

HEALTH INDICATORS
THEIR VALUE IN CONSIDERING THE EFFECTS OF DEAFNESS

by

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(This paper does not attempt any careful referencing as its main purpose is to stimulate discussion and I apologise for any lack of acknowledgement you may detect).

Measurement of state of health, the final output of the health services, is one of the overriding problems in evaluation of the effectiveness of services. Valuation of this output is one of the central problems in the discussion of efficiency of the services. If we are to stay strictly within our discipline as economists we should be concerned exclusively with the latter. However, to do this would be to ignore many sectors in the health services because the nature of the output is obscure. In addition it is part of an economists role to distinguish the final output from intermediate outputs and inputs, and therefore to be involved in research into the measurement of the output of health services. I have possibly gone a little further than this implies and have become directly involved in developing indicators of the effects of deafness which is in effect developing state of health indicators for deafness.

The research project on Hearing Disorders, which is funded by the D.H.S.S., has among other aims been concerned to develop indicators of state of health in relation to deafness. This is the first stage of proposals for evaluative studies of selected services.

The nature of the population of deaf people is one that creates immediate difficulties for the conduct of evaluative studies. The vast majority of people who have difficulty with hearing are elderly, who probably constitute about 80% of a very rough estimated total number with hearing disorders of about 1½ million. Among the elderly deaf and increasingly among the young deaf there are also many with multiple disorders. The age of onset varies from onset at birth or before to onset in old age, which obviously creates very different problems. The aetiology of a number of categories of deafness is

largely unexplored; presbycusis is one diagnostic category, and is the name for deterioration in the ear due to ageing though the underlying causes are probably numerous, and there is also a large group of causes which are specifically labeled 'of unknown cause'.

There are two types of deafness, conductive and sensory-neural; conductive deafness may be amenable to surgical treatment and the loss of hearing from both conductive and some forms of sensory-neural deafness may be ameliorated by amplification.

Conditions causing deafness can also be directly associated with other effects in addition to loss of hearing. The most common of these are tinnitus and giddiness, with tinnitus (ringing or banging in the head) probably the most distressing of these effects. Where loss of hearing alone has consequent social effects in all aspects of life requiring auditory communication, tinnitus and giddiness can also effect sleep, concentration, ability to drive, etc.

This brief description of the background to the research is intended to indicate the complexity and relatively unexplored nature of this field. Many other areas in the health services have similar characteristics and it is therefore these areas which present the greatest challenge in the development of state of health indicators.

Before going on to discuss state of health indicators in relation to deafness I would first like to make my position clear as far as health planning is concerned. I do not support the contention that because resources are allocated in a certain fashion to different group of patients, or conditions and diseases, that this implies the existence of a state of health index common to all groups and conditions. For this to be true would require assumptions about the motivation of the people responsible for allocating resources or procuring the allocation of resources. We could assume instead that allocation of resources is based mainly on the influence of competing pressure groups or the past allocation of resources. Or we could have a crisis management model where changes in allocation of resources are made only in the face of dramatic developments such as the 'discovery' of inadequate treatment to some group or the discovery of dramatic new treatments. We may of course argue that we should allocate on the basis of a global production function based on effects of treatments measured on a common scale, but whether this is feasible or appropriate is a different matter.

I would contend that our ignorance of the causes of, let alone effective therapy for, many diseases and other conditions which afflict people, makes allocation of resources between different conditions and diseases based on outcome of therapy, measured by a single state of health index, an impossible method of planning currently. In the rest of our life-time I think this will also be the case; I see no age of enlightenment in medicine or economics for that matter. This is not to say that indices of mortality and morbidity will not provide useful indicators of health or disease trends. And in dispersing the shadows of ignorance around individual conditions or diseases there is more hope for specific state of health indices and economics.

I would like to go a little further in my arguments against a general state of health index of the sort proposed by Culyer, Lavers and Williams¹. This consists of a series of components, pain, restriction of activity, distress, etc., which are related through an underlying model of the nature of ill health and the therapeutic process. The model of the effects of ill health proposed assumes that the effects are related through some form of health function in which we can map points of indifference between various components of effect. The underlying assumption seems to be that therapy makes one worse before it makes one better. It also appears that, during therapy and possibly as a result of the effects of therapy we have to trade on component of our ill-health say pain for another, say change in degree of activity. Certainly some therapy does fit into this pattern, and I believe these are mainly for chronic conditions such as arthritis. However, for many chronic and most acute conditions I do not believe this is the case; some components of effect show an improvement and none show a decline as a result of therapy. For these conditions each component of the health index can be considered separately and independently. Could we not then use a sort of Paretian criterion for improvement, some of the components of health improve and none get worse?

More seriously, I think we can accept the position that for many conditions we do not need a mapping of points of indifference, whether or not they could be specified, but this does not help with the problem of comparison of the index between conditions and diseases.

My position is that the construction of the general health index is not feasible because it is not possible to equate the very different aspects of life that different diseases and conditions effect. Deafness, for example, is not often accompanied by any pain or by restriction in activity in a physical sense. The effects are all in areas of activity requiring the reception of sound. Though the effects of deafness on a persons life may be dramatic they are obviously very different from the effects of heart diseases or cancer. Therefore we are brought back to the problems of comparison of the effects of different conditions and diseases when the effects are not of the same kind. I cannot see this being overcome; how do you trade distress or pain for loss of communication? To say the medical profession must produce the answers is only to ignore the problem; to hope that potential or actual patients will produce the answers is wishful thinking unless we can find people who are suffering from multiple disorders who can be asked how they would trade-off the different effects! This problem has nothing to do with our ignorance of the effects of therapy and will have to be faced however enlightened we become in that direction.

We have reached a stage, in my opinion, where for comparison between conditions for which the effects are different we can only construct a health index with a nominal scaling, that is we can say things are different but not that they are better or worse. For particular conditions and in comparisons between conditions which have similar effects we can produce an index of state of health which has a ranking. We cannot, nor do I feel that we can ever produce an index of state of health for particular conditions which is cardinal. If we accept that we can only achieve at best a ranking in the scale of our indices then we must develop our models of the allocation process around this².

This brings me to the attempts I have been making to discover measures of the effects of deafness. I have mentioned the clinical effects of deafness and indicated that these have concomitant social effects. I would like to discuss these items in a little more detail and in doing so bring out the problem of creating a simple descriptor of effects which would act as a surrogate for an index of state of health resulting from deafness.

The first and obvious measures of the effect of conditions causing deafness are audiometric, the various methods of measuring loss of hearing. Two main types of measure are available, pure tone audiometry and speech audiometry. The data from these measures can be used to

produce scales of hearing loss and some of these are widely used; indices of this sort I will call primary indices.

Depending on the cause of deafness the two associated conditions, dizziness and tinnitus, mentioned previously, can occur which may have important effects on the social functioning over and above the direct effects of the loss of hearing. Both of these pose problems of measurement; neither are directly measurable and both are more or less subjective. These should be included within the primary index in some way and for the time being we have used a binary classification to indicate presence or absence of the conditions.

Deriving from the loss of hearing are handicaps in the social and work situations. It is not difficult to imagine what these might be if we think how much we use conversation in our day to day life. One deaf person suggested that "the consequences of deafness fall into three main groups: problems arising from the difficulties in following speech in normal situations (e.g. at meetings, on the telephone, in restaurants), problems stemming from disorientation which can occur from inability either to hear or perhaps decipher normal ambient sounds (e.g. for locating an object dropped, for knowing where someone is in a house or office by noise), and lastly the inability to do two things at the same time"³ (e.g. walk along the road and have a conversation at the same time).

In attempting to assess the effects I have so far concerned myself with the problems arising from the difficulties in following normal conversation. I have for the moment ignored the problem of loss of production which is in some way more straightforward but only applies to a minority of deaf people,⁴ and I have ignored so far the other two main types of difficulty described above as presenting very great problems of measurement. Indices developed as a result of examining these social effects, I will call secondary indices.

Our primary concern in our initial exploration of the problem has been to try to establish the relationship between the primary indices and associated conditions and secondary indices. We hoped that a strong relationship would exist between hearing loss and impairment of social function which would allow us to bypass audiometric measures in creating an index of the effects of deafness. Previous work indicated the following relationship between a social measure, a social hearing handicap index (S.H.I.), and an audiometric measure called the speech reception threshold (S.R.T.): "A heavy hearing impairment, can be,

but does not have to be, a condition causing heavy social handicap, and a slight hearing loss may (rarely) be experienced as a heavy social handicap".⁵

This provides a good starting point, though S.R.T. in the form used, I am told, is not very good as a reflection of loss of ability to discriminate speech and with better measures of this a closer relationship with S.H.I., or some modification of it, might be possible. We are currently testing other measures but we have not yet progressed sufficiently for any useful discussion of results. Rather I would like, in conclusion, to discuss briefly the nature of the data from which the index just discussed is constructed and the difficulties this presents.

The social hearing handicap index is constructed by scoring the answers to a series of questions on the problems of hearing in difficult situations and summing the scores over all the questions. This is of course a simple method of creating an index but it does ignore certain problems similar to those met in trying to compare different effects. Though the score is only a ranking, individual question scores are given equal weight. For example, inability to hear the television scores the same as say inability to carry on a telephone conversation. However, though weighting is arbitrary, item analysis of a similar index does indicate high correlations between total score and individual question scores⁶. This indicates that the questions are all measuring a similar thing and the index is fairly homogeneous which could be said to justify summing the individual items. If however, this scale were extended to measure other handicaps the homogeneity would be lost and equal scores could not be considered equivalent.

A final problem is whether the scale of the index is specific enough to measure change in handicap as a result of therapy. We have tried to increase range of scoring on each question in classifying responses but the scoring cannot be made consistent between scorers. We may, however, find that deaf subjects can score consistently for themselves, certainly there is some evidence that they will⁶.

These are some of the sort of problems on which I have been reflecting as a result of our attempts to develop a programme for the evaluation of health services to deaf people, but I know similar problems must confront other people involved with problems of economics in the health services.

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