TALKING POINT

"Batch" or "on-line" for child health—a review

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The report of the New Charter Working Group¹ showed that general practitioners have joined most other medical groups in recognising that computer systems will become the principal form of medical record keeping in the future. The debate is, therefore, not whether computers should be used but which type of system is the most appropriate to child care—"batch" processing or "on-line." There have been many articles in the press on the subject. Some have given helpful accurate information but many have contained half truths and emotive statements which have misled medical and lay readers.

The essential difference between the two systems is that with batch processing written information is sent to a central service for conversion to computer language for processing, whereas with on-line systems each user enters and retrieves the information using his or her own keyboard and visual display unit. As examples of the two systems I have chosen the Scottish neonatal record batch process system and the Exeter on-line project.

Scottish batch process

The purpose of the two systems is broadly the same—that is, to facilitate the accurate recording and retrieval of medical information. But they differ in several important respects. The batch process system, which has been proposed by the DHSS for the child health computing programme, is designed primarily to help in the efficient care of every child from birth. But it is also intended to record a large amount of medical information not only for the benefit of the patient and his attendants but also for the management of community health programmes, for the study of epidemiological trends, and even for a limited amount of clinical research. It has been described as "a remote, centralised, bureaucrat-controlled, administrator-oriented system"²—"a monster of a computer."³ It is centralised in the sense that the doctor, having checked the original record, is then relieved of further work by area computer personnel. But on the other hand, the Scottish neonatal batch processing system,⁴ almost 10 years old, was originally designed and organised by and for the paediatric doctors and nurses who completed the records on behalf of their paediatric patients, in close co-operation with computer and administrative colleagues. On discharge copies of the baby's records are sent to the appropriate community child health doctors and to the general practitioners, some of whom in the Grampian and Tayside areas of Scotland now take part in this programme. There is no reason why there should not be similar successful co-operation in the Child Health Computing Committee's system.

Computer batch processing has been used for clinical purposes for almost 20 years to the benefit of patients and doctors. The sharing of stored information assumes a premise not acceptable to all—that is, that most information about a patient should be available to all those who are concerned with the care of that patient at the time. What has not been made clear is that any confidential details which the patient or doctor

wishes to withhold from the computer need not be recorded. Such information should be carefully selected and exchanged on a person-to-person basis as it is now—that is, by letter or telephone between health professionals. To obviate statistical error which might arise from the absence of these data a marker can be added to the computer input to show that the record is in some unknown respect incomplete. A personal request for this information can be made—and refused if the holder of it or the patient so chooses.

Exeter on-line system

The Exeter type of on-line system, which is supported by the BMA, provides, at least at present, a one-practice, one-file input and recall, the users in this instance being GPs. A big selling point of this system is that access to the information is controlled by doctors and so the system is more secure. This feature has, I believe, been overplayed. The information stored by the Exeter programme can be made available to other members of the profession but at present the users intend to restrict its availability. The reason for this policy was given by an Exeter doctor who said, "Hospital security is not good enough so we don't let consultants use our system. We don't even give health visitors or district nurses access to it."² Since this statement was made, however, limited access has been made available to nurses in some practices, but information is not available to the other services caring for the children of that practice, as it would be in the batch process system. Indeed, I understand that different doctors have different restrictions as to who has access and most now share at least some data with medical and nursing colleagues. Hospital record-keeping methods should undoubtedly be improved and new codes of practice are now under discussion. Perhaps when these are agreed and operating the Exeter doctors will permit hospital and community staff access to their computer files.

Furthermore, it is a fallacy to think that the storage method in the Exeter system makes batch processing impossible. It can and is being done successfully within the confines of the single practice and could be extended by linking individual GPs' files.

Can such a system be justified when the information is not freely shared with others caring for the patient? If GPs undertook the total preventive and curative care of every child then a personal on-line system would suffice. But so much child care takes place in hospital and in the community that the chosen system must be the one which includes all services. Several reports (including the Court Report⁵) have pointed out the difficulties of a tripartite system in which information is not shared. It is unclear whether or not the BMA envisages two separate computer systems—one for primary care and another for hospital and community care. Two systems would double the expense but—more importantly—would perpetuate the division between branches of the Health Service which recent integration exercises have tried hard to eliminate. A big advantage of the batch process is that it does help to integrate the three branches of the Service as could the on-line system if permitted to do the work of which it is capable.

In terms of their potential for sharing information, for batching data for analysis, and for programming care these two systems are almost identical. The difference lies in the use to which each is being put.

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Accuracy

The batch process system is claimed to be less accurate than the on-line. Experience has shown that almost all the errors in the former are made at the clinical end of the process. Transcription of data from a clinical record to a computer input document is a potential source of error. This can be reduced significantly by using well designed documents and even further when medical and nursing staff either check or complete the input document themselves. Validity checks are written into all batch processing computer programmes. Specific tests of accuracy have been in operation for many years in the Scottish programme and similar tests are planned for the Child Health Computing Committee's programme.

Errors are less likely in an on-line system in which the programme asks preset questions, but any additional free data added by the user has the same chance of error as any other type of entry. If, however, the operator sees his entry before it goes into store the errors are further reduced. Much of the Exeter system uses these accuracy safeguards and the error rate is said to be low.

Confidentiality and security

These terms confidentiality and security have caused confusion since they are often used synonymously in error. In the present context confidentiality is used when considering the sharing or withholding of information among professionals looking after a patient—that is, between doctors, nurses, medical administrators, social workers. Security means the physical safety of information in respect to loss, damage, or access by unauthorised personnel. Knowledge as to how medical batch processing might threaten privacy of information concerning the individual has been collected for almost 20 years and steps have been taken to reduce the risks of breach of confidence to a minimum.

The confidentiality of the two systems is similar in that sensitive information can be withheld from either. By confiding in the doctor the patient or parent shows a willingness to share personal and private information and they should be told if it is intended to process this by computer. It is then up to both parties to decide what should be withheld. In this way the patient's right of privacy, defined by Miller and quoted in the report of the Data Protection Committee as "the individual's ability to control the circulation of information relating to him," is upheld.^{5a} An example of one way of ensuring that the GP receives information withheld from the neonatal discharge record of the Child Health Computing Committee's programme is to add this by hand to the top copy going to the child's doctor. No one else will have access to that data. The rest can then be shared freely. In the on-line system sensitive data can be secured by a system of codes whereby those having access to the keyboard have limited retrieval according to their position in the health care team.

After developmental assessment during the preschool years the same procedure can be adopted but this type of information would rarely be regarded as highly sensitive. The success of either programme depends, therefore, on the willingness of the person doing the assessment to put the results into the system. It is disappointing that in their section on "surveillance" the RCGP interim paper¹⁰ makes no reference to children—for example, immunisation and developmental screening. Hopefully this will be included in the final version.

It is mainly on the security of the system that the batch process has been challenged and where misleading information has been circulated. In batch processing more people handle the data either in the form of written narrative or as computer print-out than in the on-line system, but the security risks of the former have been exaggerated. A *BMJ* article⁶ portrayed the two systems pictorially, making out that there were numerous places where unauthorised personnel could "steal" information from the batch system, so it seems appropriate to consider the Scottish batch process in more detail.⁴

The named, identifiable, computer input documents are like any hospital case record handled at ward level. On completion, copies are placed in sealed containers and transported by hospital service van or mailed in Envopak by recorded delivery to the computer centre. Other copies are sent, like any hospital letter, to the GP and to the community child health office for distribution to the appropriate community clinic. At the computer centre the information is converted to computer language and from then on the data are

unintelligible. The computers are guarded by personnel by day and by alarm systems at night, the tapes and discs are stored in burglar and fireproof safes, access to which is difficult. The discs containing patients' names can be different from those on which medical information is stored, with matching done by a few authorised individuals. The only information on the disc is that contained from "punching" (translating) the record, and for a print-out of this to be intelligible it is necessary to read it with an interpretative (decoding) programme. All routine print-out data are unidentifiable and only with the approval of the doctor putting in the data and with a double check (a senior information services division medical officer and the doctor in charge of the medical aspects of the programme) does the computer manager permit the printing of identifiable data. The annual statistics sent to all participants contain no identifiable data, but this is available on request, as it should be, by the doctor who contributed the data or by others strictly in accordance with the principles already approved by the former Minister of Health in the House of Commons, by the BMA, and by the Child Health Computing Committee.⁷

Safeguards and sanctions

Is it really believed, as suggested in the *BMJ*'s paper, that van drivers are a security threat, especially when they can be disciplined, including dismissal, for breaking the code of practice? The only likely person to break the security code would be the coding clerk who reads the document while converting it into computer language. He or she is also covered by a code of practice and many are required to sign documents relating to secrecy. In Exeter, in contrast, a person wanting access to the GP file only needs to know the practitioner's personal code number or password and access to the file is achieved and visual or print-out data are available. This would seem easier than the almost impossible access by an outsider to the computer holding batch data described above. The chance of unauthorised knowledge of these code numbers is, apparently, remote.

Identifiable information transported from the computer centre elsewhere is probably at less risk than are the thousands of documents despatched around the country by various means. Recommendations concerning this aspect of record security are included in the report of the Data Protection Committee,⁸ to which the Child Health Computing Committee's programme will adhere. To allay the BMA's fears it has been agreed to recommend in the child health programme that information on patients emanating from the computer centre will be identified by code number only, that the names appropriate to these numbers will be transferred separately, and that the two will be matched by the recipient. This diminishes the risk of unauthorised access but I wonder who would be likely to want to read the data just before it leaves the computer centre or in transit. The disadvantages of this extra step are the time-consuming matching process of name and numbered data by the recipient clinic clerk, nurse, or doctor—a potential source of error and the possible interposition of another person who handles the child's record unnecessarily. If this approach was taken to its logical conclusion then all medical information transferred by the NHS or public postal services should stop unless it was in unidentifiable form—an extraordinary concept.

The *BMJ* article⁶ makes a point about the security dangers of print-out copy, but print-out equipment is also used with the on-line method. Any computer system must have the capacity to print out data and therefore the Exeter system is equally open to misuse—possibly more so since there are one or two printers required in each health centre, whereas there is only one central printer per area in the Child Health Computing Committee's system. There are, therefore, printed data, prescriptions, letters, and a microfiche register in the doctor's office, all potential sources of information for the determined "thief," though these may become less necessary as the system is extended. Meanwhile, however, the on-line system does not diminish the need for security locally. In its informative paper offering interim advice on the use of computers in general practice, the RCGP Computer Working Party recognises that lay secretaries and technical "experts" will be required and that their "respect for patient confidentiality" will have to be assured.¹⁰

The on-line system certainly avoids the need for this transfer of print-out material. But if the computer is the only store of information and the members of a group practice are the only people to know the key for access then anyone else seeing the patient—an agency deputy or others of the medical care team—will be ignorant of preceding events—something about which the British public are becoming most vociferous. Other doctors and nurses, however, do now have

limited access so this is not quite as private a system as it might seem at first sight. Provided the numbers are small then the sharing of on-line entry codes among these doctors is relatively safe. It is not unusual nowadays for one doctor to be on call for two or even three group practices and this would necessitate the sharing of entry codes of six or eight doctors, at which point the security of the system might be in jeopardy.

Any determined and skilful thief could find ways of organising access to data held on any form of computer, just as they could to records in the doctor's surgery or hospital. In practice, however, there has been no recorded case of computer invasion in the NHS during the 20 or so years that medical information has been stored in this way. That does not mean we can be complacent. In some important respects, however, the batch process data being run by a few staff in a single central operation are more secure than the on-line data controlled by hundreds of users.

Cost

These days cost is an important factor in deciding which system is appropriate. The DHSS shows interest in the future of the on-line as it has allocated a further £394 100 to the Exeter project to cover the next three and a half years, but it thinks that the on-line system is still too expensive for universal application. In terms of hardware and resources it is economically impossible to site visual display units in every doctor's office, outpatient room, ward, and community clinic in the country, and provide numerous dedicated computer units and the technical services essential for their maintenance. That is what a comprehensive on-line system would require if all those caring for the children were to have access to data relevant to their management.

It has been argued that the NHS computer equipment suggested for use with the child health programme is already out of date. It is accepted that in time NHS computers will require replacement but this is an expense which must be met since there are many other purposes to which they are put in addition to patient data collection. The adoption of the on-line scheme would, therefore, be additional expense, whereas the Child Health Computing Committee's programme is suited for use with existing and future NHS hardware.

Conclusion

Probably the strongest argument for adopting the batch process system is that it has been designed specifically for children and is virtually ready for use now. In many areas programmes have been running successfully for years to the benefit of patients and doctors. Around 60 AHAs already use the vaccination and immunisation module of the child health system and many GPs take part; for example, in Scotland they participate in the neonatal discharge and developmental screening computer programmes. While more doctors are slowly adopting the Exeter system, after four years it still covers only two practices and 11 doctors with partial participation of others. Could this be an indication that not all doctors in the NHS will be prepared to learn and spend time working a keyboard? If this rate of expansion in Exeter is anything to go by it will take many years for GPs to accept the system and many more for GPs, hospital and community doctors, and nurses to learn its use. The Exeter experiment is encouraging but there is no experience yet of the difficulties of extending it to multiple participation. What, for example, will happen when a GP chooses not to participate, which he is entitled to do as an independent contractor with the NHS? If the children of that practice are excluded from the programme who will ensure that they receive appropriate care?

On the other hand, a truly comprehensive on-line system has great merit. It does not require coding clerks, it needs little transport or mailing of information, it is possibly more accurate, and marginally more secure. Surely the sensible solution is to proceed with the Child Health Computing Committee's system, which is ready for operation now, and

steadily pursue the expansion of the on-line method at the same time. The two systems can work in parallel. Much of the hardware and operation are common to both. In this way the advantages of batch processing will not be lost and those of the on-line system will gradually become available. In this way it is practically and economically possible to get the best of both worlds without delaying the improvements in child care which the child health computer scheme offers today.

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Senior Hospital Staffs Conference

On administration and finance the conference . . .

- wanted all contracts and related moneys for senior hospital staff to be held at regional level.
- welcomed the evidence in the Government's paper on future expenditure that provision for the NHS would not be subject to further cuts.
- called for health authorities to have early discussions with the consultant staff where cuts in clinical services were unavoidable.
- wanted maximum publicity given to the reasons for expenditure cuts.
- proposed additional central funding for identifiable national centres, such as the Stoke Mandeville Spinal Unit.
- called for the present extra two statutory bank holidays—described as disruptive to patient care—to be incorporated into the annual leave of NHS staff.