

## *Radio-paging services*

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**SUMMARY.** This report is a description of the development and organisation of an area radio paging service in Cambridge and its application to doctors and para-medical staff working in various hospitals and in the community. It reviews the first five years of operation.

Personal selective radio paging has some fundamental advantages over the car radio-telephone as a means of communication. Currently, the service operates only in the Cambridge area, but it is planned to extend this to cover the new county of Cambridgeshire by February 1975, and, at the same time, to introduce speech.

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### Introduction

Radio paging means calling people by a pocket 'bleeper.' It is a common method of contacting individuals or groups of people within buildings, but it is only relatively recently that equipment has been available in the United Kingdom to make long-range radio paging a possibility.

Cambridge Medical Answering Services Limited (C.M.A.S.) was formed in 1968 to explore the place of area radio-paging in a medical community and it was the first organisation of its kind to be issued with a licence for this by the Post Office. It was developed by a Committee of Management consisting of doctors representing general practitioners, hospital consultants, and the professors of biochemistry and surgery of the University of Cambridge.

The pocket paging units were developed by Messrs PYE Telecommunications Limited to specifications laid down by the Home Office as for calling rural firemen and lifeboatmen in emergencies. The dimensions of the units are  $12.7 \times 6.3 \times 2.5$  cms. ( $5'' \times 2'' \times 1''$ ) and weigh 227 g. (8oz.) They are powered by nine volt re-chargeable batteries with a life of 30 hours. Each radio-paging unit is selectively operated, i.e. it responds only to its own signal (or tone) determined by the control operator. The system operates on a very high frequency (VHF) in the 161 MHz band. The range of reception is 15 to 20 miles. The area, being mainly flat, is very favourable for radio transmission.

Radio paging has fundamental advantages over the car radio telephone for the following reasons:

- (1) Radio telephones are usually mounted in a vehicle and the person cannot be reached when away from it. Portable radio telephones have a limited range of transmission and are bulky pieces of equipment.
- (2) Radio telephones often operate on a frequency shared by non-medical persons and, as outgoing messages are heard by *all* mobiles, there is a real problem of loss of confidentiality. Furthermore, it is necessary to listen to the radio the whole time in order not to miss one's individual call sign unless the radio is fitted with a selective calling device, which is an added expense.

The radio paging units are small and easily carried in a pocket or handbag and, being silent until 'bleeped', they do not impose themselves on the carrier in an unacceptable manner. As there is no voice communication, there can be no danger of a loss of confidentiality. An obvious disadvantage, which has not proved to be any great inconvenience, is the necessity to telephone the control operator for the message. Despite the dearth of public telephones in rural areas and vandalised telephones and parking problems in the city, the average delay between the 'bleep' and the telephone call back is  $2\frac{1}{2}$  minutes.

### Organisation

The arrangement is simple. A 25-watt transmitter with a 30 metre (100ft.) aerial array is placed on high ground outside the city and general post office (GPO) landlines connect this to a remote

control encoder in one of the operator's houses. Further landlines connect this to the house of a second operator who lives about two miles away. The service works from 08.00 to 23.00 hours throughout the year. Two additional part-time operators are employed and they take over the service for a few hours in either of the two houses. All the operators are state registered nurses.

### Costs

The instruments are rented at an annual charge of £100 a year (plus eight per cent value added tax) and this sum includes licensing, insurance, and free maintenance. Spare instruments are held by the operators and are available for short-term loan (e.g. a day or a weekend) for members who do not wish to hire a paging unit continuously for a year. Some general practitioners only use the organisation as a telephone answering service. Messages are then held by the operator and the doctor telephones back at intervals for these. The charge for this service is £46 per year (plus eight per cent VAT).

### Users

Once the reliability of the equipment had been proven, the application of the system to medical and para-medical personnel working in the three branches of the National Health Service quickly became apparent. Those who now use the service are shown in figure 1.

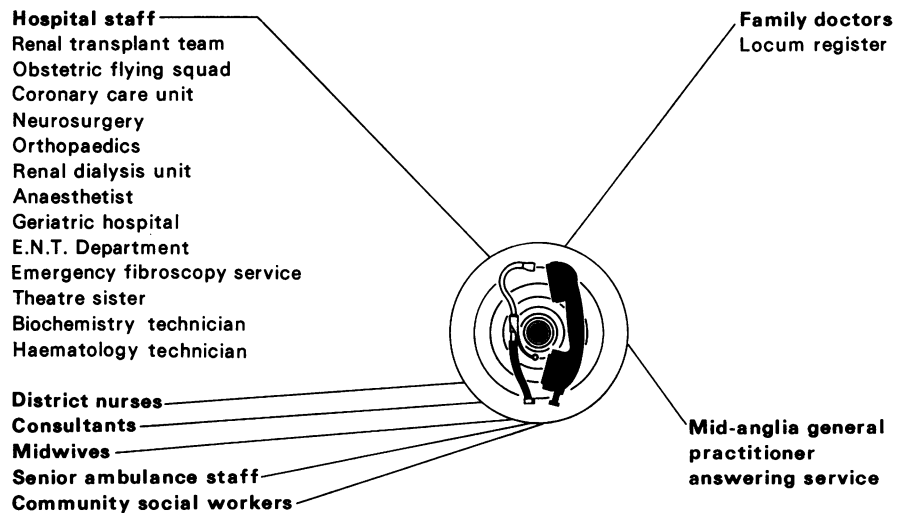


Figure 1  
Links with the radio-paging service.

#### 1 General practitioners

The service provides a series of links in a communication chain that permits general practitioners to put their telephones through to the operator on duty after surgery hours, at weekends and in the evenings, thereby allowing the doctors and their wives the freedom of not being tied to a telephone. The doctor's telephone is put through to the service by one of several methods which includes both subscriber and GPO operator-controlled transfer systems, GPO operator interception and by various types of telephone-answering machines. Therefore patients speak directly to the operator who assesses the degree of urgency of a call.

During the day the general practitioner may be out on his rounds and can be 'bleeped' for a late call which, though not medically urgent, may save an irritating journey back to an area already visited. It is usual for a partnership of doctors to hire only one instrument which is carried by the doctor on duty for the day.

An analysis by questionnaire of 250 consecutive 'bleeps' showed that the general practitioners considered that 25 per cent of the calls were either urgent or moderately urgent and that in 65 per cent there was a saving of time of up to 30 minutes per call.

The service also maintains a register of doctors in the area who are available for locum work and this has proved to be useful at holiday times and in the event of sudden illness.

## *2 Hospital staff*

Twenty-two radio paging units are lent to the United Cambridge Hospitals and are used by the registrars on call in various departments shown in figure 1. It can be argued that providing radio paging for these staff is a luxury as it allows them the freedom to pursue other activities while on duty (e.g. shopping, going to sports, a theatre) and, although this may be pleasant for the staff, it confers no benefit to the hospital.

However, experience has shown that medical staff often work at different hospitals and are usually difficult to locate by conventional methods.

Furthermore, it is now unrealistic to expect any person who is on duty for long periods to be continuously available on a telephone. At a time of increasing shortage of hospital staff and with more economic use being made of manpower, the ability to lead a normal domestic life with the freedom to pursue other activities, yet remaining in touch in case of an emergency, makes being on duty much more acceptable.

## *3 Local health authority*

(a) *Midwives.* All midwives in the city of Cambridge have been equipped with CMAS pocket paging units for the past five years and patients booked for home confinement are instructed to telephone the association when they go into labour. Although fewer women are being booked for home confinement, the district midwives are now going into the maternity hospital to deliver their patients and, on these occasions, the hospital contacts the midwife by radio paging.

(b) *District nurses.* The association acts as a message-holding bureau for district nurses in the evenings and at weekends when the district nurses' office is not staffed. General practitioners and the various hospitals telephone their requests for a district nurse to attend a patient at home during an illness or after discharge from hospital. These messages are held by the operator and the district nurse on duty telephones for these during the evenings and at weekends. Without such a service, the hospitals and general practitioners would have to be circularised with the nurses' duty rotas, and the district nurses themselves would have to arrange for someone to be available to answer their own telephone while they were out on their rounds.

(c) *Senior ambulance staff.* One station officer is on duty in the evenings and at weekends to be called in the event of any major incident. One radio-paging unit is shared by all the station officers and is carried by the one on call, thereby enabling them to lead a relatively normal domestic life, yet still remain in reach.

(d) *Social workers.* For a trial period one of the social service teams has been issued with a long range 'bleeper' which is carried by the social worker on call each day. They, too, are often on duty for a long period and out of touch with their office. At weekends they and their families suffer the same degree of limitation of movement as other medical and para-medical persons on call and general practitioners often experience considerable difficulty in trying to make contact with a social worker at these times. Radio paging has gone some way to eliminating these frustrations.

## *4 Consultants*

A number of consultants use the association's services in the same way as general practitioners and take out a private contract. Those using radio paging tend to be in the emergency specialities such as anaesthetists, orthopaedic surgeons, and obstetricians. Other consultants simply use the telephone answering service, putting their private telephones through to the association's operators, who make appointments for patients to be seen privately. This is particularly useful in vacation time when the consultant's telephone is put through permanently for a number of weeks.

## *5 The Mid-Anglia general-practitioner accident service (M.A.G.P.A.S.)*

This organisation was formed in 1971 and consists of a group of about 80 general practitioners provided with medical resuscitation equipment who have volunteered to attend accidents occurring within their own practice areas. Since April 1973 CMAS has acted as the call-out for general practitioners in the Cambridge area and this has proved extremely useful. Every time

an ambulance leaves for an accident, the operator at ambulance control passes the details to the association's operator who bleeps the doctor in whose area the accident has occurred. Many of these doctors have also been equipped with radio telephones in their cars which are tuned to the ambulance frequency, and the combination of radio paging for call-out and use of the radio telephone to integrate the general practitioner with the emergency services, has shown itself to be most successful.

### Workload

All incoming and outgoing telephone calls as well as radio-paging calls are logged by the operators and the increasing use being made of the service for the past five years is shown in figure 2. It can be seen that the ratio of incoming calls to radio-paging calls has gradually increased and this is interpreted as showing more skill of the operators in 'filtering' the calls and separating the truly urgent from the others.

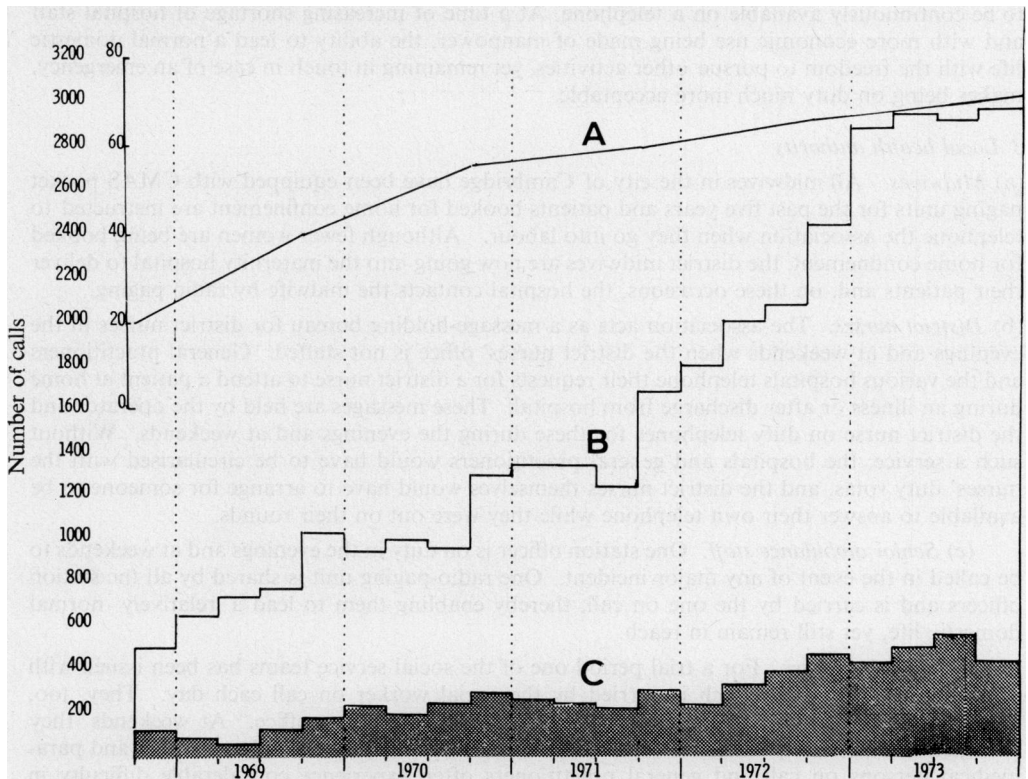


Figure 2

#### The development of an area medical radio paging service

- A. Total number of radio paging units in use.
- B. Number of incoming telephone calls per month averaged out to quarterly period.
- C. Number of radio-paging calls made per month averaged out to quarterly period.

### The future

Permission has recently been granted by the Ministry of Posts and Telecommunications for CMAS to extend its service to cover the whole of Mid-Anglia and, at the same time, to introduce voice communication to those doctors in the Mid-Anglia General Practitioner Accident Service. Technically, this development will require two further transmitters situated near St. Ives and near Peterborough and these will be connected to the main Cambridge transmitter by VHF radio links. The area covered will be coterminous with that of the new area health authority. The system will accommodate up to 1,000 radio paging units and should prove versatile. The capital cost will be about £35,000.

By introducing a duplicate encoder at either a hospital switchboard or an ambulance control room, radio paging could be continued during the night when CMAS does not work. Such a 24-hour service could remove the need to install conventional telephones in the homes of hospital technicians, maintenance staff, retained ambulance men and other emergency staff in the NHS. Furthermore, a single 'bleep' can be shared by all the members of one department and carried by the person on duty during the day and could be placed by the bedside at night. This could lead to considerable financial saving for the NHS.

Cambridge Medical Answering Services Limited has demonstrated that a real need exists for a long-range radio paging service for medical and para-medical staff and this has been provided in the spirit of an integrated NHS. While it is appreciated that the capital cost of such a radio system is high—although it can be rented in part or in whole—at a time of manpower shortage in every field of the NHS, radio paging undoubtedly provides one of the most successful means of making maximum use of highly trained staff, retaining them on duty for long periods of time, yet enabling them to lead a fairly normal domestic life without being tied to the telephone. If an emergency arises, they can be reached immediately.

#### Acknowledgements

I should like to record the debt of gratitude to Mrs J. Drake S.R.N. and Mrs N. M. Chamberlin S.R.N., the principal control operators, without whose dedication and loyalty it would not have been possible to develop the service. I would like to thank Mr L. S. H. Beard and the staff of the Department of Medical Photography and Illustration, Addenbrooke's Hospital, Cambridge, for their help with the preparation of the figures. I acknowledge with thanks the helpful criticism of Mr B. B. Milstein, F.R.C.S. in the preparation of this paper.

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## GENERAL PRACTICE

... We also have our strengths and our greatest strength is that, although most of medicine has been preoccupied with technical progress, general practitioners have never lost touch with human value.

Medical education should, if properly conducted, be the greatest liberal education of all, for it brings one at every turn to questions about the human condition. I believe that the road on which medical education has been set for most of this century has been carrying us steadily away from this humane tradition.

How can this be rectified? By giving rightful emphasis to the values of medicine as well as to its intellectual and practical aspects. This means that the care of a dying patient is given as much emphasis as that of a diagnostic problem, and a doctor's obligation to his patient is of as much concern as the drug he prescribes.

The values and attitudes are not transmitted by lectures or books. They have to pervade the whole environment in which learning takes place. This is why the learning environment is crucial to the education of family physicians. This is why we maintain that graduates can only learn to be family physicians if a major part of their education takes place in a setting which is pervaded by the ethos of family medicine.

#### REFERENCE

McWhinney, I. R. (1972). *Canadian Family Physician*, 18, 129.