Department of Health and Social Security as a matter of urgency. The building plans of some hospitals may have to be modified and greater priority given to the rebuilding of departments of venereology if we are to deal adequately with the increasing demands on the service. In some areas, where the demand is greatest, a crash programme of rebuilding and rehousing of clinics in modern suites, large enough to absorb the future demands of the public may have to be undertaken, similar to that carried out in the 1950s for the maternity ser-

vices and recently for the mental subnormal hospital groups.

The recommendation of the International Union against the Venereal Diseases and Treponematoses that governments should urgently review their services for venereal diseases and make adequate financial provisions for these services was timely in view of the seriousness of the situation. The results of our investigation indicate that such a review is needed in the United Kingdom if we are to take realistic measures to try to control the sexually transmitted diseases.

Liaison of a County Health Department Medical Officer with a Group of General Practitioners in Hampshire

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Summary: A pilot scheme was set up in Hampshire in January 1970, in which a local health authority doctor was "attached" to a group of general practitioners to carry out developmental assessment on infants and young children. Older pre-school children are also seen when necessary, and in all cases possible future educational requirements are considered. Such a scheme reduces duplication of work, increases mutual understanding between general practitioners and local health authority doctors, and helps to make full use of the limited resources of medical manpower.

Introduction

The principle of "attaching" nursing staff—that is, district nurses, domiciliary midwives, and health visitors—to groups of family doctors is now well established in Hampshire. Partly as the result of such attachment and partly as the result of utilizing the computer to call children for routine immunization and vaccination the amount of infant health work undertaken by family doctors has increased.

Child Health Work Carried Out in General Practitioners' Surgeries

Year	L.H.A. Clinics		At G.P. Surgery with L.H.A. Health Visitor Attending		Percentage of Children Born During Year who Attended		
	Average Sessions per Month	No. of Children who Attended	Average Sessions per Month	No. of Children who Attended	L.H.A. Clinic	G.P. Surgery Clinic	Total
1967	534	31,946	180	8,099	69	17	86
1968	539	33,143	244	11,287	67	21	88
1969	542	32,671	270	13,996	68	27	95

The statistics given in the Table, which refer to the administrative county as a whole, indicate the increasing amount of child health work carried out at general practitioners' surgeries.

In the town under consideration it was decided, following a meeting in March 1969 between the general practitioners of the district and representatives of the county health department, that a detailed survey of the child health clinics in that area should be undertaken by the area nursing officer. The results of this survey were discussed at a further meeting held in November 1969 between representatives of all practices in the town and representatives of the county health department.

The work load of the local health authority clinics was

found to have decreased and, while the more peripheral clinics were still well attended, those in the centre of the town near the family doctors' surgeries were poorly attended. Health visitors' time was wasted by duplication of work at surgeries and clinics, and mothers who visited the clinics serving more than one practice could be given conflicting advice, as they were often not seen by their own health visitor. Clearly the functions of the local health authority clinics had to be reconsidered and, after discussions with several general practitioners and the area nursing officer, the local authority doctor suggested that she should be attached to a group practice to undertake developmental assessments of children on the practice lists. This suggestion was received with interest and enthusiasm by the county medical officer, and those concerned agreed to try the scheme.

Implementation of Scheme

The scheme began in January 1970, and a developmental assessment clinic is held by the local health authority doctor in the general practitioners' surgery twice a month. Between 12 and 20 children are seen at each session. Three of the partners in the practice select the children to be seen by the local health authority doctor, all the appropriate children on the lists of the other two partners being seen on a non-selective basis. In all cases the practice notes are available to the examining doctor, and conversely her notes on the assessment clinic are available to the practice doctors.

The children are seen at 6 weeks, 6 months, 12 months, and also at 18 months if necessary, appointments being sent out by post by the surgery staff. Ten minutes is allowed for an initial attendance and five minutes for each subsequent attendance. At each of these the mother is told that not only is the development of her child taken into account but also that future possible educational needs are considered. Any child who it is thought might or will need special educational provision at a later stage is notified to the county education officer in accordance with the established procedure in this county. This is much appreciated by the education department, as it helps them to forecast their future requirements.

Other pre-schoolchildren are also referred by the general practitioners to the local health authority doctor if there are any problems, such as speech difficulties, mental retardation, and emotional problems, which may have a bearing on future educational needs.

Current Assessment of Scheme

At the time of writing the scheme has been in operation for six months. The general practitioners consider that the

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prime advantage of such a scheme is that a united infant care service is given to patients and much reduplication of work is avoided. They find that the closer liaison with the county medical officer helps greatly in placing backward children in suitable educational establishments. The local health authority doctor considers that an important result of this scheme has been the increased mutual understanding between herself and the general practitioners. Furthermore, parental interest has been high and non-attendance low.

Though it is too early as yet to make any valid statistical assessment of this pilot scheme both the local health authority doctor and the general practitioners are most anxious to continue with this arrangement. Since this scheme was started doctors in a neighbouring group practice have asked for the same local health authority doctor to be attached to their practice in a similar manner, and this second attachment began in July.

Discussion

It is important for a local health authority to keep under continual review the manner in which staff are used. This is particularly true in relation to medical staff, as their recruitment is becoming increasingly difficult. In addition, with the

proposed changes in the National Health Service structure the role to be taken by doctors who have a special interest in preventive medicine, and considerable experience of this in relation to child development and allied problems (such as special educational provision for handicapped children) must be considered.

This scheme seems to point the way to a partnership of local health authority doctors and general practitioners. In such a partnership there should be a full understanding and appreciation of the role each has in relation to his or her particular interest and experience. That such a liaison should entail true professional co-operation should hardly need mention. In this way the health services should be able to develop along the lines suggested in the recent Green Paper, making full use of the limited resources of medical manpower available in Britain and at the same time providing the best possible service to this and future generations.

We should like to express our appreciation to Dr. I. A. MacDougall, county medical officer for Hampshire, for his interest in this scheme and for his advice in the preparation of this article. We should also like to thank Dr. A. G. Turner and his partners and Miss H. W. Arnold, without whose interest and co-operation this scheme would not have been possible.

NEW APPLIANCES

Radio and Telephone System for Multiple Channel Transmission of E.C.G.s

Dr. PETER W. MACFARLANE and Professor T. D. V. LAWRIE, University Department of Medical Cardiology, Royal Infirmary, Glasgow C.4, write: Use of telephone lines for the transmission of E.C.G.s was first made by Einthoven in the early 1900s (Caceres, 1965). The actual telephone wires were used simply as long connexions between the patient electrodes and the galvanometer of the electrocardiograph. More recently, commercial equipment has become available in the United States for both single- and multiple-channel telephone transmission of biomedical signals by use of a completely different technique. In this method the E.C.G. is used to modulate an audio-frequency which itself is transmitted normally through the telephone system. In Britain a system for telephone transmission of a single-channel E.C.G. has recently been described (Colbeck *et al.*, 1968).

This preliminary communication outlines a combined radio and telephone system for simultaneous transmission of three channels of E.C.G. data, either one lead from each of three patients in a coronary care area, for example, or a three-orthogonal lead E.C.G. from one patient.

Most E.C.G. transmission systems in operation require a telephone to be placed at the bedside, and the electrocardiograph used in conjunction has a unit into which a telephone handset is placed. This suffers from the disadvantage in a large general hospital of either having a telephone facility at each bed station or a long telephone cable stretching the length of the ward. It was therefore decided that it would be more suitable to incorporate a radio link between the electrocardiograph (at the bedside) and the transmitting telephone. This is illustrated in Fig. 1, which shows the general outline of the system.

The battery-operated radio transmitter has three inputs into which the E.C.G. sig-

FIG. 1.—Schema of radio and telephone transmission system. (a) Equipment to encode and transmit E.C.G. signals. (b) Equipment which receives and decodes signals.

FIG. 2.—Three-lead E.C.G. (a) recorded at bedside, (b) received at computer laboratory. Signals were recorded on tape recorders with frequency response of 0–625 Hz and each was replayed on to the same Mingograf 34B ink jet recorder with equivalent frequency response. Illustrations show four 0.5-mV calibrations which were also transmitted, with an interchannel time separation.

nals are fed. Each signal is used to modulate the output of a voltage-controlled oscillator of unique centre frequency. The outputs of the voltage-controlled oscillators are summed and the single resultant signal is transmitted at a frequency of 102.2 MHz to a receiver up to 30 yards (27.4 m.) away or further, depending on the number of intervening walls. At this juncture the incoming signal is converted to an audio signal and transmitted by telephone to the computer laboratory. At the receiving end the transmitted acoustic signal is fed to a

series of band-pass filters which separate out each of the original voltage-controlled oscillator signals. These in turn are demodulated to obtain the initial input signals.

The centre frequencies used for the three channels are 1,250, 1,625, 2,000 Hz. Each can be deviated by ± 100 Hz. This has meant that the best results are obtained with an overall system frequency response of 0–35 Hz—that is, the frequency response is 3 db down at 35 Hz. This gives a modulation ratio (maximum deviation/maximum