MEASUREMENT
OF LEVELS OF HEALTH

Report of a Study Group

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STUDY GROUP ON THE MEASUREMENT OF LEVELS OF HEALTH

Geneva, 24-28 October 1955

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MEASUREMENT
OF LEVELS OF HEALTH

Report of a Study Group

1. INTRODUCTION AND GENERAL OBJECTIVES

The meeting of the Study Group on the Measurement of Levels of Health was opened on 24 October 1955 by Dr V. A. Sutter, Assistant Director-General, Department of Advisory Services, WHO. He welcomed the group on behalf of the Director-General of WHO and emphasized the importance of exploring this fundamental problem.

He stated that the United Nations, under the provisions of General Assembly resolution 527 (VI) and ECOSOC resolution 434B (VI), had convened a Committee of Experts in New York in June 1953, with the participation of ILO, UNESCO, FAO and WHO, to discuss the subject of "International Definition and Measurement of Standards and Levels of Living".

In its report, this Committee restricted its analysis to the problems of definition and measurement of actual levels of living, and recommended that twelve components be taken into consideration in any such task. Of these components, "Health, including demographic conditions" was chosen as first on the list. The Committee also attempted to design a set of indicators for the measurement of each of the twelve components but concluded that, as the available knowledge and information were inadequate for the purpose, further studies should be made in the search for suitable indicators. An approach recommended by the Committee was through family living surveys. The Economic and Social Council, in its resolution 585B and F (XX) invited the specialized agencies concerned to collaborate with the United Nations in this matter.

WHO included "Health indicators for measurement of levels of living" in the agenda of its Expert Committee on Health Statistics in September.

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1954, and the opinion of the Committee on this subject is expressed on pages 20-23 of its report.¹

A consultant, Sir Andrew Davidson, was invited by WHO to make a preliminary study of the question of health indicators in February 1955, and the report prepared by him was submitted to the present Study Group.

This report was subsequently sent to the members of the WHO Expert Advisory Panels on Public Health Administration and Health Statistics, for their comments. The response was most gratifying and these comments were incorporated into working papers for the Study Group.

In September 1955 the International Labour Organisation convened a group of experts to discuss family living studies.²

The Study Group elected Dr Ira V. Hiscock as Chairman, Professor P. C. Mahalanobis as Vice-Chairman, and Dr H. Romero as Rapporteur, and adopted the following agenda, along the lines of which subsequent discussion proceeded:

1. Review of the experience and knowledge on the indices and measures for assessment of health
2. Concept of health and factors affecting health
3. Basic elements of health
4. Possible indicators of health
5. Needs and suggested approaches for further study.

The Group reviewed at some length the more important features of the working papers and noted that a declared objective of international bodies working in the field of social welfare is to ensure to all peoples the highest attainable level of living. It is a worthy ideal, but how to achieve it is a complex problem of many facets, whose solution requires intensive study in many sciences and much more knowledge than is now possessed. The patterns of life throughout the world vary so much that no single standard can be set for all peoples, nor even for the same people. But, standards apart, each group is considered to have a level of living which rises or falls in accordance with changes in social and economic conditions; and, if the objective is to be reached, it is implicit in the term "level" that some method of its assessment should be evolved. That calls for constructive thought and correlated research in the wide fields of health, economics, sociology, psychology, statistics and perhaps others.

As might be expected from the complexity of the subject, it was impossible for the UN Committee to suggest any single index of level of living

¹ Unpublished document WHO/HS/56
² For summary report of this working group, see unpublished ILO document GB. 130/21/12.
which could be applied internationally; and that Committee suggested that methods of measurement should be sought separately for the individual components which go to make up the level of living of a community. It was considered that it might be possible to find indicators which would help to measure the influence of each component on the movements of levels, and produce a composite measuring rod capable, at least, of indicating trends. Twelve components were described as follows: health, including demographic conditions; food and nutrition; education, including literacy and skills; conditions of work; employment situation; aggregate consumption and savings; transportation; housing, including household facilities; clothing; recreation and entertainment; social security; and human freedoms. In addition, the UN Committee examined possible indicators for several of the components and made suggestions which were referred to the appropriate specialized agencies for their consideration. The catalogue of components—perhaps rightly so—gives health pride of place; but, bearing in mind the definition of health adopted by WHO, it is difficult to dismiss the thought that all the other components include, to a greater or lesser degree, a health element. But the suggested indicators, even with refinements, fall short of giving a full picture of level of living because descriptive material and background information would be necessary as well.

Even then, however, the UN Committee considered that the picture would be incomplete unless the actual conditions of life were examined and recorded in surveys at family level; and it was suggested further, as a next step, that the possibility of evolving more or less uniform techniques and schedules of family living studies should be explored by the international organizations concerned.

That part of the problem referred to WHO is concerned with the health component and its indicators. It represents a field of inquiry in which a certain amount of work has already been done but a vast amount still remains to be undertaken.

No more fundamental problem confronts the health administrator than the measurement of the level of health of his community; and nothing could be more valuable than to have at his command one or more measuring rods to help him in this task and also in assessing his specific problems relating to the health of the people, in designing his plans to deal with these, in guiding his administration and in evaluating his schemes. His sources of assistance lie in analysis of vital statistics, in epidemiological information, to a lesser extent in data collected from special health surveys and in appraisal and evaluation methods for health activities such as those developed by the American Public Health Association 1 (see Annex 2,

1 American Public Health Association, Committee on Administrative Practice (1955) Guide to a community health study, revised, New York
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page 26). None of these sources contains any satisfactory specific indicators of health as defined in its tripartite context of physical, mental and social well-being, nor even in any single element.

The usual practice is to seek guidance concerning health status in a community from mortality rates, expectation of life and the incidence of communicable diseases; and to use the rise or fall in the levels of these figures as an indication of progress or retrogression as the case may be. It has been argued that low death rates and lengthening expectation of life do not necessarily reflect improved health of a community but, generally speaking, there is a positive correlation between the length of life and the improvement of health. Even though in some countries it has been noticed that as regards tuberculosis the number of deaths has declined more quickly than the total number of cases, there are abundant indications that severe and even active cases are getting fewer; the fact that many sanatoria beds now remain empty is significant in this respect. Again, the sum total of degenerative diseases tends to increase with prolongation of life, although their apparent rates of prevalence are influenced by skills in diagnosis and other factors.

Although mortality data have their limitations, they do have, also, in countries where medical and statistical services are adequate, the merit of comparability from one period to another and from one country to another. They can, if properly analysed, provide valuable if rough indication of changes in community health and some knowledge of factors influencing it. Statistics of notified communicable disease have also been used in attempts to appreciate the health status of populations, but these statistics, although of value to assess the importance of certain diseases as specific health problems, and their seasonal and secular trends, vary too much in their reliability to be internationally comparable.

Nowadays more and more interest is being shown in morbidity data concerning non-infectious diseases. This new development springs largely from two movements. In the first place, as the application of medical science brings more of the infections under control, information concerning them is becoming less useful as a factor in assessing health status although it may still serve in the appraisal of sanitary conditions and public health activities; secondly, the changing demographic pattern in many countries brings, in its wake, problems in non-infectious conditions, notably in the degenerative diseases, towards which public health endeavour is now being directed to a greater extent.

Studies in the field of morbidity statistics have differed in nature and source of data; some are based on routine collection of data, others on special inquiries, and all vary in respect of population groups covered and
in the criteria used for illnesses and disabilities. A large list would include
records of sickness among persons covered by social security schemes,
adult incapacity, social survey of sickness of all forms, hospital in-patient
and out-patient records, general practitioner studies, together with the
more routine surveys of population groups such as schoolchildren and
military recruits. But such inquiries are merely intended to indicate the
nature and extent of disease and defects of various kinds, to measure the
size of the problem and to study variations with a view to elucidating
causation and predisposing factors. The study of morbidity statistics is
therefore valuable in its own way and should be encouraged. Here is a
good field for seeking knowledge about health indicators; and, already,
some work is now being done in the measurement of morbidity, which is
the first step to its possible use as a health indicator.

WHO realized at an early date the importance of morbidity studies.
In 1951 it convened a conference on morbidity statistics with a view to
standardizing in so far as possible measurements of morbidity, which had
hitherto lacked uniformity. A series of studies were recommended and
carried out by national committees on vital and health statistics set up
under the sponsorship of WHO.

Morbidity statistics were again discussed by the International Confer-
ence of National Committees on Vital and Health Statistics in 1953\(^1\) and
by the Conference for the Seventh Revision of the International Lists of
Diseases and Causes of Death in 1955.\(^2\)

Apart from the collection and analysis of vital statistics and the use of
morbidity data, the health administrator may also seek information through
specialist health surveys. This technique has been applied in nutrition, in
housing and in the study of special age groups. This more direct line of
approach to health indicators is gaining in popularity and should be de-
veloped. The term "epidemiology of health" has made its appearance within
recent years and it seems logical to inquire not only into the factors con-
cerning disease but also into those determining health.

The appraisal form of inquiry, a method of acquiring information
primarily concerning health practices, has been successfully used in the
USA, mainly for the purpose of stimulating public health effort in local
areas. It has also been used for teaching purposes. While it has been found
of great value in that country for assessing health activities, it did not pro-
vide adequate information on most environmental and social factors of
health.

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\(^1\) "\textit{Wld Hlth Org. techn. Rep. Ser.}, 1954, \textbf{85}\)

\(^2\) Unpublished document WHO/HS/7 Rev. Conf./17 Rev. 1
2. CONCEPT OF HEALTH

The concept of health and the concept of living are both vague, as is that of well-being. Living refers in a positive manner to the effective functioning as fully as possible of the human being as a physical, mental (intellectual, emotional and moral) and social organism. In fact the WHO definition of health embraces physical, mental and social well-being. This is a very proper ideal; it indicates general goals towards which we may continually strive.

The concept of health can be regarded as being of two main orders: one very broad and abstract, and the other narrower for working purposes. In its broadest sense as a very general concept of a considerable degree of abstraction, health is difficult, if not impossible, to define precisely. Health in this sense is a relative concept—a condition or quality of the human organism expressing the adequate functioning of the organism in given conditions, genetic and environmental.

The above WHO definition of health does not lend itself easily to objective measurement. As regards physical well-being there are many measures which can be used, although of varying ranges and validity, for comparative purposes. As regards mental well-being, there is a growing appreciation of the need for standards of estimation that can be applied, although by no means such clear-cut criteria are available as in the case of physical well-being. Nevertheless, in general terms it seems probable that fairly close agreement can be secured on what constitutes mental well-being and ill-being, and in fact most people have generally some notion of what is involved by these terms. But this concept has never been clearly defined and there must also be wide difference of opinion as to what is meant by social well-being. What may be in some minds, presumably, are such things as social security systems. There seems to be a tendency to argue that a country with a social security system has necessarily a better health status than one without. Much depends of course on the quality of that system, on the way it is administered and even on its financial prospects in relation to the national income. This would necessarily imply that health status has to be looked at from the community as well as from the personal point of view. Social well-being might therefore be regarded as a state of predisposing conditions of health. In order that the concept of health may be used operationally with more clarity, it may be advisable to study further the definition given by WHO, with the object of making it more precise.

In the narrower aspect, from the point of view of personal health, for example, it may be pertinent to ask this question: when a physician examines a man and says that he is in good health, what does he mean? He means, in general terms, that the person is functioning normally—leaving
aside for the moment the difficulties inherent in the use of this term. He means that he has seen no obvious evidence of disease. As far as the physician can observe, the person’s organs are functioning within normal limits of deviation from accepted averages or standards in characteristics such as pulse, temperature, blood count, blood pressure, etc. As regards accepted standards for persons of the same sex, age, community, region, etc., he is within reasonable limits of variation. In addition to these measurable criteria, the physician also uses his judgement in regard to many small submeasurable characteristics. These imponderabilia such as steadiness of hands, absence of fatigued appearance of the face, etc., though not quantifiable, are extremely important in health estimation. The “doctor’s guess” is an important part of his trained judgement.

Health then may be expressed as a degree of conformity to accepted standards of given criteria in terms of basic conditions of age, sex, community and region, within normal limits of variation. It is a relative concept in this sense also.

There is something more, namely, a concept of the organs of the body having functions “proper” to them; they do certain things for the body. If they go beyond certain limits on either side then the body is in a state of mal-functioning. This concept implies also a relation of each organ and its functions to others in the total organism. In other words, health implies, on the one hand, a totality and, on the other, parts functioning in relation to one another in that totality. This implies again a kind of equilibrium theory. The concept of homeostasis in the human organism is well recognized. But in the social organism it has by no means the same unchallenged position.

In discussions of health and in attempts to measure it, figures of mortality are almost inevitably used. In the strict sense, mortality is not an indication of health but experience has shown that where certain values of the one exist, in general, certain values of the other can be postulated. Infant mortality rates and their changes are therefore good indications from many points of view of general health conditions. Yet, while general mortality in western countries has dropped greatly in recent decades, this fall applies mainly to early life; health in general has not advanced pro rata with the fall in mortality. An increasing expectation of life has meant increasing health for younger age groups, e.g., by reduction of communicable disease. But it is often thought that in later years increased life expectancy has not always been accompanied by improved health of the community. The problem then is “to add life to years, and not merely years to life”. How to do this is an important subject for further investigation.

A great deal of discussion has taken place about the fact that in ordinary health work, most measurements of health are in fact measurements of
disease. Much attention has been given to concepts such as "positive" and "negative" health which have sometimes been equated with concepts of direct and indirect measurements of health.

It would seem that different levels of sophistication may be involved in the argument here. On the one hand, estimation of the degree of inadequacy in the functioning of the body by measuring the degree of malfunctioning is often termed an indirect measure of health. On the other hand, examination of such mal-functioning of the body can be said to be direct in the sense that it is a bodily condition that is examined and measured. It is indirect as a measure of health only in the sense that, when the functioning of the body is considered from the point of view of evaluation of human activity, then the mal-functioning is looked upon as a negative contribution. The concepts of positive and negative health represent a similar evaluation. But again, the term "indirect measurement" may be applied more strictly either to averages of aggregates from which health is inferred (such as mortality rates) or to those facilities or potentialities for health which (such as protected water supplies or vaccination against diphtheria) are not themselves indicators of health but of the possibilities of protecting it. A search for "direct" or "positive" measures of health should take these alternative meanings into consideration, and specify which is implied. Obviously, more research is also needed both in the laboratory and in the field where the people live and work.

3. POSSIBLE INDICATORS OF HEALTH

The Group recognized that health indicators are useful in the measurement of levels of health of a community, in guiding public health action, and for international comparability, and found itself confronted with two questions:

(1) What can be done with the available health statistics as indicators (perhaps suitably refined)?

(2) Can any new indicators be suggested?

Health indicators may be classified in three groups:

(a) Those associated with the health status of persons and populations in a given area (vital statistics, nutrition, etc.);

(b) those related to physical environmental conditions having a more or less direct bearing on the health status of the area under review; and

(c) those concerned with health services and activities directed to the improvement of health conditions (availability and use of hospitals, physicians and other health personnel).
A second way of classifying health indicators would be from the point of view of the unit of reference. The inquiry may, for example, be directed to a single individual—which is the basic example of what may be called the micro-approach—or to a family or household, or a community, or different occupational, social or economic categories belonging to given areas or regions; or to the population of a country as a whole—which would be the macro-approach.

The Group noted that most of the indicators in current use are of the macro type. It would also be of great value if health inquiries could be made and appropriate indicators constructed which would have reference to individual persons, or households or communities, that is, at different levels of a micro type. The method of sample surveys considered in the next chapter would be particularly suitable for such inquiries.

1. Health indicators based on available statistics

The Group examined the information supplied by the Secretariat on available health statistics material which might be used for designing health indicators.

Comprehensive indicators

The Group realized that it would be possible, within each of the three types of health indicators (a), (b) and (c), mentioned above, to construct indicators for different aspects or groups of aspects of the problem. For example, it is possible to combine a number of different aspects or factors within the coverage of an indicator of an aggregative kind. It is recognized, of course, that aggregation can be higher and higher in level until all relevant aspects of the three types are fully covered, in which case the indicator may be called a comprehensive indicator of type (a), (b) or (c).

The Group agreed in principle that comprehensive indicators would be of great value for both international comparisons and the assessment of changes over time within a given area, supplemented by appropriate specific indicators of various types and levels of aggregation. On the available evidence it was impracticable at present to recommend categorically any particular comprehensive indicator, but the Group considered the following three possible indicators.

Proportional mortality ratio. The proportional mortality ratio (defined as the number of deaths at ages of 50 years and over as a percentage of total deaths) suggested by S. Swaroop and K. Uemura 1 looks promising.

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1 To be published in the Bulletin of the World Health Organization.
Using 50 years as the limiting age, it is clear that if all persons survive up to 50 then the proposed index would be 100; on the other hand, if no one reaches this age the index would be zero. The primary data are comparatively simple to collect and the method of construction is straightforward. However, the Group felt, as indeed did the authors themselves, that further critical studies (both in the laboratory and in the field) on the validity and range of applicability of the proportional mortality ratio would be necessary before it could be definitely accepted as a comprehensive indicator. The Group recommended that such studies should be continued. Limiting ages other than 50 could be further explored as also the use of data concerning males and females separately or both sexes taken together.

The Group observed that the percentage of deaths under five years to total deaths may well express the toll of communicable diseases and desired that studies on this indicator should be continued.

*Expectation of life.* Expectation of life also has a comprehensive character. In view of the fact that infant mortality below 12 months is being included among specific indicators, it may be of advantage to use the expectation of life at one year rather than at birth. Expectations of life at other ages may also be useful as comprehensive indicators. The Group noted that expectation of life—because it is related to census periods that ordinarily come every ten years—would be suitable for comparisons of long periods of time; its usefulness is somewhat limited from the standpoint of public health action. Where available, its value should not be ignored.

*Crude death rate: total deaths per 1000 population per annum.* The total number of deaths per 1000 population per annum is certainly conditioned by age and sex distribution. Notwithstanding this limitation, death registration and birth registration may be the only sources of available data in a high proportion of countries. As time goes on, crude death rates are being replaced by more sensitive indicators.

In this connexion the Group endorsed the opinion expressed by the Expert Committee on Health Statistics at its fourth session in September 1954,\(^1\) as follows:

\(^{"The \text{ 'crude annual death rate ' (number of all deaths in relation to 1000 population) should be included in the set of proposed ' Health ' indicators, as manifesting the overall intensity of mortality in a certain community or country. However, when the crude death rate is used for purposes of international comparison, its value would be limited because of the influence of the sex-age structure of the population on the level of the crude death rate. This index will usually be the indicator most commonly available as demographic information, and in fact available in very many areas where data concerning expectation of life at birth and infant mortality rate will not be. Examination of its reliability particu-\}"

\(^1\) Unpublished document WHO/HS/56, p. 22
larly for many under-developed areas should not, of course, be overlooked when adopting
it as a measure of some aspect of the 'Health' component."

The reliability of all three indicators suffers from the difficulty of
obtaining accurate information on age as well as from lack of completeness
of reporting.

Specific indicators

When an inquiry is directed to a single aspect or a particular factor of
interest, the relevant indicator or method of assessment may be called
specific for the purpose in view. Provided the information is available, the
following indicators may be considered under this heading.

Infant mortality. Traditionally, the infant mortality rate has rightly
been considered of great significance as an indicator of the level of health.
A decrease in infant mortality, however, may not necessarily mean an
improved general level of health in a community, if there have been specific
attacks on this particular problem. Late infant mortality (from 1 to 11
months) may be more sensitive to environmental and social conditions,
but this refinement can only be made in highly developed countries.
Nevertheless, for wider use, deaths under one year of age out of 1000 live
births should still be considered a useful indicator.

Deaths from communicable diseases per 100,000 population. Since most
of the diseases under this heading have proved to be preventable, a high
death rate from these causes may actually reflect a low level of living. For
the purpose of comparison it is desirable to include all infective and parasitic
diseases listed in section I of the Detailed International Lists of Diseases,
Injuries and Causes of Death \(^1\) (or the corresponding items in the Inter-
mediate or Abridged Lists) or, if this is not feasible, the diseases listed for
the total mortality figure should be specified.

Indicators of health services and activities. The Group considered possible
indicators under this heading but concluded that with existing information
it is difficult to design indicators for world-wide application. Nevertheless,
it would be useful especially in the less developed countries to have inform-
ation on the number of physicians and other health personnel with their
geographical distribution. In collecting such information it would be
desirable to specify the nature of the technical training and qualifications
of the personnel. The Group also noted that it was not only the number
and geographical distribution which were important, but also the extent
to which their services were actually used.

\(^1\) World Health Organization (1948-49) \textit{Manual of the International Statistical Classi-
Manual, incorporating the Seventh Revision of the International Lists of Diseases and
Causes of Death, was published early in 1957.
Also, information on the number of hospital beds and similar facilities, their geographical distribution and the extent to which these facilities are being used, would be of special value in less developed areas.

The Group realized, however, that the numerical data on physicians and hospital beds had only a potential significance as regards "treatments" given to the population.

The effective mass health surveys and treatments now provided by mobile health units in an increasing number of African territories were not adequately represented by these crude indicators.

2. Possible new indicators

As far as the environmental conditions are concerned, the two most important factors are water supply and excreta disposal, for which the following indicators may be useful:

(a) percentage of population receiving protected water supply;

(b) percentage of population having facilities for proper disposal of excreta.

With regard to the standards to be employed in the assessment of these factors, the Division of Environmental Sanitation of WHO submitted to the Group a summary of criteria.1 It was pointed out that it is not enough to collect only information concerning the availability of protected water, acceptable in quality and adequate in amount, or of a good sanitary privy, but that in addition an effort should be made to ascertain to what extent these facilities are actually used.

In addition, the Group also explored possible new indicators for measuring the status of mental health, nutrition and health aspects of housing. In so far as housing is concerned, there seem to be no practical indicators of world-wide application to measure the health element. In relation to nutrition and mental health, the Group, while recognizing the importance of these factors, found that there were too many gaps in the present knowledge to enable it to formulate possible indicators. Consequently it was decided that further studies on these subjects should be stimulated and further references have therefore been made in the following chapter.

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1 WHO is shortly to publish a manual on international standards of drinking water quality.
4. SUGGESTIONS FOR FURTHER STUDIES

The Group considered the need for direct measurement of health but recognized that, in the light of available statistical information, only deviations from health are susceptible to measurement. However, it was emphasized that special effort should be directed to planning further studies on this subject.

In the preceding section, proposals for health indicators based on available statistical material have been made. If the scope of these indicators seems limited, it has to be remembered that many countries would not even be able to provide the necessary material from their current statistics. It should also be pointed out that no indicator directly related to morbidity has been proposed, owing to lack of comparable material for most countries.

In order to acquire the information necessary for defining new and better indicators, the Group strongly recommends that special surveys on a sample basis be undertaken. By this means it is possible to obtain detailed information not otherwise available. In so far as under-developed areas are concerned, the sample survey may well be used as the initial step in the setting up of a sample vital and health statistical area and unit, which may, in subsequent years, not only continue to furnish similar data but become the nucleus of a registration area. Thus, the initial effort may yield permanent returns. In better developed areas, such a survey, if suitably designed, would no doubt bring valuable information concerning, for example, morbidity statistics.

It is unnecessary here to go into the many advantages of sampling methods, which include relatively low cost and more speedy analysis of the data. The Group desired to point out, however, that certain information indicating background factors, such as socio-economic categories in many countries, may be more reliable when gathered from interviews or observations in a sample survey than from a general national system of reporting.

In considering further studies in this field, the Group discussed the following three aspects of the problem:

1. New indicators to be studied
   
   Morbidity studies

   It would be particularly valuable to arrive at comparable national health indicators by means of sample surveys of total morbidity in different
countries. It may be mentioned here that morbidity studies by the method of interviewing samples of the population have already been made—for example, in Canada, Ceylon, Denmark, England and Wales, India, Japan and the USA. The Group felt, however, that this type of study is still in the experimental stage, and suggested that its use should be encouraged with a view to finding suitable indicators.

Where a general study of morbidity is not felt necessary or feasible, studies of the most important illnesses in a given area may be undertaken. Other limited types of morbidity study which the Group wished to emphasize are those on illnesses in specific occupational groups or on specific deficiency diseases among schoolchildren.

The Group discussed the possibility of studying sickness absenteeism in schoolchildren and wage earners. While there may be a fair chance of obtaining valid observations in this regard in respect of schoolchildren, it is, in the opinion of the Group, questionable to use absenteeism of wage earners as a general indicator of morbidity. A series of cultural factors may enter into the causation of absenteeism in under-developed countries, and absenteeism under full employment may in some cases have no reference to illness.

Nutrition

In the matter of nutrition, the Group noted that consideration had been given to the calorie intake, and particularly to the intake of proteins of animal origin, as discussed in the United Nations report.¹ It has been suggested that the birth-weight, the development of the child from one to four years of age, and the mortality of this same age-group could be used as indicators of the nutritional status of a community. In the birth-weight, however, the fact should not be overlooked that there are ethnic factors as well as factors relating to the size of the mother and the parity. Until now, the information is meagre and further studies are needed.

Mental health

The appraisal of mental health by any measurement or indicator must be dependent on a value system which is inherent in the community from which the individual is drawn.

Because of the difficulties in measurement it is, in general, better to look for indicators of mental health in groups of population which may be subjected to special examination. Examples in more developed communities might be groups of schoolchildren or young adults undergoing military

service. Some information is available about the use of mental health measurements for special purposes, such as education and ability to be absorbed into the military training system, but little is known as to the validity of such measurements in connexion with any more generalized concept of mental health.

When considering the possibility of crude indicators relating to suicide, delinquency, insanity and the like, it should be noted that any information from these sources is dependent on the types of service available in the community for the detection and investigation of the causes of these conditions. These services vary throughout the world from practically complete development to none at all. Still it may be possible to adduce the rates of occurrence for some of these crude indicators through special surveys which may also be employed to investigate families as units from the point of view of their mental health.

Crude as they are, and having no absolute value, these indicators may nevertheless be suitable for use in comparative studies. It might be possible to compare the state of mental health of a population at two different points in time or that of two communities which have similar social structures and consequently similar value systems. Clearly, more experience is necessary before extending the range of comparisons to two communities which have widely differing cultural values.

A further problem concerns the relative lack of knowledge of the natural history in any community of the development of ordinary mental symptoms or diseases and much preliminary work of an epidemiological nature is necessary before the value of such symptoms can be assessed.

Environmental factors

It has been mentioned previously that two possible indicators might be found in relation to water-supply and disposal of excreta. But there is still room for further studies in connexion with these two aspects of environmental sanitation, particularly in regard to the cultural background of the population in adapting such facilities into their living habits. The present knowledge on the health aspects of housing and on air pollution is inadequate to define suitable indicators and more detailed information should be sought. More precise knowledge is also needed on sanitation of schools and places of work in relation to health and on other environmental factors affecting health.

Health services

The Group considered that a high priority for inclusion in sample surveys should be given to the study of the actual use of health services in relation to the services available in an area, and noted that the local health
studies initiated by WHO have, among other things, included inquiries into the utilization of health services. Although reference has already been made in the preceding section to the possible use of the number of physicians and health workers and the number of hospital beds and similar facilities as health indicators, much more information is required about the actual utilization of these services.

Social factors affecting health

In understanding the significance of some indicators of levels of health, it is essential to have knowledge of the social behaviour and attitudes of people in the communities concerned. In many parts of the world such knowledge is still not systematic or profound enough to interpret the full meaning of some of the health indicators. In particular, it is inadequate for giving a good background for action programmes based upon the available health information. The Group therefore wishes to recognize the importance of wider studies which would help to provide valuable background and interpretative material for studies of health indicators. These include, on the one hand, the household living and allied studies made by international organizations, national bodies, academic and research institutions; and, on the other, the more intensive studies of social structure and values by specialists in fields of sociology and anthropology. Again, the material provided by such social studies, particularly of the latter kind, is especially necessary for the under-developed countries. The Group wished to underline their importance and to express the view that they may be further promoted as a contribution towards a general understanding of the problem of measuring levels of health.

2. Types of sample survey


The multi-purpose survey is one designed to obtain a wide range of data on a number of relatively simple items, whereas the special purpose survey is an investigation focusing on a single set of more complex objectives.

Multi-purpose surveys

The Group was of the opinion that it would be desirable to collect certain types of information on health conditions, environmental factors

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and health activities and services in combination with general household inquiries on different aspects of living (employment, education, housing, food, clothing and other consumer goods, transport, social security, etc.), employing non-professional interviewers and investigators without highly specialized training or expert knowledge in the health or medical field as such. This approach would broaden the base and scope of health surveys in many ways. A combined or multi-purpose survey would supply for the persons, households, communities, and areas included in the sample, a large variety of information having a bearing on health which would enable health factors to be studied in relation to other aspects of living. Such integrated surveys are likely to be particularly useful for studies at different levels (persons, households, communities, occupational or socio-economic categories, regions).

Multi-purpose sample surveys would be extremely economical in technical personnel and operational costs and would therefore enable the coverage (geographical and otherwise) of health information to be increased in a significant manner, especially in the less developed countries.

Such sample surveys are particularly convenient for multi-phase investigations in the same area. The general household inquiry would normally supply, in the first phase, a good deal of general information for a large number of sample-units (persons, households, communities, occupational or socio-economic categories, regions, etc.). On the basis of such first-phase information, it is possible to select (in accordance with principles of probability) suitable (and usually small) fractions of the original first-phase sample for the collection of more detailed or more technical information in the second phase, possibly by a comparatively small number of professional investigators with appropriate expert knowledge and training. If desired, the information collected in the first and second phases can be used to select a third-phase sample (still smaller in size) for more intensive studies at a higher technical level by experts; and so on.

The Group emphasized that when health items are included in general household inquiries it is essential to secure the active collaboration of public health experts, in the preparation of the design of the sample survey, in organizing short courses of training (in health items) for the field staff, and at the stage of analysis and interpretation of the data. It would also be desirable to secure the help of such health experts, to the extent possible, in the technical supervision of the inquiry.

It has been suggested that multi-purpose surveys be made and these have obvious advantages in terms of saving of time and effort. It appears useful to consider what type of information might be collected by individuals not professionally trained in a given field when no professional person is available. Certain procedures such as taking blood specimens could be
taught to any intelligent person in a relatively short time, as could the performance of such operations as taking blood pressure, doing simple tests such as tuberculin and Schick tests, and a number of others. These surveys would provide a large amount of useful medical information, which could be interpreted and analysed by the physician.

Certainly, information gathered by an anthropologist on food habits is of interest to the nutritionist, and additional nutritional information might be obtained from analysis of specimens of blood collected. Conversely, it is possible that medical men performing surveys could be taught methods of collecting socio-economic data which would be of use to specialists in the social sciences and would carry sufficient validity to be analysed by them.

Here, two general types of information are considered. The first concerns prevalence data relating to a given time on, for example, the existence of persons, cases of disease and so forth. This type of data is usually collected by census methods. The second general type of information (called "incidence") refers to incidents or happenings which occur over a period of time and which must be reported at the time of occurrence in order to be accurate. This includes occurrences such as births, deaths and new cases of disease. It is clear that two different kinds of mechanism are required to obtain the types of information mentioned above.

In securing prevalence data, a survey is designed to count the actual number of people, the proportion who are sick at the time, the number of houses and the proportion with adequate water supply and excreta disposal facilities, and data of a similar sort. An estimate of duration may be made by assuming that, on the average, a person found chronically ill will be encountered half-way through his illness, the average of preceding days of a given type of illness multiplied by two thus forming an estimate of total duration.

To obtain incidence data from a survey, one of the following methods must be employed:

1. Compilation of history of occurrences previous to the survey. This is likely to be unreliable as events recede in time.

2. Repeated surveys in the same community. This is a better method, allowing an estimate of change of situation during the interval, and therefore an estimate of frequency of happenings. A modification of this method is a survey covering a considerable period of time, with repeated visits to given households and an opportunity to observe what is happening in the interval. This could be considered as a sort of reporting system limited to a short time in a circumscribed area.

3. Collection of information on previous sickness experience in each age group. This is an entirely different approach, which has a limited use.
Preferably this is done through objective tests indicating exposure, such as tuberculin and Schick tests, or through serological examinations, such as yellow fever protection or Wassermann tests. The interpretation of these tests must of course pay due attention to immunity induced by vaccination, which may be widespread or even compulsory in the case of tuberculosis (BCG), diphtheria and yellow fever. Alternatively, histories of past infections may be obtained according to age. From a study of the cumulative number of attacks admitted by a population on the different age groups, it is possible to obtain a fairly clear picture of the amount and severity of the morbidity suffered by the population from a particular communicable disease. As stated, histories are increasingly unreliable with time, but a certain amount of correction can be applied statistically, even to data based on histories of previous infection.\(^1\)

**Special purpose surveys**

In addition to multi-purpose surveys, there is need to collect information of a more technical nature through “specialist” surveys employing professional investigators with expert knowledge in the field of health. It is desirable that the design of such inquiries should be in accordance with the principles of probability.

In a number of areas, where no information whatsoever exists on morbidity or mortality conditions of the population, it should be useful to organize a medical team to ascertain the most prevalent diseases in these areas. Sometimes only a few diseases account for a high percentage of the total morbidity and mortality of the population. In such areas, a medical team, by examining a sample of the population, would be able not only to gather important information for the estimation of the morbidity conditions of the population, but also to find out the chief causes of the morbidity. Information so obtained would be useful, too, in guiding the health authorities in taking specific action concerning these diseases.

Specific studies of factors affecting health in nutrition, environmental sanitation, mental disorder, health services and social and economic conditions would naturally come within the scope of special purpose surveys. Reference has already been made in the beginning of this section to the possibility of obtaining indicators in some of these fields.

\(^1\) In a study of yaws in Jamaica, conducted some years ago by the Rockefeller Foundation, it was found, somewhat surprisingly, that memory of past yaws infection disappeared quite rapidly with increasing age, and that positive serology remained somewhat longer although it also tended to disappear in later years. However, it was possible to compensate for this loss, and from cumulative historical data with age, to deduce an annual rate of infection which was surprisingly close to that actually observed over several years of study.
3. Suggested approaches in pursuing such studies

In framing the approach to further research in this way, the Group was aware of problems concerning the use in medical work of non-medical personnel. As already stated they regarded this course as justified, especially in the conditions of most under-developed areas. But, again, they were also aware of the importance of proper training of such personnel for the investigations proposed, and of the need for their effective supervision by qualified medical men. The Group was also of the opinion that any general interpretation of the health findings would have to be made by qualified medical personnel; and it wished to draw the attention of WHO to the need for further exploration of the type of training to be given and of the means to be made available for it.

It was further felt that inter-disciplinary investigators, trained in both medicine and anthropology sociology would also be useful. Workers of this kind could study social conditions bearing upon health. In particular, they could examine the relation between suggested indicators of health and those factors of the social milieu which help to explain the values to be attached to the indicators; e.g., a test of the relation between hospital facilities and allied services on the one hand and social structure, attitudes and values of the people in the "hospital catchment area" on the other, might be so made. Such investigators trained in joint disciplines are doubtless very rare, but the Group hopes that by an approach of this sort it may be possible to plumb the depths of social well-being as a component of health.

The Group also noted a new type of investigation by anthropologists or sociologists specially trained in the study of environmental hygiene, in which the degree of use or neglect of factors such as protected water supply or sanitary arrangements and the local reasons for variation in the use of these are examined. This type of work of course relates especially to under-developed countries.

Similarly, in the field of medicine, further studies are needed in respect to the effective functioning of the human being as a social organism. Many disciplines are involved, as, for instance, physiology, social and preventive medicine, anthropology, sociology, biostatistics and perhaps others; and it seemed to the Group that academic and other research institutions were well placed to make a substantial contribution in this area.
5. SUMMARY

1. The Group considered that a suitable working classification of health indicators was as follows:

   (a) those associated with the health status of the individual or group;
   (b) those related to environmental conditions;
   (c) those concerned with health activities.

2. While recognizing the importance of designing indicators for the direct measurement of health, the Group concluded that, for the present, working indicators have to be sought in deviations from health which are susceptible to measurement. Nevertheless, the subject of direct measurement of health was important and must take a prominent place in any programme of further study.

3. The Group discussed some possible health indicators capable of being used for the measurement of levels of health and has suggested several such indicators which are based on statistics already available in many countries.

4. The Group suggested that the search for new indicators might profitably be pursued in several fields such as (a) morbidity, (b) nutrition, (c) mental health, (d) environmental sanitation, (e) health services, and (f) socio-economic conditions. In doing so, the Group appreciated that there were inherent difficulties for those countries where statistics and research facilities are scarce.

5. With regard to mental health, the Group found much difficulty in suggesting any indicator, but recognized that the development of objective indicators for mental health is not only a problem of highly developed countries but also of those in a phase of rapid industrialization and that the subject should be further studied.

6. Because of the inherent difficulties of the subject and to some extent also because of the limitation of time, the Group was not in a position to offer any concrete suggestions on the measurement of social well-being per se.

7. In stressing the point that the search for new indicators—direct and indirect—should be strenuously pursued, the Group felt it desirable to outline, at some length, methods of doing so, especially through sample surveys emphasizing the importance of the household (or family) as the unit of investigation.
8. The Group discussed various ways of carrying out studies aimed at eliciting new indicators and suggested the following approaches:

(a) through research by public health schools, medical colleges, universities, statistical institutions and other interested organizations;

(b) through special studies initiated by national health authorities;

(c) through the collaboration of the various agencies interested in family living studies and social surveys by introducing health aspects as an integral part of the studies.

9. The Group noted that WHO had already initiated local health studies, in which one of the objectives is to study the measurement of health and the factors affecting community, family and individual health.
Annex 1

LIST OF WORKING DOCUMENTS
Submitted to the Study Group *

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<th>Document Number</th>
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<td>WHO/PHA/Lev.Hlth/1</td>
<td>Levels of living—the health component</td>
<td>Sir Andrew Davidson, M.D.</td>
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<td>WHO/PHA/Lev.Hlth/2</td>
<td>The use of vital and health statistical data as health indicators,</td>
<td>M. Grais</td>
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<td>WHO/PHA/Lev.Hlth/3</td>
<td>Some basic considerations concerning health indicators</td>
<td>M. G. Neurdenburg</td>
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<td>WHO/PHA/Lev.Hlth/4</td>
<td>Definitions of levels of living and health in relation to health indicators</td>
<td>B. Roos</td>
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<td>WHO/PHA/Lev.Hlth/5</td>
<td>Some suggestions on designing health indicators</td>
<td>J. J. Hanlon</td>
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<td>WHO/PHA/Lev.Hlth/6</td>
<td>Physiology of health and physical fitness</td>
<td>Shri Kalidas Mitra</td>
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<tr>
<td>WHO/PHA/Lev.Hlth/7</td>
<td>The measurement of health</td>
<td>R. Kohn</td>
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<tr>
<td>WHO/PHA/Lev.Hlth/8</td>
<td>An attempt to evolve a comprehensive indicator to quantify the</td>
<td>S. Swaroop and K. Uemura</td>
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<td>WHO/PHA/Lev.Hlth/9</td>
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<td>WHO/PHA/Lev.Hlth/10</td>
<td>Levels of living—the health component</td>
<td>F. A. E. Crew</td>
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<td>WHO/PHA/Lev.Hlth/11</td>
<td>An index of vitality for assessment of national health levels</td>
<td>P. Stocks</td>
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<td>WHO/PHA/Lev.Hlth/12</td>
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<td>Living standards and health</td>
<td>R. H. Hazemann</td>
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<td>WHO/PHA/Lev.Hlth/14</td>
<td>Correlation between proportion of urban population and public</td>
<td>R. F. Bridgman</td>
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<td>WHO/PHA/Lev.Hlth/15</td>
<td>Rate of use of hospital services as a health indicator</td>
<td>R. F. Bridgman</td>
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<td>WHO/PHA/Lev.Hlth/16</td>
<td>Information on some indicators for measuring nutrition conditions</td>
<td>J. M. Bengoa</td>
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<td>WHO/PHA/Lev.Hlth/17</td>
<td>HILLEM as a measure of the health index of a population group</td>
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* Copies of these working documents are available on request to WHO.

1 To be published in the Bulletin of the World Health Organization.
Annex 2

SOURCES OF INFORMATION ON HEALTH STATISTICS
AND MORBIDITY SURVEYS

1. WHO Periodical Publications containing Mortality and Morbidity Data

The WHO Epidemiological and Statistical Services, in continuation of the work of the League of Nations Health Section, have issued regularly since 1946 a monthly Epidemiological and Vital Statistics Report, and Annual Epidemiological and Vital Statistics. These publications contain routinely-collected statistical material reflecting the health of the populations of most countries in a position to provide the data.\footnote{Inactive Members of WHO not included.}

Included are:

1. cases of and deaths from all notifiable diseases (for some 180 countries and territories);
2. natality, infant mortality and general mortality rates (for some 50 countries and territories);\footnote{Until 1952 similar data were also published, relating to several hundred towns, many of which are situated in territories for which global figures were not available. Publication of this material is to be resumed in the near future.}
3. mortality from the 50 causes included in the Abridged International List (for some 30 countries and territories);
4. mortality rates from selected causes in the Detailed International List issued for special purposes, such as providing the basis for discussions of expert committees.

A number of special enquiries on specific diseases or causes of death have also been made by technical units of WHO and published in the Bulletin of the World Health Organization or the Epidemiological and Vital Statistics Report. The Epidemiological and Statistical Services have for the last four years collected and published, as the Medical Statistics Documentation IID series, data on medical and auxiliary health personnel, hospitals and hospital beds of various types, and vaccinations performed, for some 180 countries and territories.

The Epidemiological and Vital Statistics Report, volume 8, No. 11 (November 1955), contains for 29 countries a series of health indices including general mortality, infant mortality, neonatal mortality, late infant mortality (1–11 months), proportional mortality under five years, mortality from infective and parasitic diseases, and proportional mortality from these diseases; also expectation of life at birth and at one year of age by sex. These data, in so far as they are available, relate to the years 1911, 1931, and 1951.

Morbidity statistics and their improvement have been the objects of: a special conference convened by WHO in November 1951, a series of studies made by several of the national committees on vital and health statistics sponsored by WHO, and discussions and recommendations by the Conference for the Seventh Revision of the International Lists of Diseases and Causes of Death (February 1955) and the Expert Committee on Health Statistics (December 1956).\footnote{Unpublished document WHO/HS/7 Rev.Conf./17 Rev.1} A selected list of the documents issued by WHO is given in section 2.
The form and the nomenclature to be used in recording morbidity statistics are covered by Articles 13 to 17 of WHO Regulations No. 1 regarding nomenclature (including the compilation and publication of statistics) with respect to diseases and causes of death, adopted by the World Health Assembly in 1948.

2. Other WHO Publications and Documents on Morbidity Statistics

WHO Conference on Morbidity Statistics, November 1951


Working documents:

- WHO/HS/Morb.Conf./1 Statistical evaluation of morbidity
- WHO/HS/Morb.Conf./2
- WHO/HS/Morb.Conf./3 Morbidity statistics—England and Wales
- WHO/HS/Morb.Conf./4 Sampling surveys of sickness prevalence
- WHO/HS/Morb.Conf./5 Morbidity statistics—Yugoslavia
- WHO/HS/Morb.Conf./26 Morbidity statistics from the social security standpoint
- WHO/HS/Morb.Conf./27 Morbidity survey—USA
- WHO/HS/Morb.Conf./31 Morbidity statistics—Israel
- WHO/HS/Morb.Conf./32 Morbidity survey—Canada

First International Conference of National Committees on Vital and Health Statistics, October 1953


A number of documents prepared for this conference were published in *Bull. Wild Hlth Org.*, 1954, 11, 1-314 (No. 1-2).

National committees on vital and health statistics

Various documents:

- WHO/HS/Nat.Com./24 General Lists for classifications in sickness surveys
- WHO/HS/Nat.Com./31 France Definition of terms in hospital statistics
- WHO/HS/Nat.Com./41 USA Hospital morbidity statistics
- WHO/HS/Nat.Com./43 Various countries Mental hospital statistics
- WHO/HS/Nat.Com./48 USA Recommendations for collection of data on illness and impairments in the United States
- WHO/HS/Nat.Com./54 England and Wales Measurement of morbidity
- WHO/HS/Nat.Com./62 Netherlands Statistics of sickness absence in industry
- WHO/HS/Nat.Com./64 France Social Security morbidity statistics; school health statistics
- WHO/HS/Nat.Com./73 Egypt Survey of sickness in Egypt
- WHO/HS/Nat.Com./92 Japan The National Health Survey of Japan
3. Publications on National Morbidity Sample Surveys

Canada


Ceylon


Denmark


England and Wales


Registrar General (1951) *Statistical review of England and Wales for the two years 1946-1947*, Text, Vol. 1, Medical, p. 278


India


Japan

Ministry of Welfare, Division of Health and Welfare Statistics. Various information on morbidity statistics in Japan, received by WHO and summarized in documents available on request from the Division of Epidemiological and Statistical Services, WHO

United States of America


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