

## *Helping the pharmacist—an idea from general practice*

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As doctors we are familiar enough with the National Health Service prescription. In general practice the EC10 is one of our most commonly used written documents. Most patients who consult us directly and many who have only used the telephone obtain prescriptions on these thin pieces of white paper.

The cost of National Health Service prescriptions has risen at a rate of approximately 100 per cent every ten years since the start of the Service in 1948. The total cost for England alone in 1972 was £210,000,000.

Although the details written on prescriptions are not always as legible as they should be, the pharmacist mercifully works to a high standard as interpreter and scrutineer, checking against many of the more dangerous errors. The details he reads show items and units of items which he translates into goods. Then the goods are replenished on the shelf through the wholesaler, and the prescription costs honoured through the pricing bureau.

### **Items and units**

Quite apart from the ever rising cost of medication, other progressive changes have been taking place in the pattern of dispensing during the past 30 years. Noteworthy are the fall in the number of private prescriptions and a steady reduction in the proportion of retail output which has to be prepared on the premises. The vast majority of preparations are now prepared in pre-packaged form or in dispensing packs from which the retail chemist has only to count his units.

The changes in presentation and in packaging methods have undoubtedly saved the pharmacist much time and energy albeit at the expense of under-using his special skills. He must still replenish his stock of items and units and supervise turnover, delivery delay and shelf life. He is also responsible for sorting, sub-sorting, ordering and tallying prescription forms before forwarding them to the pricing bureau.

Is it now possible to relieve the pharmacist and his trade associates in the pharmaceutical industry of much of their clerical burden by automated methods? The answer is undoubtedly yes.

### **The present system**

The interlocking cycles of item and unit data generated by the EC 10 can be represented by the following diagram.

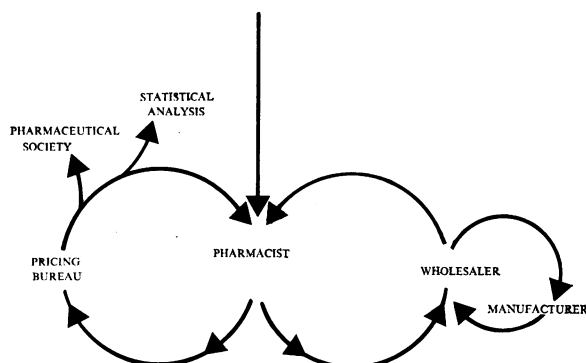


FIGURE 1

ORGANISATIONS INVOLVED WITH EC 10 PRESCRIPTIONS

In the sequence of transactions much labour is spent on manual processes. The pharmacist has to add to the EC 10 his branch stamp, the number of items on the form and the pack size from which he has dispensed. The pack size dictates the price he receives from the pricing bureau, and he has a duty to order the correct size pack to conform with a six-week turnover in the item concerned.

The pharmacist is required to submit his prescriptions to the pricing bureau preclassified by type of prescriber, whether or not the patient is exempt from payment, the executive council, the doctor's name and the month. In a small shop the sorting of forms may take about ten hours per month.

Retail pharmacists reorder stock much more often than most other types of retail trades. The local wholesaler is faced with meeting this myriad of demands, billing them and reordering his own wholesale stock.

The prescription forms are sent from the retail chemist each month to the pricing bureau where all item and unit data are priced point by point, totalled and all other necessary deductions and additions incorporated. The resulting figures are passed back to the executive council for reimbursement of the retail chemist. The Pharmaceutical Society maintains surveillance of the pricing process by instigating checks of test batches of forms. Finally statistics are extracted which reflect prescribing habits for individual doctors and national and regional patterns.

### New electronic aids

#### *Rapid counter*

There are two new developments in electronics which can be used to 'capture' the data about items and units and enable a computer to provide nearly all the tally, calculation and listing required for the working of the cycles in figure 1. Both machines work in the principle of sensing and registering the interruption of light rays by interference.

The units can be counted and registered by a solid state counter such as that manufactured by Kirby Lester.<sup>1</sup> This is a rapid counter for tablets or capsules which has 16 parallel sensors. Tablets poured into the throat of the counter divide into 16 channels and fall past the sensors on to a tray ready for packaging. The total number of tablets which has been counted is registered in figures.

#### *Light pen and bar-code system*

The item identification is conveniently undertaken by the light pen and bar-code system developed by Plessey.<sup>2</sup> In this system a succession of short parallel lines is printed on a strip of paper. The parallel lines are of two different thicknesses and therefore may be used to represent binary information.

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FIGURE 2  
SPECIMEN BAR CODE

A third width of line may be used to subdivide the total signal into areas. The signal is read by sweeping a light source across the series of lines and reading the interruption to reflection caused by the dark stroke of each line. The signal is transmitted to a magnetic tape on cassette, and this tape is subsequently processed as one of a batch by a computer. The ordering and grouping of a succession of unique numbers is thus achieved by a relatively cheap input device, and the system is able to use 'batch mode' and thus economise in processing costs.

### New system

I suggest that these two machines be combined and that the tablet counter be enabled to record its total on the cassette, side by side with the bar codes. The addition of command keys to the combination is also required to lodge additional points of information and instructions on the tape.

The counter assistant in the shop would now receive the prescription from the patient and allocate a serial number to the prescription form by sticking a bar code label on it.

The doctor's prescribing number also appears in bar code on the prescription form. These two code numbers will be registered when the final touch button is pressed to signify the end of data entry for that particular prescription form. The pharmacist selects the items one by one according to each entry on the form. As he does so he uses the tablet counter not only to count the tablets, but also to register the total on the tape when he presses the item button. As he presses the item button he also holds a bar code printed on the outside of the pack of the drug he is using against the electronic eye. This code number registers drug identity, strength, and pack size simultaneously. The chemist thus records:

(1) *Doctor's number bar code.* This translates into the doctor's name, address and prescribing status.

(2) *The serial number* which is given by the counter staff to the prescription form. This is important for matching the paper prescription form with the tape record during later cross checks. The serial number may also incorporate information to show differences in exemption status of the patient for payment of prescription charges, and the identity of the executive council.

The same serial number in numeric form may conveniently be issued to the patient on a strip of paper at the time that the counter assistant first receives the prescription from the patient. At the same time a duplicate of this strip should be retained by the counter assistant and inscribed clearly with the patient's name and address to be attached later as a label to the outside of the paper bag in which the drugs are parcelled ready for collection by the patient.

(3) *The units* registered by the tablet counter for each item. If an original pack is used instead of the counter then one item is registered.

(4) *The items*, their nature, strength, and pack size.

(5) *The chemist's identity.* The cassette contains unique information and is labelled with the chemist's name, address, and date.

### Advantages

#### *Pay off and spin off*

It has been said that computers do for the human mind what the industrial revolution did for human muscle—they help to spare the human being repetitive and unimaginative drudgery. How does the new system save clerical effort?

(1) The pharmacist no longer has to add his branch stamp, pack size and number of items to the prescription form. He therefore makes no clerical contribution to the form unless, acting on behalf of the doctor, he has to alter an item.

(2) The pharmacist no longer has to sort, subsort, order and tally the prescription forms when they are returned for pricing since the details by which various categories of prescription differ have been registered on the tape alongside the items and units, and are sorted by the computer. The categorising details are the patient's exemption status and executive council (serial number bar code), and doctor's identity and prescribing status (doctor's bar code).

(3) With a frequency which is determined by the needs of stock replenishment, the cassettes are submitted to the local wholesaler. The wholesaler uses a machine which reads the tapes, amasses totals of items and units and after reference to the retailer's reserve, turnover, optimal pack size and the shelf life of the stock in question, lists the quantity and pack of the fresh supply to be allocated for delivery to the retailer.

(4) The wholesaler's data machine also invoices the items listed for delivery to the retailer, and keeps the accounts relating to them.

(5) The wholesaler's own stock control is maintained by an extension of the same system. Here the calculations will take into account not simply a set pattern of stock by which supplies from manufacturers are re-ordered, but in addition the turnover, trends in turnover, delivery time and shelf life of the stock items.

(6) At this stage the cassettes are forwarded with the bundle of prescription forms to the pricing bureau. Here all pricing is done by computer directly from the cassette information.

Although it need only be simple and rapidly accomplished, a manual check procedure is necessary at this point in order to prevent fraud. The number of units and two check letters from the name of the item if typed on a keyboard could be matched automatically against the cassette data. Further developments may well prove that this type of check procedure can be automated in future.

(7) The double check on test batches of prescription forms by the Pharmaceutical Society will be rendered unnecessary.

(8) Statistical analysis of prescribing habits and drug use would be automated and rapidly available.

(9) Speedier and more accurate and detailed information will be the basis for more effective control of drugs and their cost.

Doctors would value as a guideline an analysis of their prescribing costs by categories such as antibiotics, analgesics, antirheumatics compared with the national and regional figures. The Government would have much more accurate and up-to-date information with which to negotiate with manufacturers.

Since replenishment of retail pharmaceutical supplies would be matched against the number of items specified on prescription, a measure of control would be introduced at the retail level. It would become more difficult, for instance, to sell hypnotics over the counter as the supplies needed would have to be obtained by an emergency requisition.

Do we possess in a system of this kind a way of supervising more closely the processes of drug supply and drug expenditure?

#### REFERENCES

Kirby Lester Electronics Ltd. KL7 Electronic Tablet/Capsule Counter  
Plessey Telecommunications. The Plessey 'Library Pen' Data Systems Division.

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THE NORTHERN IRELAND COUNCIL FOR POSTGRADUATE MEDICAL EDUCATION

### **General Practitioners' General Course**

A one week general course for general practitioners will be held from 20–24 May 1974. One day each will be spent in the Belfast City Hospital, Royal Victoria Hospital, Belfast, Ulster Hospital, Dundonald, Craigavon Hospital, Craigavon and the Health Centre, Ballyclare.

The programme will include lecture/discussions, clinical presentations and symposia.

Approved as under Section 63 for postgraduate training and seniority purposes.

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