Communication in the Modern Hospital

By

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Communications form a vital part of the “nervous system” of a modern hospital. Upon their scope, speed and sureness in emergency, life may often depend. Their efficiency in daily routine is reflected in the general well-being of patients and staff.

Electronic progress has led to a number of new British radio and wire communications systems, some designed expressly for hospital use and others claimed to have equal industrial and commercial value.

The original pocket radio “buzzers” was developed some years ago for alerting individual surgeons, anaesthetists and other key staff on general duties about a hospital in an emergency.

From this first limited application a variety of sophisticated selective paging and information systems capable of linking up to 1,000 staff members of a large hospital has been developed. The original buzzers have grown into a family of powerful miniature pocket receivers, no larger than spectacle cases, which offer a range of individual and group alerting facilities, with and without speech, and are sensitive enough to operate over a large radius, indoors or outside.

Linking Of Systems

One manufacturer (1) has produced a number of communications systems which can be linked together, if desired, through a comprehensive message centre. The firm’s basic system, the very high frequency (VHF) pocket paging radio, operates on frequencies between 13 and 50 megacycles/second (Mc/s) to cover the varying regulations in different countries. It incorporates optional one-way speech facilities where these are officially permitted on the paging frequency band.

Operating through a simple rod aerial, normally fixed outside a building, it enables any staff member to be called, wherever he may be, without disturbance to other receiver-holders. Each pocket receiver has its own frequency. An operator at a central “exchange” can contact the desired receiver by pressing the appropriate combination of numbered or lettered buttons on a desk “encoder”. This electronic device, the size of a small typewriter, translates the “telephone number” into a signal indicating the correct calling frequency which passes to the transmitter unit coupled to the aerial. A paging signal of fixed duration is then automatically sent out on this frequency.

This firm’s encoders are made in models handling 24, 70, 210 or 528 such channels. They are fully transistorised and require no skill to operate. The transmitter unit has an oscillator controlled by a temperature-stabilised crystal. The signal from the encoder automatically switches on the H.T. and modulates the carrier. A range of breast-pocket receivers—measuring 3-75×2×0-57 inches (14-5×5×1-5 cm.) and weighing from 4-7 to 5-7 ounces (0-1 to 0-16 kg.) with battery according to type—provides choice of loud or quiet alert-signal, with or without speech. Speech is transmitted from the encoder position through a compact plastic-encased hand unit with a built-in moving coil microphone and three-stage transistor amplifier.

Only one receiver is alerted by each paging call. Following the fixed-duration alert signal, a recipient with a speech receiver holds one end to his ear to receive the message. When no speech is provided the recipient usually dials a special number on the nearest telephone and is connected immediately with the message-handling centre.

Emergency System

A new, simplified, “crash call” system, enabling a whole team to be called together for emergency duties through one control operation, has recently been developed by this company. The new unit, said to be unique, combines both individual paging and “crash-call” facilities in one receiver. A team of, say, six to eight can be alerted simultaneously and, where speech

A nurse at the duty station receives a call from a patient whose bed location is shown by the light on the indicator panel of this communication system.
facilities exist, told of the emergency's whereabouts. Pressure of a single "group alert" button on the control causes a continuous tone (different from the individual-paging bleep-bleep) on all the team receivers. Other paging-only receivers are unaffected.

This group facility—which can be added to an ordinary paging system by connecting a special encoder to the standard one—is being installed in St. Thomas's Hospital, London.

Choice Of Alerts

Several other paging systems, basically similar but with operational variations, are now being produced in Britain. For example, the "Teletrace" receivers introduced by another firm (2) offer a choice of quiet buzz or loud whistle alerts and one model, incorporating a beamed light signal together with the buzz, is effective and unobtrusive in both noisy and quiet areas. Speech reception is also available. Up to 1,000 channels can be covered and standard systems provide for from ten to 500 receivers over reception areas of up to 1,000,000 square yards (836,000 square metres).

Multi-colour, push-button control units initiate the calls. Blue keys select the required receiver. White keys start the call—as a plain signal or as a code series. A black key is pushed for urgent calls and a red one for speech. A loop aerial, made from a single length of insulated wire, may be used. Receivers have automatic recharging, without replaceable batteries, and are always at full power. The system also includes a presence board, visible to the operator, with numbered compartments. Receivers temporarily not in use are replaced in numbered compartments, extinguishing users' individual lamps on an indicator board.

Patient-Nurse Systems

Advanced systems for patient-nurse communication are now being produced by several firms. One which can be combined with a electronic entertainment unit behind a patient's bed has been designed by one of the largest makers of communications equipment (3).

The manufacturers state that a patient in need of attention has only to press a button on his remote-control bed unit to initiate light and sound signals at a nurse-answering position, and these signals continue until they are answered. If a nurse is already speaking to another patient, the second call is automatically stored in the control panel until the line is clear, when the alarms are actuated again. Directly they are answered a voice-operated relay in the amplifier and control unit is operated and enables patient and nurse to carry on a two-way conversation without any switching.

The patient need use no transmitter; nor need he sit up or turn round to speak. The loudspeaker of his bed unit is also a microphone, sensitive enough to pick up the weakest of voices talking into the air. When the nurse replaces her receiver the patient's unit is automatically restored to entertainment, with the choice of up to four broadcasts and two television sound channels.

The system devised by another maker (2) employs a central nurses' master station which can receive calls from each bed, lavatory or bathroom and is connected to other stations throughout a hospital. On receipt of a patient's call the master station operator speaks to the patient through a two-way phtophone, locates the appropriate nurse and directs her to the patient or relays any message necessary. When the master station is temporarily unattended for any reason, calls are retransmitted automatically to all other stations or, through the pocket paging system, to the duty nurse.

"Tailored" Installations

Simplicity and reliability in operation of such systems is increasingly ensured by elimination of mechanical parts and reliance on electronic, preferably solid-state circuits. The "first fully-transistorised nurse-patient communication system in the world" was shown at the International Hospital Equipment Exhibition in June, 1965. The unit (4) displayed is fully transistorised and designed on modular principles. With this system each bed would have its own printed-circuit board in a control-cabinet rack assembly. These boards—numbered and easy to remove—hold the transistors and switching devices which replace relays. Gold-plated connectors ensure minimal resistance and freedom from corrosion. An illuminated display tops the cabinet.

Sound And Light Signalling

A comprehensive network of sound and light signalling, with nine

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