefully defined in advance. The objectives must also be feasible, given the available statistical infrastructure. This chapter, and to some extent that by Ewbank<sup>1</sup> which follows it, set the context for the remaining papers on different collection procedures by discussing the various uses to which mortality information is put and the characteristics of the categories: those of a general descriptive or demographic nature, usually the responsibility of national statistical offices; those related to health sector development, usually the responsibility of ministries of health; and those of an epidemiological or medical perspective, usually the responsibility of research organizations.

#### A. GENERAL DESCRIPTIVE AND DEMOGRAPHIC USES

##### *Population forecasting*

Mortality is one of the three factors, the others being fertility and migration, that determine changes in population size, distribution and structure. For most countries, mortality is the second most important factor after fertility in determining such changes at the national level, although migration becomes increasingly important as disaggregation proceeds

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below the national level. Population forecasting is essential for all long-term planning, and for much short-term and medium-term planning as well. In the education sector, the size, distribution and structure of the school-age population is an essential prerequisite of orderly planning for the provision of services, and the school-age population will be determined by the future stream of births attenuated by child deaths. Development of the transport sector will also depend in part upon population growth, distribution and structure, although economic factors will also be important. Agricultural development, in particular the mix between products for domestic consumption and those for exportation, requires that likely population changes be taken into account. Development of the modern sector requires a consideration of population factors, both from the point of view of demand for its products and from that of supply of labour, dependent upon changes in the economically active population. The provision of public health infrastructure, such as water-supply and sewage disposal, also needs to be planned in the light of realistic projections of future demand, an important element of which will be determined by population changes. It can thus be seen that mortality information, as an essential component of population forecasts, is an important element in practically all planning exercises.

The information required is simply current levels and likely future trends in mortality rates specific by age group and sex for population subgroups of interest.

##### *Social description*

Mortality levels are correctly regarded as indicators of the general welfare of a national population and its subgroups (they are clearly indicators of the quantity of life and, through links between morbidity and mortality, also reflect the quality of life within quantity). Summary measures of mortality conditions, such as life expectancy at birth or the infant mortality rate, are routinely included in indices of the quality of life—indices that are useful for charting socio-economic development, for identifying population subgroups in need and for making international comparisons. Deeper analysis of conditions of different social groups requires more detailed measures, such as specific mortality rates by age and sex (which permit the study of groups at different stages of the life cycle or of different cohort experiences) and by socio-economic groups.

## B. HEALTH SECTOR USES

### *Planning and development*

The sector in which mortality information is most directly valuable is that of health, and the data requirements are more extensive. It should first be noted that for the health sector, mortality information is generally used as a surrogate for measures of morbidity, which more accurately reflect health status but which are also hard to collect and harder to interpret. A comparison of mortality rates from different diseases without allowance for different case-fatality ratios may distort the perception of the relative health risks of the diseases, although overall mortality rates probably reflect the health status of different population subgroups adequately. Thus, the first use of mortality information in the health sector is to identify high-mortality areas and high-risk groups within areas, so that health sector resources can be directed where they are needed and are likely to have most effect. This use requires only fairly simple mortality information, such as mortality rates specific by sex and age group for fairly large population subgroups, for a fairly recent period (since mortality differentials change only slowly over time, the obtaining of current estimates is not a major consideration) and of moderate accuracy, because the differentials of importance will be large.

More detailed information can further improve the efficiency of resource allocation in the health sector, particularly concerning causes of death. Information on deaths by cause for major regions can be used, preferably in combination with some idea of the case-fatality ratios involved, to determine the type of health services that will produce the maximum benefit. It may be noticed that whereas all the other uses so far discussed have required mortality rates, that is, not only information on deaths but information on the population exposed to risk, the structure of deaths by cause, without further age detail or information on exposure, may be sufficient for some planning purposes.

### *Evaluation of health services and programmes*

This use of mortality information, extensively discussed by Ewbank,<sup>2</sup> is based on the idea that the efficacy of general health services and of specific health programmes can be evaluated in terms of observed changes in mortality. It is generally difficult to establish the success of general health surveys in reducing mortality by comparing rates of change with those for an earlier period or those for a country at a similar stage of development because of the usually unknown role of factors other than the health services themselves. The case may be somewhat strengthened by introducing more detail into the comparison, such as disaggregation by area and the demonstration that mortality rates in the areas in which services were concentrated fell faster than elsewhere, or disaggregation by cause and the demonstration that change in cause-

specific rates followed service priorities. Thus, the mortality information needed for the evaluation of general health services should be disaggregated by population subgroups and preferably by cause of death; should refer to a recent period, with a suitable earlier period available for comparison; and should be of high accuracy, because the important feature is change rather than level. Even with such data available, the evaluation may be less than conclusive.

For the evaluation of specific health programmes, the problems are somewhat less acute, since such programmes generally focus on particular disease groups. In either case, mortality changes in the target areas or cause groups can be compared with those observed elsewhere or in other cause groups, and marked differences can be attributed to the programme. Mortality information is thus required for one point in time before the programme gets under way and for another point in time sufficiently later for the programme to have had a measurable effect. The data required are of some detail, perhaps age-specific and sex-specific mortality rates for target and control areas that are similar socio-economically and ecologically with similar cause-of-death structures. The data should be of considerable accuracy, since once again it is relative changes that are of importance.

It is clear from the foregoing discussion that the evaluation of health services or programmes requires much more in terms of timing and accuracy of mortality data than do the other uses discussed so far. However, for evaluating specific programmes, national representativeness is not required.

## C. USES FOR EPIDEMIOLOGICAL AND MEDICAL RESEARCH AND INVESTIGATION

### *Epidemiological studies*

Prevention is generally cheaper and less painful than cure, and advances in disease prevention are most likely to come about through a better understanding of disease aetiology. Epidemiology uses observed mortality differentials to suggest links between risk factors and diseases, and to indicate the magnitude of the risks. The chapter by Lyngé<sup>3</sup> discusses a number of approaches to the collection of mortality information for the examination of occupational risks. To be useful for such a purpose, the mortality information should be sufficiently disaggregated to identify particular risk groups, be they by occupation, place of residence, personal habits, diet or whatever; and detailed disaggregation by cause is required.

### *Evaluation of medical procedures*

New medical procedures, both preventive, such as inoculations or prophylactics, or curative, such as antibiotics or treatment regimens, require testing for efficacy and side-effects before their widespread adop-

tion, and mortality information represents an important element in both tests. It is not, of course, the only element; in testing a new type of vaccine, for example, the effect on incidence of the disease would be of primary importance, but the effect on case-fatality ratios would also need to be examined. Such evaluation studies require careful design, generally of a follow-up case-control type; and general mortality statistics are of little use. D'Souza<sup>4</sup> describes the work of this type carried out in Matlab Thana, Bangladesh, by the International Centre for Diarrhoeal Disease Research; and Ewbank<sup>5</sup> also refers to similar studies. The mortality information required for such evaluations should be highly detailed by age, sex and cause, and of high accuracy; it must refer precisely to the test and control populations and to a specified period from the beginning of the trial to its completion or until loss from observation. The overall population involved has to be fairly small, given the intensive surveillance required; and it does not have to be nationally representative. The allocation of population to test and control groups should be random, rather than on the basis of volunteers, and should preferably be blind. In conclusion, it should be emphasized that evaluations of this type must be regarded as special exercises rather than as a regular part of procedures for the national collection of mortality data.

## CONCLUSION

The major uses of mortality information in national planning, health sector planning and epidemiological and medical research have been outlined. The various uses have different requirements in terms of detail, accuracy and time reference; and these requirements should be taken into account in considering the merits of the various approaches to the collection of mortality data. In some cases, the requirements are so stringent that they are simply beyond the reach of the existing statistical system, and concentration on that which is feasible rather than on that which is desirable is to be recommended.

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## NOTES

<sup>1</sup>Douglas C. Ewbank, "Uses of mortality data for evaluating the success of specific health and development programmes", chapter IV of the present volume.

<sup>2</sup>*Ibid.*

<sup>3</sup>Elsebeth Lyng, "Experiences in estimating differentials in mortality in developed countries—achievements and shortcomings of the various approaches", chapter XII of the present volume.

<sup>4</sup>Stan D'Souza, "Small-area intensive studies for understanding mortality and morbidity processes: two models from Bangladesh—the Matlab Project and the Companiganj Health Project", chapter XIV of the present volume.

<sup>5</sup>D. C. Ewbank, *op. cit.*