This is a repository copy of *Social indicators: health*.

White Rose Research Online URL for this paper:
http://eprints.whiterose.ac.uk/118333/

Version: Published Version

**Article:**
Culyer, A. J. (Anthony J.), Lavers, R. J. and Williams, Alan, 1927- (1971) Social indicators: health. Social Trends, 2. pp. 31-42. ISSN 2040-1620

---

**Reuse**
This article is distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND) licence. This licence only allows you to download this work and share it with others as long as you credit the authors, but you can’t change the article in any way or use it commercially. More information and the full terms of the licence here: https://creativecommons.org/licenses/

**Takedown**
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.
Social indicators: Health

A. J. Culyer, R. J. Lavers and Alan Williams, University of York

This article was one of several presented at an international conference on social indicators held at Ditchley Park in April 1971. The conference was sponsored by the Social Science Research Council and attended by representatives from USA, Canada, France and United Kingdom, including representation from the Central Statistical Office. Current thinking on social indicators is proceeding in many and various directions. It could not yet be claimed that there is any consensus on the most desirable line of development even within particular social policy areas. This is especially true of the difficult field of health with which this article deals. Nevertheless it is part of the editorial policy of Social Trends to keep in touch with developments in this important field. The article is therefore published not as representing a line of thought which has any especial status with public health authorities, government, or the medical profession but simply as an interesting example of the kind of substantive research which is going on in this field.

I. Introduction

The general background to the current debate on social indicators was given in Social Trends No. 1, 1970 by Professor C. A. Moser. In the present paper, attention is focused on the development of indicators in the particular field of health. We take it as self-evident that the choice of indicator is governed by the purposes for which it is intended to be used. These, it would appear, are broadly two. First, they are useful in recording the state and progress of groups of individuals. Second, they are useful in formulating policy: what targets shall we attempt to aim at? As is clear from the survey of some of the literature on social indicators contained in the appendix to this paper, it has not always been recognised that indicators designed to fulfil the first function will in general be different from those which are constructed with the second purpose in view. In particular, indicators which are to be of use in the formulation of policy must take account of the preferences of society and the costs involved in accommodating these preferences.

Since the policy functions will include the purely recording function, it is convenient to consider indicators in the context of the requirements of social policy decisions. This suggests that the decision taker requires three different kinds of indicator, each serving a different function and each complementary to the others but none sufficient alone for policy making. These three requirements are:

(A) A measure of the 'output' of social policies, e.g. the 'amount' of education, health, etc.

(B) A means of deriving the social valuation placed upon different 'outputs'.

(C) A measure of the technical possibility of increasing 'output'.

Together, adequate information on each of these measures is sufficient to form policy: (A) provides the units in which policy objectives are to be defined, (B) values increments (in terms of social worth) in each objective and (C) specifies what it is physically possible to do, for example, how much of one good thing must necessarily be sacrificed in order to obtain more of another.

Corresponding to each of these functions are three kinds of social indicator required in the field of health which we term as follows:

(A) Measures of the State-of-Health ('State' indicators)

(B) Measures of the Need-for-Health ('Need' indicators)

(C) Measures of the Effectiveness of health-affecting activities ('Effectiveness' indicators)

Each of these indicators can be used at a more or less aggregated level, for example to refer to society as a whole or to groups within society such as unmarried mothers, retired persons, specific social class or ethnic groups, or patients suffering from particular disorders. Each is necessary for proper planning, each raises important problems in conceptualising the kind of actual numbers needed and the extent to which what is practical corresponds to what is ideally required, and each raises problems of ambiguity of interpretation.

Need indicators are required in order to establish priorities. Not all needs can be met and some are more urgent than others. Essentially, a Need indicator would have to combine two elements: a social and humanitarian value upon an improvement in the community's health and the value of the other socially and compassionately desired programmes that would have to be gone without as a result of devoting more resources to health.

Effectiveness indicators are required in order to
sort out the effects of health services per se as upon the community’s health and to discover what inputs are required in order to achieve an objective stated in terms of the State indicator. Thus, one use for the Effectiveness indicators would be to demonstrate how by varying one such input the State indicator would respond during various time periods, or to show how different inputs may substitute for one another in promoting a given State or change of State. Essentially Effectiveness indicators would provide the technical informations between inputs and outputs. We do not underestimate the practical problems of discovering these relationships with any degree of precision.

Obviously, however, logically prior to both Need and Effectiveness indicators is the State indicator, since both of these variables—in principle one socially decided, the other technically determined—expressed as a function of the State indicator. If the problem of the State indicator cannot be solved within a similar framework, the problem of the output of health services, then no progress will be possible with the other two, for the objectives of policy, we believe, ought ultimately to be definable in terms of the state of the communities.

In this paper we therefore turn our attention in the first place to the state-of-health (section II). Next we discuss the meaning of the need for health care (section III). We have very little to say at this stage, for obvious reasons, about the technology of medical care. Here we are concerned with the discussion of this problem in the Appendix which surveys some of the literature on health indicators.

II. A proposed health indicator

In order to generate a state-of-health indicator which will also serve as an effectiveness measure, it will be necessary to devise an algorithm which will encompass both (a) medical data and judgements and (b) social judgements, with each expressed numerically in a standardised manner, yet clearly distinguished one from another. In this section of our paper we outline such an algorithm and point out some of its implications.

If we are to build up an index of health (or, in this case, of ill-health) we need to measure both intensity and duration. ‘Intensity’ is here interpreted as having two dimensions, ‘pain’ and ‘restrictions of activity’, and for expository purpose the distinction is here concentrated throughout in terms of these two dimensions only. In practice, however, it would probably be desirable to extend the number of dimensions to include other factors that are relevant such as ‘distress’. The fundamental problem, however, of how to combine the relevant measures of ill-health into a single index can be illustrated without loss of generality in a two-dimensional example. The first step would therefore be to experiment with simple standardised descriptions of painfulness and of the extent to which activity is restricted, to see if there is any consensus among medical personnel as to how painful and how restricting particular conditions are, using these descriptive categories.

The initial descriptive stage may be represented as in Figure I below:

![Figure I](image)

α, β, γ, and δ are simple descriptive statements concerning with painfullness (such as ‘mild’, ‘uncomfortable’, ‘very uncomfortable’, ‘extremely painful’ etc.). a, b, c, d, and e are simple descriptive statements concerning with restriction of activity (such as ‘light work only’, ‘confined to house and immediate vicinity’, ‘confined to house, confined to bedroom, confined to bed’, etc.). 1 α, x and δ each refer to different medical conditions or different combinations of medical conditions. For example, the medical condition α in Figure I is regarded by one observer as involving, for a patient suffering from it, degrees of painfullness and restricted activity described by the statements x and y respectively. Of the other four observers, who place condition δ in the ‘painfully restricted activity’ space, two agree with the statement of the first observer on painfullness (but categorise the degree of restricted activity by statements c and e) and two agree with the statement of the first observer on activity restriction (but regard associated painfullness as being better described by statements β and δ). Each o plotted on Figure I represents one expert’s corresponding judgements by other experts of the most appropriate descriptions of those conditions. The specification of medical conditions may, of course, have reference to age, social class and other attributes, and the degree of the painfullness and restricted activity would have to be such that patients suffering from each condition formed a relatively homogeneous group. If there is any consistency in these judgements (as there is in α and δ in the example) some ‘norm’ will be indicated as the standard description for that condition; where no consensus exists (as with x in the example) it is likely that the condition under study needs to be re-defined. Consequently, in the next group of equivalents (β, a; b, e) and (β, x) and so on.

Despite the fact that describing the intensity of pain is notoriously difficult, and that interpersonal comparisons are bound to be rather arbitrary due, for example, to varying thresholds of pain, medical personnel can and do make such comparisons between stages of classes of condition, and such comparisons already have to be assimilated into judgements about ‘acceptable’ degrees of medical disability and pain at the diagnostic and therapeutic level when determining courses of treatment. It is therefore suggested that it should be possible to move to the second evaluative stage and construct (say) a 10 point scale on intensity of ill-health along the following lines: 0 = normal, 1 = able to carry out normal activities, but with some pain or discomfort, 2 = restricted to light activities only, but with little pain or discomfort, 3 = various intermediate categories reflecting various degrees of pain and/or restriction of activity, 4 = conscious, but in great pain and activity severely restricted, 5 = unconscious, 6 = dead.

Since it is intended to use these numbers as weights, and not simply as rankings, it is important to stress that society’s judgements concerning the relative importance of avoiding one state rather than another are represented by the actual numbers attached to each respectively, e.g. state 2 is twice that of state 1, and state 10 is ten times as bad. This implication must not be shirked, and must be regarded as a statement about health policy (and is to be made by whoever is entrusted with that responsibility—e.g. the Minister), not a technical statement about medical condition. 4 In terms of Figure II this would be represented by attaching numbers to each of the contour lines.

As to duration, this will be based on the outcome of scientific investigations, cast in statistical terms. For instance, regarding a medical condition we would follow one time-path (incorporating both intensity and duration) in 90% of the cases, another in a further 9%, and yet another in the remaining 1%. Chronic cases where no (or little) improvement in intensity is to be expected will have a duration equal to the life-expectancy of that class of individual, and the duration of the ‘gain’ from postponing death where successful treatment is possible will be similarly measured. A ‘successful’ treatment is not only one which reduces intensity and duration but could also be one that reduces ‘intensity without affecting duration, or vice versa; or even that decreases one at the expense of the other. To provide the net outcome is to reduce the index number (a product of intensity and duration). The important sources of information here are the medical statisticians since it is purely empirical information that is required at this stage in the process.

There are many uses to which such an indicator could be put, but here we will concentrate on only two of them: first in a cost-effectiveness study, and secondly as a tool in measuring the state-of-health in a community.

Cost-effectiveness studies in the health field are plagued by the difficulties encountered in measuring the effects of various input changes on the health status of the clients. An index of the kind we are suggesting might be used in the following manner for such studies.

Figure III starts at a point of time O when the condition in question is diagnosed, and the unit of the illustration would have to be such that patients suffering from each condition formed a relatively homogeneous group. If there is any consensus in these judgements (as there is in α and δ), the example) it is likely that the condition under study needs to be re-defined. Consequently, in the next group of equivalents (β, a; b, e), and so on.

3 A detailed ‘Schedule for the Medical Assessment of Physical Disabilities’ illustrating the kind of thing required here is to be found in Andersen, 1964.

4 In this schedule, we have assumed that death is the worst state of all. In terms of a ‘clinical’ approach to the problem, a close look at the horizontal axis through which a contour higher than any other passes. It may be, however, that a preferred ranking of the medical condition ‘death on a lower contour than some other condition characterised by, say, a patient in an extremely painful moribund state’.

5 Magdalena, et al., 1967, in their work on a similar indicator fail to make this clear.
tion) is represented by the broken line (----). The area of uncertainty about the consequences of alternative patterns of resource allocation.

As a measure of a community's state-of-health the same categories could be used as a basis for a large-scale statistical survey, the object of which would be to measure both the intensity value and the duration of the various conditions affecting the population. Repeated periodically throughout the year (to allow for seasonal fluctuations) and from year to year (to establish trends) this would provide the kind of information required as a contribution to general social indicators, and would be free of many of the defects inherent in medical record-based statistics (though there would obviously be some advantage if these too included some standardised information of the kind here suggested).

Certain features of this system in general are noteworthy:
(a) In principle it enables preventive as well as therapeutic activities to be incorporated;
(b) although much more difficult in practice, in principle it can embrace mental illness;
(c) it treats one week of suffering at any particular intensity level as being equally undesirable irrespective of the identity of the patient. Other distributional assumptions are possible in principle, but would make the analysis much more complicated;  
(d) it relates only to patients, and does not include infectivity, or the pain and suffering caused to others by the patient’s condition. A major shortcoming of this insuperable in principle, but as a practical matter they would be difficult to overcome in the near future;
(e) the satisfaction felt by patients themselves (or their friends and relatives) is not regarded as an independent consideration in this formulation, and to do so would raise such enormous difficulties of any kind of health indicator that the statistic mentioned here only so that it is not lost sight of.

One important purpose of such an indicator is to facilitate cost-effectiveness studies, by providing a quantification of the purely humanitarian benefits to be used in conjunction with economic costs and benefits (as far as the cost of providing care and earned income losses avoided) in order to improve the effectiveness of health services in the face of scarce resource limitations. But it could also generate, as a by-product, improved indicators of the state of health of a community if used as part of the basic information matrix in a National Survey of the State of Health of the community.

If successful, this would fill an important gap in our present knowledge, for it would include cases where people had not presented themselves for treatment, or where those giving treatment were unaware of the patient's condition between episodes of treatment.

III. An exploration of the meaning of need

The purpose of this section is to explicate the various concepts that are commonly met in discussions of policy and to relate them to one another (leaving aside in this context the practical difficulties of compiling appropriate statistical series which are considered elsewhere in the Appendix) in order to concentrate initially on the purely conceptual difficulties. The general framework encompasses, we hope, all of the meanings of 'need' that are commonly encountered in discussing social indicators.

Need indicators are commonly expressed in terms of a target level which has been decided that a particular state indicator should take. Alternatively, they may be expressed as the difference between a target and the current (or some projected) level of the indicator. These need indicators are thus expressed in terms of the state indicators.

This approach appears to us to be unsatisfactory since it is not clear how the target is decided. For example, it is said that 'Society needs' . . . it is not clear whether what is meant implies that the speaker himself needs it, whether Society ought to have it in his opinion, whether a majority of members of Society want it, or all of them want it. Moreover, it is not clear whether it is 'needed' regardless of the social and humanitarian cost to Society.

We urge an alternative approach to the meaning of need, which is that the agent responsible for the decision (the 'Minister') should attach explicit valuations to a variety of levels of the State indicator; increments in these could then be compared with the incremental social cost of attaining any given level. Essentially, this procedure amounts to the calculation of an intensity of need measure which states the intensity with which 'Society' needs each of a variety of states-of-health.

Simplifying at the conceptual level, we assume that decisions regarding the meaning of social needs are taken by a single individual—the 'Minister'—who can fulfill more health needs only by forgoing known quantities of other desired needs. For simplicity we assume that only the government provides these goods. The amount of health is measured by a State indicator and the amount of education by some analogous indicator. With a given budget and constant technical possibilities, he could provide either OE education or OH health or any combination of output of both education and health shown along the possibility boundary EaH in Figure IV.

Figure IV

Suppose that the 'Minister' has located the public sector currently at a1 so that the community will be enjoying OE education and OH health. One possibility immediately available to the 'Minister' is to say that OH health is 'needed' (in the sense that it is a target level of the indicator to be aimed at) where h2 is located at some arbitrary point to the right of h1. (An alternative way of expressing the same idea would, of course, be to say that the community had h1, h2 (OH - OH) of unmet need, and one could if one wished define need to mean the difference between levels of the State indicator.) We term this concept of need for a more general analysis one could measure all non-health aspects of social well-being on the vertical axis instead of just education. The total resources of the community as a whole would then not a limit to health provision rather than the government's budget, and private as well as public provision could then be incorporated in the analysis.
the more health the community enjoys relatively that they will be substitutable at a constant rate, assume that needs are substitutable in the social regarding as off-setting a small reduction in the expressly needed, and hence that there is some increase in the level of health which would be reasonable to suppose that all needs are simultan-
cerned about another need. We assume that it is concerned with the 'Minister'. The relative values are derived and of the relative values of health and education the cost of more health (in terms of less education) based conceptually upon a consideration of both the 'Minister' will wait until one need is satisfied at the 'Minister's' choice of b is that he judges it to be in the community's interest that the improvement in productivity in the medical sector be partly exploited in the form of released resources rather than greater output, these resources being transferred to the education sector, (e.g. releasing nurses to become teachers).

This constitutes a further potential source of weakness in the arbitrary measures of need, in that they tend implicitly to assume that the fruits of technical progress in any sector are to be enjoyed only up to a certain limit. Alternatively, it is again undesirable, as was OEH, but for analogous reasons since it implies that b2 is attainable when it is, in fact, not attainable. Similarly, if b2 is moved even more worse. Again, then, we find substantial reasons for preferring the cost-benefit definition of need at the conceptual level since it avoids the possibility of mistakes of principle whereas the other concepts, whatever their practical relevance, can lead to erroneous specifications of the problem (and hence, pressure for technical solutions of the problem of well). In practice, the difficulty with the cost-benefit notion of need is that it requires that the properties of the social welfare function be identified in the relevant range.

Summarising the principal themes of the argument thus far, two major propositions have been advanced:

a) Not all changes in the state of health (SOH) of magnitude will be of the same value in terms of social well-being.

b) Even if we assume that any change in the SOH makes a positive contribution to social well-being, we need, necessarily, to recommend its implementation as a target because its contribution, though positive, may be less than the losses incurred else-where as a necessary result of its implementa-
tion. These losses, or marginal social costs, can be expressed either in terms of the value of impact of the 'Minister' and the SOH indicator or in terms of the value of the other desired outputs forgone 1. As the percep-
tive reader will have noted, the cost side of the calculation will rely heavily on the develop-
ment of satisfactory Effectiveness indicators.

The implications of these propositions are therefore the need for a valuation of the (marginal) trade-offs between SOH and other outputs is required. Effectively, this implies that the 'Minister' should take a range of different SOH trade-offs and find if the total losses are less than the levels of the State indicator needed? These valuations, or measures, of the intensity of need at each level, would be expressed in terms of some numerical variable (e.g. the analytical level they correspond to the slopes of the iso-welfare lines as they pass through EbG vertically above each SOH level. There is a strong case, we believe, for viewing these indicators of the intensity of need as the need indicators themselves.

Although they have not been grasped with the title of 'need', some attempts have already calculated such an index. The most notable example in Britain is the Department of the Environment's use of explicit values of human lives expected to be saved by reducing risks. This indicator presents formidable problems of quanti-
fication. Progress is however, being made toward their solution 1.

Second, the cost-benefit approach offers the most comprehensive method of coping fully with the problems raised in devising and using social indicators. In particular, the cost-benefit approach includes an explicit valuation of the (marginal) trade-offs in both sides of the problem (Need and Production (Effectiveness indicators) between SOH output and inputs and other outputs and inputs. It also provides methods for devising and checking the correctness of the indicators. These have failed to produce any or where they are known to have been produced only imperfectly.

Finally, these more ambitious methods are predicated upon the existence of a State indicator though the latter cannot be regarded in any way as an adequate substitute for them. Essentially, the State indicator provides the dimensions of 'output' in which the problem for solution is measured. We emphasise that we regard the calculation of the State indicator in this light—as a necessary but limited (though difficult) first step.

One possible conclusion derived from this

1. Under certain conditions these two alternative ways of expressing the same costs are the same thing. For cases where they diverge, there are means of selecting the appropriate measures.

2. Some workers in this field see, for example, Lord, 1949; Dawson 1967; Schelling, 1968; Fromm, 1968; Janez 1969.
discussion may be that the word 'need' ought to be...centrality of its ambiguity but also because we believe it generally true that the word is most frequently used in the 'arbitrary' senses of which we have already spoken. We hope to have shown here that there is a meaningful and useful, if unconventional, concept of need. The calculation of a Need indicator based upon our concept is particularly fruitful, and the only case in which it seems clear that the operationality of a State indicator such as that proposed elsewhere in this paper is feasible. Speculative horses are perhaps last backed one at a time.

IV. Conclusions

The chief aim of this paper has been to devise a conceptual scheme with particular reference to health and to suggest the construction of social indicators designed to achieve the objectives of measuring the quality of life, estimating the effects on social phenomena of the actions of government, commercial and voluntary organisations and of individuals, and measuring the magnitude of social problems, the rate at which they are changing and the manner in which they are changing. These general objectives in which construction of social indicators are discussed, for example, in Allen, 1968; Bauer, 1966; Cohen, 1968; U.S. Department of Health, Education and Welfare, 1969; and Moser, 1970 (a) and (b).

In a number of respects, however, we find ourselves in disagreement with contributors to the recent debate. It should by now be clear, for instance, that we do not regard some of the indicators reviewed in detail by Riddel, 1966, as useful social indicators, on the grounds that the goals whose achievement they are designed to monitor relate to inputs (e.g. more hospitals, clinics, nursing homes). State indicators, as well as being free of any input content, should also in our view be distinguished from Need indicators. The statement of Cohen, 1968, that 'there is a need for state indicators to indicate clearly and precisely present conditions in our society, including, for example, the magnitude of existing social problems and their rate of change' (our italics), fails to make this distinction clear, for while State indicators may serve adequately to indicate present conditions, the magnitude of social problems can properly be determined only by taking into account society's preferences and the opportunity cost of satisfying them. Need indicators, that is to say, should not be subsumed under State indicators, since confusion of the two leads to such unhappy statements as 'we are still far from assuring every American the right to the best health care that modern medical science makes possible' (Cohen, 1968).

We have also argued that policy values must inevitably enter into indicators, both 'internally' (e.g. relative valuations of different dimensions of health within a State indicator) and 'externally' (e.g. the quality of information on the State-of-Health in a population and on changes therein, even though they may appear to do so.

Similarly indicators of health service provision, such as hospital beds or doctors per thousand of population, commonly used in e.g. annual reports of the Department of Health and Social Security and other published sources of data, are not State indicators. Although input measures have been proposed as indicators of level of health in, for example, WHO, 1957, indicators of State-of-Health need to be quite frankly input content in order that the effects on them of varying input combinations may be subsequently estimated. We also note that the State indicators considered in this section—mortality, morbidity, restriction of activity and composite measures—are indicative of the degree of ill-health rather than of the level of positive health of a population.

(i) Mortality measures

Data on mortality can be both in place and space, have been traditionally used to indicate levels of health, and form the logical starting point of such general frameworks as that of M. Frisch, 1965. However, neither comprehensive (crude and standardised death rates, expectation of life at a particular age, or the ratio of deaths over 50 years of age to deaths under 50) nor specific indicators of mortality (infant and neonatal rates, rates for infective and parasitic or the degenerative diseases) nor direct indicators of the level of the health of the living members of a population. As noted by Acheson, 1968, however, they might be more of relevance in situations where ill-health is due largely to a few fatal diseases whose evolutionary time-scale is relatively brief, e.g. in under-developed countries.

(ii) Morbidity measures

Simple measures of morbidity which might be used are: the frequency of a medical event in community or social medicine be encouraged for national policy formation and we have attempted to indicate how the first operational step towards implementing these ideas may be taken. We do not underestimate the difficulties that remain. Even the implementation of our limited first step will involve a long, sustained and heavy programme of national research. But the payoff is potentially considerable and for this reason we recommend that some group interested in the state of health with respect to particular disorders, such as the incidence (flow rate of new cases over time) and point-prevalence (stock rate at a particular time) often involve different forms of information: i.e. F. B. M. and Oldham, 1964, for example, point out that diseases with a high prevalence may have a high or low incidence combined with a (respectively) high or low case mortality. For this reason, and on the basis of our experience in other fields, we believe that the construction of morbidity indicators should be attempted.

More complicated actuarial measures require data on age-specific first diagnoses: morbidity, the probability of contracting a disease in the age interval, the probability of death (or other relevant end of risk), the probability of a newborn-born who survives to age x contracting a disease; and the expectation, or risk, of a newborn-born contracting the disease (Morgan, 1965). Such indicators can be constructed from data on the rate of occurrence of morbidity, the whereabouts of the population, and on changes in the State indicator could be adopted as a goal.

What we have proposed both in the way of conceptualisation and potential measurement may appear to be unduly abstract to coming from such a perspective. The purposes and explores the assumptions implied in the use of social indicators is made absolutely clear, the danger is that what a giant with an insatiable appetite for data for all kinds is likely to be the firstborn—and probably stillborn—offspring of the social indicators movement.

In the present state of the art

The purpose of this Appendix is to review some of the literature on health indicators and to comment on some of the relevant available data. Many of the studies to which reference will be made were not designed specifically for the construction of health indicators, but are of obvious relevance.

(a) Indicators of State-of-Health

In general it is necessary to distinguish State indicators proper, which relate to the output of the State, from indicators created by the conditions of and health service provision, which are measurements on the dimension of input. Indicators of environmental conditions, e.g. the probability of different changes in a State indicator) and 'externally' (e.g. the quality of information on the State-of-Health in a population and on changes therein, even though they may appear to do so.

Similarly indicators of health service provision, such as hospital beds or doctors per thousand of population, commonly used in e.g. annual reports of the Department of Health and Social Security and other published sources of data, are not State indicators. Although input measures have been proposed as indicators of level of health in, for example, WHO, 1957, indicators of State-of-Health need to be quite frankly input content in order that the effects on them of varying input combinations may be subsequently estimated. We also note that the State indicators considered in this section—mortality, morbidity, restriction of activity and composite measures—are indicative of the degree of ill-health rather than of the level of positive health of a population.

(i) Mortality measures

Data on mortality can be both in place and space, have been traditionally used to indicate levels of health, and form the logical starting point of such general frameworks as that of M. Frisch, 1965. However, neither comprehensive (crude and standardised death rates, expectation of life at a particular age, or the ratio of deaths over 50 years of age to deaths under 50) nor specific indicators of mortality (infant and neonatal rates, rates for infective and parasitic or the degenerative diseases) nor direct indicators of the level of the health of the living members of a population. As noted by Acheson, 1968, however, they might be more of relevance in situations where ill-health is due largely to a few fatal diseases whose evolutionary time-scale is relatively brief, e.g. in under-developed countries.

(ii) Morbidity measures

Simple measures of morbidity which might be used are: the frequency of a medical event in community or social medicine be encouraged for national policy formation and we have attempted to indicate how the first operational step towards implementing these ideas may be taken. We do not underestimate the difficulties that remain. Even the implementation of our limited first step will involve a long, sustained and heavy programme of national research. But the payoff is potentially considerable and for this reason we recommend that some group interested in the state of health with respect to particular disorders, such as the incidence (flow rate of new cases over time) and point-prevalence (stock rate at a particular time) often involve different forms of information: i.e. F. B. M. and Oldham, 1964, for example, point out that diseases with a high prevalence may have a high or low incidence combined with a (respectively) high or low case mortality. For this reason, and on the basis of our experience in other fields, we believe that the construction of morbidity indicators should be attempted.

More complicated actuarial measures require data on age-specific first diagnoses: morbidity, the probability of contracting a disease in the age interval, the probability of death (or other relevant end of risk), the probability of a newborn-born who survives to age x contracting a disease; and the expectation, or risk, of a newborn-born contracting the disease (Morgan, 1965). Such indicators can be constructed from data on the rate of occurrence of morbidity, the whereabouts of the population, and on changes in the State indicator could be adopted as a goal.

What we have proposed both in the way of conceptualisation and potential measurement may appear to be unduly abstract to coming from such a perspective. The purposes and explores the assumptions implied in the use of social indicators is made absolutely clear, the danger is that what a giant with an insatiable appetite for data for all kinds is likely to be the firstborn—and probably stillborn—offspring of the social indicators movement.

In the present state of the art

The purpose of this Appendix is to review some of the literature on health indicators and to comment on some of the relevant available data. Many of the studies to which reference will be made were not designed specifically for the construction of health indicators, but are of obvious relevance.

(a) Indicators of State-of-Health

In general it is necessary to distinguish State indicators proper, which relate to the output of the State, from indicators created by the conditions of and health service provision, which are measurements on the dimension of input.
notifications of some of the acute infectious diseases, and these are of little relevance to the overall health of the community.

In addition to the difficulties associated with the choice of morbidity measures (e.g. incidence or prevalence rates) and the coverage of the data from which these are calculated (total population or users of health facilities only) the construction of satisfactory State indicators involves the problems of selection and aggregation. That is to say, an index of morbidity measures for different disorders to be combined into a single index useful for inter-temporal and cross-section comparisons? In Holland formulation adopted by Draper, 1963, for example, the problem becomes one of selecting the values of the weights in a linear combination of age- and sex-specific morbidity measures. It is important to note that even when these weights are generated by some ostensibly neutral technical procedure, such as the regression of air pollution levels on the prevalence of a number of diseases thought to have this aetiological factor in common, at heart their selection is a policy decision (in this example the importance of air pollution, the functional form of the regression equation, and the regressor diseases to be included).

(iii) Measures of restriction of activity

The use of measures of the extent to which activity is restricted in a population, e.g. the number of days of restricted activity in a year as State indicators, is discussed by Sullivan, 1965. For example, with measures of total morbidity in the population, these indicators could be constructed from information gained from such inquiries as the Survey of Sickness in England and Wales, 1943-45, which included questions on interference with usual activities, days kept indoors etc. (Linder, 1965). Such measures would not be without ambiguity as State indicators, however, since even when or not a morbidity condition restricts activity depends partly on the occupation, marital status, personality, etc. of an individual.

Published data relating to restriction of activity are, however, the first takes the form numbers of permanent registered disabled at points of time, which do not necessarily reflect accurately the prevalence of disability in the community, mortality is to be considered. Categories eligible for registration are the only ones relevant. Taylor and Fairlie, 1968, for instance, found that although 11% of the male population of working age were registered as disabled, three-quarters of these were in fact registered. Due to the effects of degree of information available and social attitudes, moreover, this proportion is unlikely to remain constant across space and time. Secondly, for the insured population only, series are available on spells and days of certified incapacity by diagnostic category over time, and numbers incapacitated at points of time. As with data on discharges of hospital in-patients, several spells of incapacity may be accounted for by one or more persons. Furthermore, the use of such data to construct State indicators is bedevilled by the intervention of other levels of health, such as job satisfaction and unreported sickness absence.

Comprehensive measures

Many of the inadequacies in the separate use of measures of mortality, morbidity or restriction of activity as bases for the construction of State indicators arise from the inherent ambiguity as State indicators, however, since prospective (prognosticated course of, and risk of death attaching to, the disorder) and the prospective period envisaged will vary from one disorder to another. Furthermore, various component measures, moreover, are valued by reference to the expected course of the disorders suffered, rather than by recording the progress of the individuals suffering from them. Any attempt to construct State indicators on the basis of data on point or short-period morbidity of a once-for-all kind, of course, has to resort to such devices in order to encompass as many relevant factors as possible. As should be clear from Section II above, however, the use of longitudinal data would enable a more satisfactory approach to be adopted by treating disease as a state, and a target of complete immunity is decided upon (by the Department of Health and Social Security) which these individual measures may be aggregated. The resulting measure, for example, might be a function of the number of individuals in various states, the time spent in these states, and the weights attached to them. Resource allocation among different programmes (e.g. the provision of preventive measures or treatment facilities) could then be decided upon according to the estimated effect of the programmes on the measure of effectiveness. Such an approach, although it involves a more rigorous data collection and the development of individualised data schemes or linked records, would seem to be the most promising if health indicators are to be effective guides to policy.

(c) Effectiveness Indicators

Effectiveness also is frequently interpreted in terms of the extent to which the targets of the system of health provision reach specified levels. The investigation described in Nuffield Provincial Hospitals Trust, 1960, for example, evaluates the effectiveness of a programme of vaccination against diphtheria. Although the reference to such variables as the relative number of hours during which consultant cover is provided. The health problem index described by Magdeleine, 1967, is to measure the effect of devoting resources to particular diseases or aspects of health, and would therefore seem to serve as a measure of effectiveness in the sense of this paper. The arguments of the index, however, include relative length of in-patient stay, total in-patient bed-days and total out-patient visits over a period, as well as measures of mortality and restricted activity. Since the former three arguments are partly input measures, our criterion of a satisfactory indicator is vitiated. As an example of the paradoxical results of applying the health problem index, which is a function of the above mentioned arguments, we note that an increased allocation of resources to the hospital service would probably result in an increase in the index, i.e. a health problem, by virtue of the effect on in-patient bed-days and out-patient visits.

A more general approach to the problem of measuring effectiveness, or rather ineffectiveness, is taken by Packer, 1968, who adopts as a starting point a measure of ineffectiveness for the individual which is given by a weighted sum of the estimated time spent in a number of states of the health problem index, which function of the above mentioned arguments, we note that an increased allocation of resources to the hospital service would probably result in an increase in the index, i.e. a health problem, by virtue of the effect on in-patient bed-days and out-patient visits.

b) Indicators of Need-for-Health

The development of Need indicators which are functions of the current values assumed by State indicators and a set of target values of these latter is clearly contingent on the construction of satisfactory State indicators. In some contexts, the need in which the word 'need' is used comes close to having this meaning for particular aspects of health: if the proportion of females of child-bearing age who are immune to rubella is regarded as a simple State indicator, for example, and a target of complete immunity is decided upon (by the Department of Health and Social Security), the proportion of susceptible tibles is an implicit Need indicator in our sense. (Frequently, however, by 'need' may be meant the prospective (prognosticated course of, and risk of death attaching to, the disorder) and the prospective period envisaged will vary from one disorder to another. Furthermore, various component measures, moreover, are valued by reference to the expected course of the disorders suffered, rather than by recording the progress of the individuals suffering from them. Any attempt to construct State indicators on the basis of data on point or short-period morbidity of a once-for-all kind, of course, has to resort to such devices in order to encompass as many relevant factors as possible. As should be clear from Section II above, however, the use of longitudinal data would enable a more satisfactory approach to be adopted by treating disease as a state, and a target of complete immunity is decided upon (by the Department of Health and Social Security) which these individual measures may be aggregated. The resulting measure, for example, might be a function of the number of individuals in various states, the time spent in these states, and the weights attached to them. Resource allocation among different programmes (e.g. the provision of preventive measures or treatment facilities) could then be decided upon according to the estimated effect of the programmes on the measure of effectiveness. Such an approach, although it involves a more rigorous data collection and the development of individualised data schemes or linked records, would seem to be the most promising if health indicators are to be effective guides to policy.

Magdeleine's indicator of mortality is not exactly a State indicator which measures the health status of a group at a point in time or over some fixed period, since its components are partly prospective (prognosticated course of, and risk of death attaching to, the disorder) and the prospective period envisaged will vary from one disorder to another. Furthermore, various component measures, moreover, are valued by reference to the expected course of the disorders suffered, rather than by recording the progress of the individuals suffering from them. Any attempt to construct State indicators on the basis of data on point or short-period morbidity of a once-for-all kind, of course, has to resort to such devices in order to encompass as many relevant factors as possible. As should be clear from Section II above, however, the use of longitudinal data would enable a more satisfactory approach to be adopted by treating disease as a state, and a target of complete immunity is decided upon (by the Department of Health and Social Security), which these individual measures may be aggregated. The resulting measure, for example, might be a function of the number of individuals in various states, the time spent in these states, and the weights attached to them. Resource allocation among different programmes (e.g. the provision of preventive measures or treatment facilities) could then be decided upon according to the estimated effect of the programmes on the measure of effectiveness. Such an approach, although it involves a more rigorous data collection and the development of individualised data schemes or linked records, would seem to be the most promising if health indicators are to be effective guides to policy.
References


Moser, C. A. (a), 'Measuring the Quality of Life', New Society, 10th December, 1970.


