

The analysis of summarized data using 'S' cards

**FROM THE RESEARCH UNIT OF THE ROYAL COLLEGE OF GENERAL
PRACTITIONERS**

THE recording of observations made in general practice must be structured if anything approaching comparability between the observations of different observers is to be achieved. It was for this reason that the Royal College of General Practitioners introduced practice registers of different kinds, a classification of diagnoses relevant to the circumstances of general practice, and methods whereby diagnoses can be recorded routinely.

The first method of recording practice data was a diagnostic index, the 'E' book, which was needed because of widespread interest by doctors in the numbers and distribution of different illnesses. This at once emphasised a difference between general and hospital practice where the range of illnesses encompassed by a technical specialty is well known and needs no further exploration.

While some were interested in incidence and prevalence of illness in terms of time and season, others required a method of data recording which would relate the illnesses experienced by a patient to his identity, to gather together his illnesses into a personal portfolio, so that they could be studied in relation to his personal, social, genetic, occupational and other characteristics. Thus summary cards were introduced.

The pace of work in general practice prevents detailed recording of routine work and the volume of data precludes manual analysis of all but the shortest and simplest studies. All methods introduced by the College were, therefore, designed so that mechanical analysis was possible. At first this took the form of the counter-sorter and the recording medium was related to the 80-column punch card used in these machines. Files of data on these cards are often acceptable as direct or indirect input to more modern computers.

An early decision was the principle that coding should be done as near the primary source of decision-making as possible. Early coding was done by observer doctors themselves and as appropriate methods were devised this duty was passed to practice research secretaries who could easily refer to the doctors for clarification of doubtful points. The intention was to avoid errors from misinterpretation by coders remote from practice.

A second principle was that data recorded by different means would be 'interchangeable' by the proper use of analytical machinery. Thus a file of diagnostic index sheets could be made into a series of individual morbidity summaries provided linkage problems were overcome.

The summary card (S card)

The summary card was designed to link episodes of illness relating to an individual by manual means. The primary data-recording sheet or card on which entries are made is therefore sized to fit the container for the patient's medical record. The current series is related to the 17.8 × 12.7 cm (7" × 5") medical record envelope. Future sheets may be international standard A4 if this is adopted by the British National Health Service.

The card contains three main recording areas, each of which may contain material in numerical code, in clear or both (figure 1).

The remaining columns

The remaining columns (22–40) are unspecified in their manner of use until decisions are made by individual doctors as to what characteristics they wish to record in relation to each person. The choice is wide, indeed unlimited as to qualities to which a code can be given.

The 18 available columns can be used, for example, to indicate year of entry to practice, race, map reference of residence, duration of residence, blood group, position in family, occupation (with date of assumption), rateable value of residence, religious denomination, known dietary idiosyncrasies and other matters in any permutation and combination that the observer wishes and space allows.

Information recorded in these columns is, however, analysable with reference to the recording practice and only exceptionally across practices, as when there has been special agreement on definitions and column allocation.

The morbidity record is contained in all columns from 41 onwards, the precise number depending on the variant of the card and the number of episodes of illness it contains. Card S4 holds 20 episodes of illness with 19 columns per episode. Card S5 has space for ten episodes, with 30 available columns as well as space for entry of the diagnosis in clear, which makes the variant popular as it provides a visual summary for service purposes.

The serial number of the episode is identified by columns 41–42 and in the succeeding nine columns the date and diagnosis are entered. These columns 43–51 are the only strictly standardized entries in this area, though other inter-practice standardizations of method can be agreed.

The use of the remaining available columns in this area is unspecified and intended to contain observations made according to pre-arranged coding plans. The S.5 card holds ten episodes of illness and allows for a change of diagnosis to be made from lesser to greater specificity. This variant also allows information on three hospital referrals in suitably coded form. The type of episode—whether a 'first' or a 'recurrence' can be indicated, as can the total number of attendances which it entailed. Alternative structures and layouts can be devised provided the principles are adhered to, as described below.

Information so entered will relate to that episode of illness. Once again there is a wide range of choices. The columns may relate to items of service occasioned by the illness, reference to hospital, investigations undertaken, outcome, residual disability, kind of treatment, response to treatment, adverse reactions, surgical procedures or any other matters which the practitioner may wish to link with the diagnosis which he has recorded.

Analysis

Standardized material

The analytical problem can be divided into two. First, are standardized data which can be examined widely across practices and which are of primarily epidemiological value. Secondly, data which relate to coding plans limited to one, or a group of practices and which are of clinical and operational value.

The standardized data include identity, age, social characteristics, date of onset of illness and diagnosis. By the design of suitable programs any permutation and combination of these may be examined from all practices using the method once their S cards have been punched. Any enquiry, the needs of which can be met by analysis of these factors, may be conducted with a suitable program and it is in this area that predesign of programs has greatest value.

The programs described below do not necessarily exist, and the present resources

of the Unit permit only slow progress towards this development. Help can be given to the designer of any research project using cards of this type, but the Unit cannot as yet undertake analyses on the scale that it would wish.

Examples might be programs to demonstrate patterns, if any, in the sequence of illnesses. Is a patient who in childhood has measles before chickenpox more or less likely to develop rheumatoid arthritis than one who has chickenpox first? The relationship between chickenpox and subsequent shingles could be further clarified.

Programs might aim at showing a seasonal occurrence where this is not immediately obvious, and at the mutual exclusiveness of epidemic illness. Ages of onset, as well as seasons of onset could be related to diagnoses right across the classification. The influence of marital status, social status and sex could, of course, be added without difficulty.

It might be possible to create, nationally, for regions or practices, a probability table relating to age groups. This would rank in order of diminishing frequency the diagnoses likely to be made for patients in predetermined age-groups—perhaps even annually. This table would represent the expectation of sickness, by type, for the locality of the practice and would be a particularly valuable baseline.

Repetition of this particular program on data accumulated year by year might demonstrate departures from the baseline for the practice and lead to search for possible causes. A practice morbidity profile may be disturbed by environmental factors in much the same way as an individual's blood profile may be altered by disease or treatment.

Definition of basic patterns of morbidity is a prerequisite to their deliberate alteration by planned preventive activity. This may be in conventional public health terms or by health education or environmental manipulation. Preventive activity might be determined by observed abnormalities in local sickness patterns and its nature more precisely defined by *ad hoc* studies, for predetermined periods, using the unstandardized areas of the summary card described below.

Unstandardized material

Although data recorded in these areas were originally intended to be defined by the observers according to their interests, full use has seldom been made of the facility. Two or three major practice studies have used the available capacity to the full, Central standardization could, therefore, be extended into areas of present unstandardized, if desired.

One example, of many possibilities, might be adoption of the card as the data recording medium in a network of, say, 50 practices, for whom baseline profiles would be worked out in the first year. Space in the individual characteristics area would be allocated to place of residence, duration of residence and exposure to a predetermined range of codable environmental qualities. These would be definable in non-medical terms and would be agreed with scientists in other disciplines concerned with the effects of pollution on the environment and on human health.

A suitable plan for updating, punching and entering accumulating information could be applied by the organising centre and selective retrieval might give the first indication of changes in morbidity pattern, perhaps relatable in time to a newly occurring environmental or social factor.

An efficient central unit would be needed to handle material from single practices and practice groups the members of which had agreed a policy for use of unstandardized areas in the S card.

The number of possible uses to which the complete cards might be put is such as to make prediction of program requirements a task for the Delphic Oracle. Some

existing programs may be directly applicable to material collected in standardized fashion. Whether these can be extended or whether new programs are required to deal with data in the unstandardized area is a matter for discussion.

Future possibilities

The S card principle has already been extended to the study of family patterns of morbidity by design of the F card. A program capable of identifying members of a family among unsorted S cards could synthesize this for those wishing to do family studies.

The principle of the card could be adapted to the clinical study of diseases. A disease would be selected and a card of a different colour and appropriate design made out. One data recording area would contain personal characteristics and symptoms, signs and coded evidence present at the first attendance.

Subsequent entries would be related to progress and treatment, each horizontal column relating to an attendance, or a day of the illness, according to the requirements of the study. This principle is capable of development both for short-term illness such as influenza or tonsillitis or for chronic disease. In either case a coded picture of the course of the illness or its natural history under treatment would become available.

The card might be adapted as a vehicle for recording the existence of problems in relation to the patient, and to the disease, on the lines suggested by Weed.

It has been suggested that the card be modified for use in veterinary practice, the denominator being the farm, its characteristics being recorded in coded fashion and serial outbreaks of disease replacing serial episodes of illness.

ADDENDUM

Requests for reprints should be addressed to: The Research Unit of the Royal College of General Practitioners, c/o Birmingham Regional Hospital Board, 146 Hagley Road, Birmingham B16 9PA.

DISTRIBUTION OF GENERAL PRACTITIONERS

The study investigated patterns of mobility and settlement among general practitioners in England and examined the effect of the designated area allowance, first introduced in 1966, on the distribution of family doctors. The response rate was 85 per cent; the total number in the survey was 1,721.

The majority of respondents had changed practices at least once during their careers as general practitioners. The assumption that the designated areas are professionally deprived and socially depressed was found wanting. It is estimated that the designated area allowance was paid to about 800 principals in England in 1968 with personal lists below 2,500 and automatically withheld from about 5,000 principals with lists above this size who were in non-designated areas.

Butler, J. R., Bevan, J. N. & Taylor, R. C. (1971). The Distribution of General Practitioners in England. Paper read at XV Annual Meeting Society for Social Medicine.

TRAFFIC ACCIDENTS IN GREAT BRITAIN

Traffic accidents in Great Britain in 1970 killed 7,501 people; 93,499 received serious injuries.