Discussion : Medical microbiology

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Dr Stirland has described an impressive system of laboratory file handling in which the results are encoded with great economy on a single punch card after the report has been issued to the ward. He has also shown us briefly what computer file handling can do for bacteriology in the way of analysis of data and quality control. If one is going to go to all the trouble of putting reported data on to punch cards it would seem logical to save clerical time by encoding results when they are initially recorded and then printing out reports with the aid of a computer. This is the essence of the system we are developing in Birmingham alongside Professor Whitehead's laboratory and this system is designed to be compatible with the data handling adopted for the rest of the United Birmingham Hospitals.

Bacteriological data present a coding problem quite different from biochemistry in that a large part of the data is non-numeric and we decided that we were unable to handle it satisfactorily on a single punch card in the way Dr Stirland has done. We have therefore developed a number of cards which accompany specimens and are used as work cards by the technicians and on which findings are recorded in code. When work has been completed the work cards are returned to the office and the coded results punched into appropriate cards. Punched cards are then taken to the computer and the program used decodes the data and yields conventional verbal reports printed on the line printer which are distributed to the wards. At the same time the data are transferred to disc and are available for further analysis. The system was demonstrated at the October 1968 meeting of the Society for Applied Bacteriology and an account will be published shortly with the proceedings of that meeting.

First, patients are registered and from the registration data a card known as 6REQ is completed which contains a summary of patient data used for identification purposes throughout the hospital. These data are readily duplicated on to other cards, of which at the moment a bacteriology request card is one, though we are working on a combined request form for several laboratories. If the clinician wishes to submit a specimen for bacteriological examination, one of the request forms supplied for the patient is taken, filled in, and submitted to

the laboratory with the specimen. The laboratory mechanically duplicates the patient data on to two cards, one of which is the work card, which accompanies the specimen to the bench; the other, the card into which the results of laboratory work will be punched, remains in the office until required. A day book entry is made simultaneously by using a linked typewriter. Five different first work cards (BACT 1-5) are used.

The laboratory work card is ruled into a large number of columns. Columns 3 to 28 consist of the basic 6 REQ data contained in the request form, and columns 29 to 40 data which will be derived from that information added on the ward when the request card is completed. Columns 43 to 63 are used for encoding observations made from macroscopic and microscopic examination of the specimen, columns 64 to 70 for the initial results of the culture, and column 70 for specifically indicating the number of organisms that the technician is going to culture further. For each organism he will take a separate card. Column 71 is to indicate if a manually written comment is to be added to the report. Columns 73 to 80 are the laboratory number, which is added to the card when the specimen is received, and which will be the only link between the first card and subsequent cards. If no significant growth is obtained, the card goes to the office and the data recorded on it are punched into the BACT 1/5 card that has been retained in the office. This card is then transmitted with other completed cards to the computer for the report to be printed.

Should bacterial growth be obtained a separate card, BACT 6 or 7, is taken for each organism to be worked on. This is treated in the same way as the initial work card. Outline layout, columns 4 to 44, deal with identification tests which are not transmitted to the wards, but are stored by the computer. Columns 45 to 47 identify the organism by a numeric code, column 49 signifies whether the organism has been kept. Columns 50 to 70 are available for antibiotic sensitivity results, column 71 again indicates the need for written comment and columns 73 to 80 are the linking laboratory number. The office then punches data into BACT 6/7 card and all the cards from the same specimen then go to the computer for a report to be produced and transmission onwards.

This system, while in some ways cumbersome, has several good features. Notably, that individual work cards are more convenient in bacteriology than work sheets for multiple specimens, that coding is done at the bench by technicians, and that there is quite considerable flexibility. It would be improved if the technicians actually punched the cards at the bench but this is at the moment impracticable.