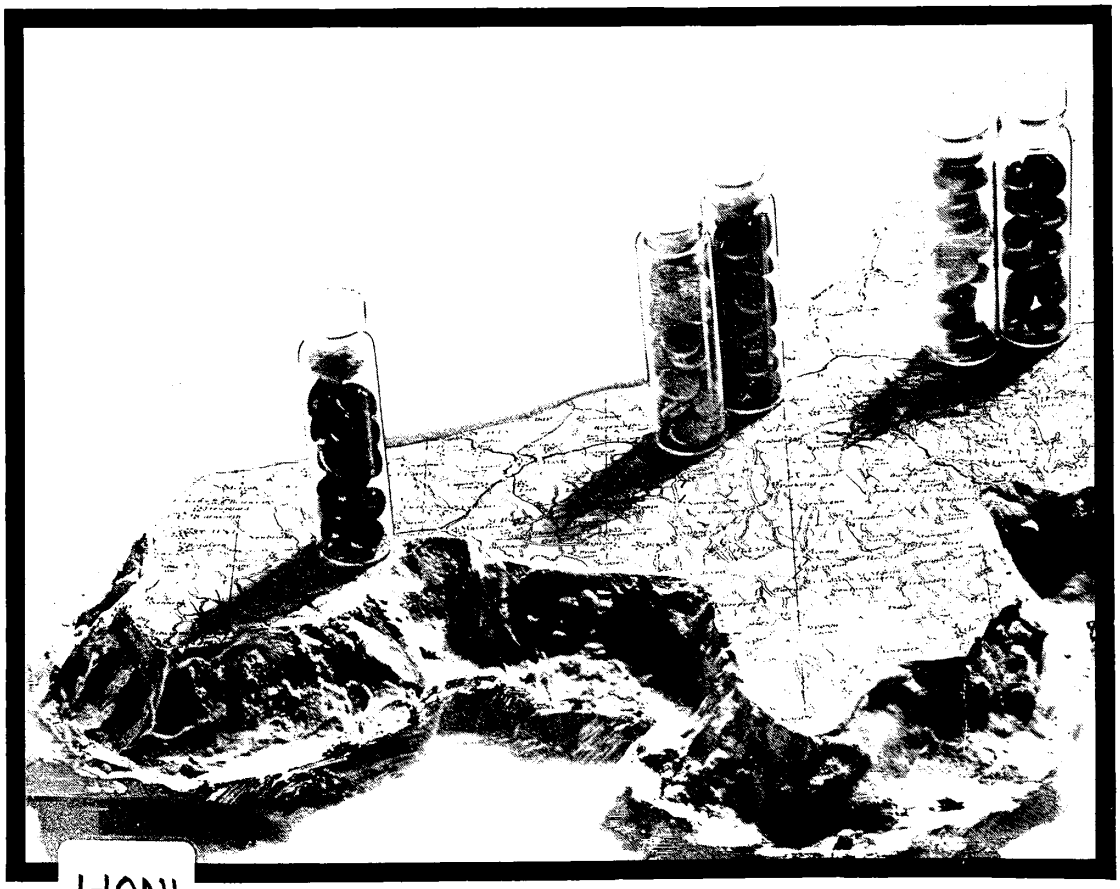
Control of Drugs in Small Hospitals

The West Cornwall System



THE WEST CORNWALL SYSTEM FOR THE CONTROL OF DRUGS IN SMALL HOSPITALS

A report on the development, introduction and evaluation of a system for the prescribing, administration and distribution of drugs in small hospitals

by Shirley Ellis MPharm BPharm MPS

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FOREWORD

It is a pleasure for me to be asked to write the foreword to this interesting and stimulating report by Shirley Ellis of her investigation into the prescribing, distribution and administration of drugs in small hospitals. The intrinsic value of this report will be appreciated by all who are concerned with these aspects of hospital practice, for it provides important guidelines for a closer integration of the work of doctors, nurses and pharmacists.

The account of this research project reflects the importance of careful planning and active participation by those concerned in carrying it through to a successful conclusion. The research project, undertaken jointly by the West Cornwall Hospital Management Committee, King Edward's Hospital Fund for London and the Pharmacy Practice Research Unit of the University of Bradford, has an interesting history.

In 1967 and 1968, four conferences under the auspices of the King's Fund and in association with the Guild of Public Pharmacists, were held at the Hospital Centre, London to discuss current practice and problems connected with the prescribing, distribution and administration of drugs in various types of hospitals. The conferences were attended by an invited audience of doctors, nurses and pharmacists representative of hospitals in the United Kingdom. At each of these meetings the participants considered that the discussions were fruitful, not only in providing valuable solutions to some of the problems, but also focussing attention on the need for further study of these in particular types of hospitals. As a result of the second conference, the King's Fund agreed to sponsor an investigation of these problems as they affect small hospitals. Patricia Stone, deputy chief pharmacist at Whipps Cross Hospital, was seconded to undertake a three months' survey in the hospitals of the West Cornwall Hospital Management Committee. Her report, Drugs in Small Hospitals, was published by the King's Fund in 1968. Its success encouraged the promotion of a further two-year research project, here reported.

Andrew Wilson

Liverpool, 1971

Professor Andrew Wilson MD PhD FPS
Professor Pharmacology and General Therapeutics
The University of Liverpool.

ACKNOWLEDGEMENTS

I would like to thank the King Edward's Hospital Fund for London and the West Cornwall Hospital Management Committee for giving me the opportunity to carry out this investigation and the members of the Steering Committee for their constant help and support. I also thank the medical, nursing, pharmaceutical and other staff who have given me so much cooperation and encouragement during the project: its success is largely due to their continuing efforts. I would like to acknowledge the firm foundation provided by Patricia Stone in her initial survey and the advice and information I received from John A Baker, Christoper Wm Barrett, Graham Calder, Ronald F Chatfield, Peter Hill, Edith M Hunter, Aileen M McIntyre, Margaret Steane and J Geoff Roberts. The various documents used throughout the project were prepared either by the King's Fund, the South West Regional Hospital Board or the University of Bradford printing departments and the high quality of the material they produced contributed to the smooth introduction of the West Cornwall System and I am grateful to them for this.

Shirley Ellis
1972

Notes

On 1 April 1971 the West Cornwall Hospital Management Committee became the Cornwall Hospital Management Committee following the amalgamation with the St Lawrence Hospital Management Committee.

The material contained in this report forms part of the research undertaken by the author for a Doctor of Philosophy degree of the University of Bradford under the direction of Dr T G Booth in the Postgraduate School of Studies in Pharmacy.

STEERING COMMITTEE

M C Hardie MA FHA	Chairman, director, King's Fund Hospital Centre
R Beckton FHA	deputy group secretary, Cornwall Hospital Management Committee
T G Booth PhD BPharm FPS	senior lecturer, Postgraduate School of Studies in Pharmacy, University of Bradford
D W Carrington MPS	group chief pharmacist, Norfolk and Norwich Hospital (formerly chief pharmacist, Royal Cornwall Hospital (Treliske), Truro)
Lorna M Macpherson SRN SCM	senior nursing officer, West Cornwall Hospital, Penzance
G Raine BSc FPS	group chief pharmacist, St George's Hospital, London (representative of the Guild of Public Pharmacists)*
W H St John-Brooks MB FRCP	consultant physician, West Cornwall Hospital, Penzance

Coopted members

J Greene SRN RMN RMPA	chief nursing officer, Cornwall Hospital Management Committee
D Higgins BPharm MPS	group chief pharmacist, Royal Cornwall Hospital (Treliske), Truro

* Now known as the Guild of Hospital Pharmacists.

CONTENTS

TABLES

ILLUSTRATIONS

SUMMARY

The Investigation

The services offered by the small hospitals in the West Cornwall clinical area are varied and numerous pharmaceutical problems arise because of this and the large distances between the base and subsidiary units. (p 14)

The problems discussed in Drugs in Small Hospitals[22] are reviewed and the progress already made towards their solution assessed. (p 18)

Before a procedural booklet containing acceptable standard procedures could be produced it was necessary to ascertain the nature of the procedures currently adopted in the area. This information was collected by means of a questionnaire to nursing staff. (p 24)

It was necessary to determine the extent to which errors in the administration of drugs* were occurring at various stages of the investigation and a method whereby accurate reproducible figures could be obtained was developed. (p 47-50)

A new design of prescription sheet was developed and care taken to ensure its suitability for, and acceptability in the hospitals where it was to be used. (p 27)

The design of the prescription sheet adopted for use in the investigation is described in detail and the method of use explained. (p 28-32)

A visiting pharmacist service was organised and its value in detecting unsuspected problems and increasing departmental cooperation assessed alongside its cost. (p 37-44)

* Referred to in future as administration errors.

The evaluation of the system introduced consists of: a comparison of administration errors before and after its introduction; (p 47-58) an assessment of the standard of sheet usage by the prescriber after six and twelve months; (p 58-60) and a canvassing of medical and nursing opinions. (p 44-46)

There are still several outstanding problems connected with ordering and supply because the volume of work involved is not matched by the facilities in the base hospitals; possible solutions are suggested. (p 61-66)

Problems of stock control and storage cannot be solved overnight because of the number of personnel involved. Several suggestions to ease the situation have been made but further investigation into the design of drug containers and labels is necessary. (p 66-69)

The method of preparation of a basic stock list is described and its usefulness discussed. (p 24, 66-67)

The Conclusions

The West Cornwall System was successfully introduced in an attempt to improve patient safety. The system consists of

1 A prescription sheet designed to be used for the prescribing and selection of the drug to be administered and the recording of such administrations.

2 A procedural booklet containing guidelines for all concerned with the prescribing, administration and supply of drugs.

3 A visiting pharmacist service to supply information, assist the nurse in the interpretation of prescriptions and improve the control of stock on the wards.

The introduction of the West Cornwall system has resulted in a reduction of over 40 percent in the number of administration errors arising and the development of a more responsible attitude towards drugs. (p 47, 50-51)

The nature of the errors detected at each stage of the investigation provides considerable insight into the problems encountered by nurses during medicine rounds. (p 53-58)

Any increase in the length of medicine rounds caused by the introduction of administration records has been slight and has been accepted by the majority of the nursing staff as justifiable in the light of the advantages such records offer. (p 45)

The need for written procedures for handling drugs at all levels has been established and the procedures adopted for this group are included in the booklet in the back flap.

The duties of a visiting pharmacist are extensive and require the services of an experienced pharmacist. (p 37-40)

The introduction of the West Cornwall system does not entail high financial commitment. A slight increase in printing costs, for the prescription sheet and procedural booklets, is to be expected but the main expenditure in Cornwall will be on the employment of one additional pharmacist to carry out the visiting pharmacist's duties. (p 42; Appendix B)

The need to maintain high standards in the pharmacy department is increased with the introduction of further controls at ward level. It is essential that all necessary safeguards can be seen to be applied whenever drugs are handled. (p 61-69)

The organisation of a project which will require the cooperation of all the professions involved in the hospital team, necessitates the establishment of satisfactory channels of communication and a free circulation of information throughout. (p 21)

The introduction of a satisfactory system is not enough in itself. Subsidiary problems are brought to light which require investigation in the future and the system itself must be kept under constant review. (p 70-72)

INTRODUCTION

In 1958, the report entitled The control of dangerous drugs and poisons in hospitals (the Aitken report)[14], focussed attention on the problems associated with the prescribing, administration and storage of medicines in hospitals and indicated a need for standard procedures to be adopted. From 1962 onwards detailed investigations by various workers [3, 4, 12, 18, 23], revealed the frequency with which errors of medication occur and the stages at which they arise along the chain of events between the prescriber writing the prescription and the patient taking the medicament. As a result of the information gained, new systems of supplying drugs to wards and new designs of prescription sheets were developed and an extension of the pharmacist's duties was introduced to include the supervision of drug usage throughout the hospital [1, 2, 6, 7, 19].

In 1967 Carrington presented a paper to a Hospital Centre conference of 'Recent developments in drug distribution systems'[9] on the system he had introduced at the Royal Cornwall Hospital (Treliske), together with his new design of prescription sheet and ward pharmacy scheme. The pharmacists in attendance at the conference were in agreement with Francke[13], who had recently called upon the profession to remember that 'drugs are as important and numerous, as complex and as potentially dangerous regardless of the size of the hospital in which they are used' and supported the official view[14] that no hospital should be entirely without the services of a pharmacist[11].

Carrington was aware that a contrast existed between the service he had introduced and the one he provided for the smaller subsidiary hospitals. An investigation was needed into the problems of prescribing, distribution and administration of drugs in small hospitals. Later in 1967, the King's Fund agreed to sponsor an investigation in the West Cornwall clinical area, which was considered particularly suitable because of the geography of the district and the scattered locations of the 18 hospitals without pharmacy departments.

In September 1967, Patricia Stone began the three months' pilot study reported in Drugs in Small Hospitals[22], which set out the major problems of the area and made a number of recommendations for further action. The West Cornwall Hospital Management Committee then asked the King's Fund to sponsor the appointment of a research pharmacist to help try out these recommendations.

The main body of this report describes the progress made and the lessons learned in the two years between June 1969 and June 1971. Problems still remain and there is much yet to be learned, but it is hoped that the information in the report will be helpful to hospital managements, doctors, nurses, pharmacists and other staff concerned with patients' safety and the associated problems of prescribing, distributing and administering drugs in small hospitals.

1 THE WEST CORNWALL CLINICAL AREA

Illustration 1 (overleaf) shows the location and variety of hospitals in this scattered area. The smaller hospitals are regarded with affection and pride by the local communities for whom they provide a service ranging from minor surgery to geriatric nursing, often within a single unit. Because of the survival of this civic involvement group centralisation is not always popular and personal patient care remains the prime consideration.

The existence of casualty departments and operating theatres in the small acute units necessitates the holding of a much wider basic stock of drugs than would be held by a hospital ward of comparable size. The range of stock held is influenced by the number of doctors, each with his own prescribing preferences, who may admit patients to the unit. The introduction of new procedures is made more complicated by the large number of general practitioners, each acting independently, in the acute and maternity hospitals. There is no hierarchy down which information can be passed and the decisions taken at the infrequent medical staff meetings are difficult to translate into practice. In those units whose senior nursing officer is based at a second hospital some distance away, the division of responsibility may complicate decisions on the introduction of new procedures. (See Table 1, overleaf, following map).

Drugs prescribed for casualty patients or patients being discharged present few difficulties where a patient is being cared for by his own general practitioner but it is a different matter in those hospitals with a resident medical staff and so far distant from the supplying pharmacy that a 24 hour delay is inevitable.

Supplies of drugs for the small hospitals are delivered in locked 'ward boxes' carried in hospital transport from the main hospitals. From Table 2 (overleaf, following Table 1) it may appear that the number of ward boxes involved in relation to the number of beds is excessive. This is due in part to the casualty departments and operating theatres in some small hospitals ordering separately from the wards and rationalisation of the system would be advantageous. This table shows that the pharmaceutical services have already undergone a considerable amount of centralisation and this process is continuing.

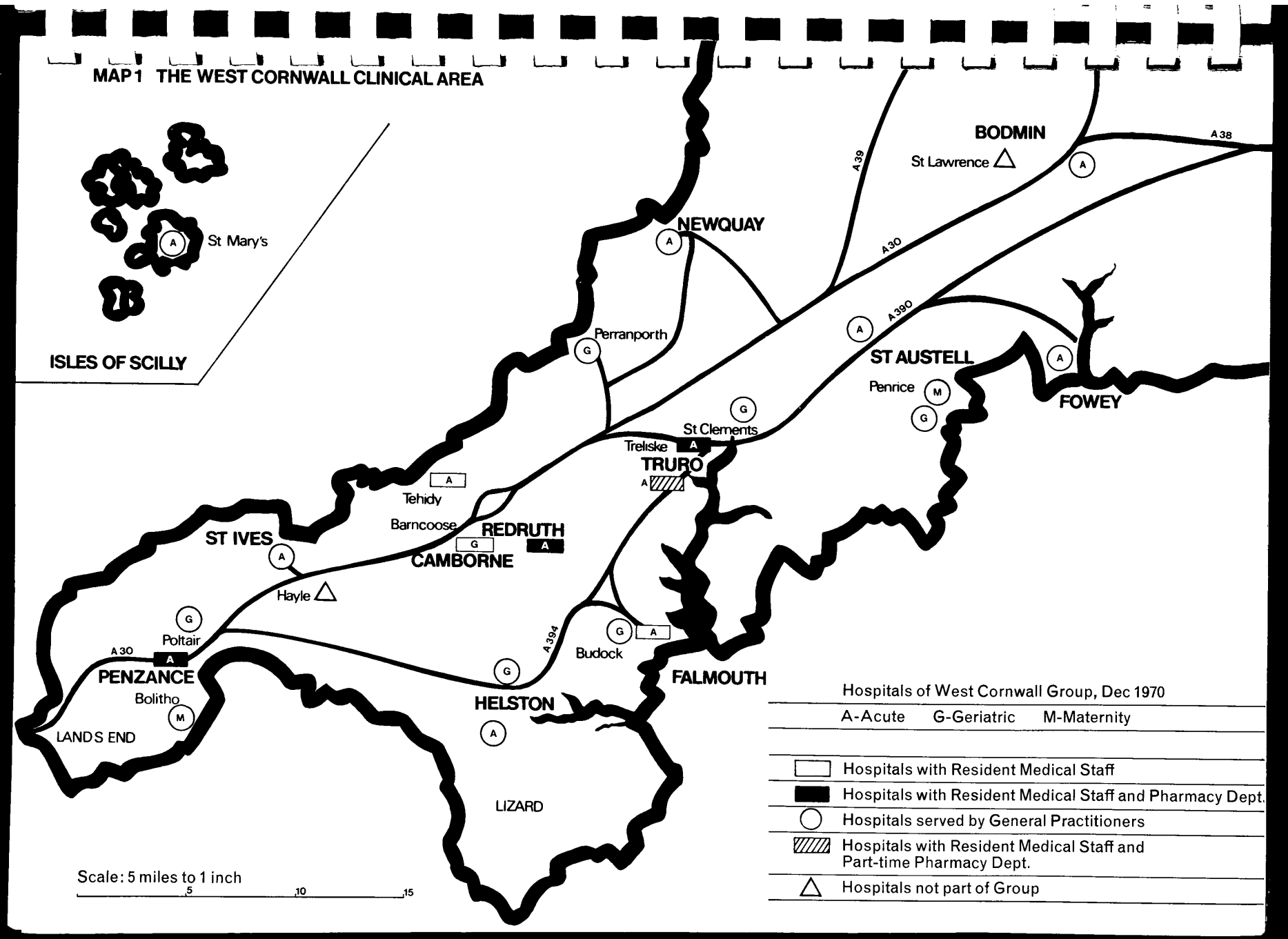

MAP 1 THE WEST CORNWALL CLINICAL AREA
ISLES OF SCILLY
St Mary's
BODMIN
St Lawrence
A 38
A 39
A 30
NEWQUAY
Perranporth
A 390
ST AUSTELL
Penrice
FOWEY
St Clements
Treliske
TRURO
Tehidy
Barncoose
REDRUTH
CAMBORNE
ST IVES
Hayle
Poltair
A 30
PENZANCE
Bolitho
LANDS END
A 394
Budock
FALMOUTH
HELSTON
LIZARD
Scale: 5 miles to 1 inch
5
10
15
Hospitals of West Cornwall Group, Dec 1970
A-Acute G-Geriatric M-Maternity
Hospitals with Resident Medical Staff
Hospitals with Resident Medical Staff and Pharmacy Dept.
Hospitals served by General Practitioners
Hospitals with Resident Medical Staff and Part-time Pharmacy Dept.
Hospitals not part of Group

TABLE 1 HOSPITALS WITHOUT PHARMACY DEPARTMENTS

hospital	beds	other departments	medical personnel** (as at 1 March 1971)	nursing administration
EAST CORNWALL SUB-GROUP				
East Cornwall*	25 acute	casualty	7 general practitioners	nursing officer
Fowey & District	14 acute	casualty surgery	6 general practitioners	nursing officer
Newquay & District	20 acute	casualty surgery	14 general practitioners	nursing officer
Penrice Geriatric	56 long stay	-	1 general practitioner	nursing officer
Penrice Maternity*	24 maternity	-	26 general practitioners	nursing officer
WEST CORNWALL SUB-GROUP				
Bolitho Maternity	17 maternity	-	19 general practitioners	nursing officer
Edward Hain*	14 acute	casualty dentistry	8 general practitioners	sister in charge (SNO at West Cornwall Hospital, Penzance)
Helston & District	14 acute	casualty	11 general practitioners)	joint matron based at Meneage
Meneage	68 long stay geriatric	-	1 general practitioner)	
Poltair*	37 long stay geriatric	-	1 general practitioner	sister in charge (SNO at West Cornwall Hospital)
St Mary's (IOS)	12 acute	casualty surgery	2 general practitioners	assistant matron (SNO at West Cornwall Hospital)
CAMBORNE/REDRUTH SUB-GROUP				
Barncoose	185 geriatric (76 acute* (81 long stay* (28 assessment	day hospital	consultants and resident staff	senior nursing officer (nursing officer per section)

* Hospitals selected as sample units.

** General practitioner units are also visited by consultants some of whom hold out patient clinics in the hospitals.

Budock	123 long stay - (61 geriatric (62 sub-normal	1 general practitioner	senior nursing officer
Perranporth	31 long stay - geriatric	1 general practitioner	nursing officer (SNO at Barncoose)
OTHERS			
Falmouth & District	57 casualty (24 acute surgery (15 preconvalescent* (6 dermatology* (12 paediatric	2 resident house officers	nursing officer (SNO at Budock)
St Clements	16 rheumatology - (5 days/week)	RCH (City) staff visit	sister in charge (SNO at RCH (City))
Tehidy	114 surgery (91 acute chest (23 chronic sick	consultants and resident staff	nursing officer in charge

* Hospitals selected as sample units.

** General practitioner units are also visited by consultants some of whom hold out patient clinics in the hospitals.

TABLE 2 THE PHARMACEUTICAL SERVICES

supplying hospitals			subsidiary hospitals		
hospital	beds	pharmacy staff (as at 1 March 71)	subgroup or hospital	beds	ward boxes
Camborne/ Redruth	62 acute	chief pharmacist	Barncoose	187 geriatric	9 (5 days/week)
Royal Cornwall Hospital (City)*	179 acute	part time senior pharmacist	-	-	-
Royal Cornwall Hospital (Treliske)**	181 acute 96 maternity	group, deputy chief, senior, and 2 basic grade pharmacists and supporting technical and clerical staff	East Cornwall subgroup		20 (4 days/week)
			Budock		14 (3 days/week)
			Falmouth		1 (2 days/week)
			Perranporth	507	6 (weekly)
			St Clements		
			Tehidy		
			City		
West Cornwall Hospital, Penzance	92 acute	chief and basic grade pharmacists	West Cornwall subgroup	162	2 (daily)
					1 (3 days/weekly)
					1 (2 days/weekly)
					2 (weekly)

* Ward stocks at this hospital are supplied from Treliske.

** All large scale manufacturing is carried out at this hospital.

2 ACTION TAKEN ON THE PILOT STUDY

The pilot study was carried out in 1967 by Patricia Stone[22]. Action had already been taken on some of the problems reported along the lines she recommended.

Transport difficulties led to inadequate deliveries to some hospitals and resulted in overstocking. Miss Stone suggested more frequent deliveries and that the supply system be more flexible to allow for extra deliveries; the range of stock held should be such as to keep these to a minimum. Transport schedules had been revised and by cooperation with other departments intermediate deliveries could be made on a daily basis. Most hospitals now regard the supply situation as adequate, if not ideal.

Reserve stocks were held by the matron in some hospitals from which she 'dispensed' drugs required at ward level. Miss Stone advised that these stocks should be removed and that all supplies should be made directly to the ward sister. Most 'matron's stocks' had disappeared by 1969 but the introduction of medicine trolleys had necessitated the provision of duplicate, standard packs of the drugs in use. These may be kept at ward level or in a central position serving all wards but no repacking or 'dispensing' occurs outside the pharmacy.

Medicine rounds are complicated and lengthened by the layout of some hospitals. Miss Stone reported that in some instances no reference was made to the original prescription when drugs were administered and the methods of recording administrations varied widely; the implication of these had obviously not been fully considered. Following publication of the report it was decided, by the medical and nursing committees, that 'medicine lists' should be banned and that a uniform prescription sheet throughout the group be developed to serve as a basis for drug selection. By 1969 only isolated 'medicine lists' remained and only two designs of prescription sheet were still in use.

Prescription sheets in use in various hospitals were of three different styles which presented considerable difficulties when patients were transferred. Two of these sheets were poorly designed which produced problems of prescribing, interpretation and administration and encouraged the practice of writing prescriptions elsewhere in the patient's notes. Miss Stone recommended that an improved design of prescription sheet be developed which would provide well documented prescribing and an efficient method of recording the administration of each dose at the time it was given. The idea of a uniform design of prescription sheet was welcomed by all the staff in the area but whilst the idea of recording administrations of every drug was accepted in principle it was thought to be impracticable in many instances. Requests were made that the new design should be as simple as possible and that some form of protection should be provided in long-stay units.

Procedures adopted in various hospitals for the prescribing, administration and storage of drugs were not always satisfactory and Miss Stone suggested that 'standard' procedures should be clearly stated in a procedural manual available throughout the group. The medical and nursing staff supported the idea provided that the contents were submitted to the various committees for approval before printing. The production of this booklet has formed part of the main study. (p 34 and back flap).

Visits by a pharmacist to the small hospitals were infrequent and prescription sheets were rarely seen so that the responsibility for interpretation rested solely on the nurse. There were insufficient opportunities for the pharmacist to discuss problems with, or impart information to the staff of these outlying hospitals. A lack of essential information can be dangerous and Miss Stone suggested that frequent, regular visits by a pharmacist be supplemented by reference literature supplying information on the use and storage of drugs. Before June 1969 it was deemed impossible to increase the frequency of visits by a pharmacist but each unit had been supplied with recent editions of the National Formulary [5] and the Drugs Names Glossary[24] and the staff were encouraged to contact the pharmacy department by telephone with any query or problem. The medical and nursing committees emphasized the need for adequate reference literature and gave general approval to the introduction of a visiting pharmacist service when practicable.

Miss Stone's work thus proved very valuable: it led to several improvements being introduced immediately and provided a useful basis for the main study discussed in subsequent chapters.

3 THE MAIN STUDY

The main study was carried out in the smaller hospitals, without pharmacists, in the West Cornwall clinical area. The objectives were:

introduction of an improved design of prescription sheets for acute and long-stay hospitals;

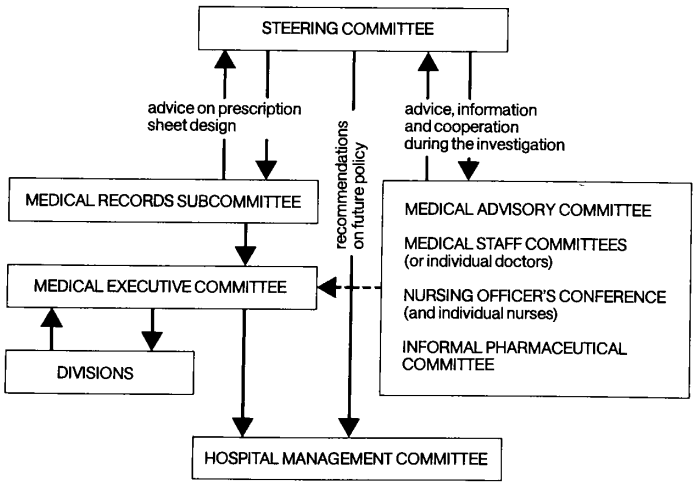
production of a procedural booklet on the prescribing, administration and distribution of drugs for medical, nursing and pharmaceutical staff;

setting up a pilot visiting pharmacist system;

improvement of the distribution of pharmaceutical preparations from the parent hospital to the associated small hospitals without a pharmacist;

measurement of the effect of these changes by conducting experiments to determine rates of error before and after.

The project was guided by a multidisciplinary steering committee representing the relevant professions and bodies. Because of the number and variety of personnel involved, several channels of communication were used. These depended upon the degree of personal involvement required from the individual members of the professions, as the following diagram shows. Efforts were made throughout to ensure that all concerned (including the nurses training school, if the hospital had student or pupil nurses) were kept fully informed at each stage of the project.



TIMETABLE

June 1969 The author took up her appointment. The aims of the project were explained to the hospital staffs in the West Cornwall clinical area

July 1969 Sample units chosen and approved by the steering committee

September and October 1969 First error rate determination carried out in sample units

October 1969 Questionnaire on drug administration circulated to nurses

November 1969 Draft forms of prescription sheet B3 and procedural booklets discussed by informal pharmaceutical committee

December 1969 Results of error rate determination and questionnaire presented to steering committee

Prescription sheet design B3 approved for preliminary trial

Prescription sheet design B3 introduced for a trial period of one month on acute medical ward, Treliske hospital - unsuccessful

January 1970 Prescription sheet design B4 submitted to steering committee and approved for preliminary trial

February 1970 Prescription sheet designs B3 and 4 together with draft procedural booklet submitted to all medical and nursing staff

Sheet design B4 and procedural booklet approved for trial

Prescription sheet design B4 introduced for a trial period of one month on medical ward, West Cornwall hospital - successful

March 1970 Prescription sheet design B4 introduced into sample units

April and May 1970 Sample units visited twice weekly by visiting pharmacist

June to August 1970 Visiting pharmacist service extended to 17 units without pharmacy departments on a weekly/twice weekly basis

September and October 1970 Second error rate determination carried out in sample units

November 1970 Results of both error rate determinations presented to steering committee and staff of sample units

West Cornwall nursing officers conference discussed the visiting pharmacist service

December 1970 Questionnaire on the West Cornwall System circulated to medical and nursing staff in the sample units and West Cornwall hospital

January 1971 Trial of alternative modifications suggested at East Cornwall hospital

The results of the questionnaire and the modifications suggested for the prescription sheet design submitted to steering committee - sheet design B5 together with supplementary sheets B6 and 7 were approved and recommended for introduction in the future

March and April 1971 Third error rate determination and analysis of sheet usage carried out

June 1971 Results of investigation submitted to steering committee in the form of a draft report of the whole project - accepted

In June 1969 the author took up her appointment as research pharmacist and an outline programme was agreed for the conduct of the project. Although such a programme is essential to any research, the very nature of the venture into the unknown makes it most unlikely that the programme will be followed precisely. In this project it proved possible to follow the programme reasonably closely and for this much credit is due to all the medical, nursing and other staff who so readily cooperated. The timetable (page 22) summarises the programme followed.

The first month was spent visiting all the hospitals in the area to discuss the aims of the investigation with nursing and administrative staff. After these visits, and discussions with the chief pharmacists, eight sample units were selected for intensive study, see Table 3. Three aspects were considered in choosing the sample: it should include a representative of each type of hospital in the area; it should involve all three pharmacy departments; and the medical and nursing staff must be willing to cooperate. All medical and nursing staff in the chosen units were approached individually and given the opportunity to opt out of the investigation before the final decision on the sample units was made.

Two months were spent in the three pharmacy departments studying the supplies sent to the subsidiary hospitals and assessing the work and problems involved. A detailed analysis of all drugs ordered by the subsidiary hospitals during 1968/9 enabled a basic stock list to be prepared and a second analysis in September/October 1970 resulted in only minor modifications. Throughout January to March 1971 all drugs in use, but not included in the list, were recorded in the sample units and a supplementary stock list for each established.

Questionnaire on Drug Administration

Before any alterations were made to the existing system a questionnaire was circulated to the nursing staff in the small hospitals to:

TABLE 3 HOSPITALS CHOSEN TO ACT AS "SAMPLE UNITS" DURING THE INVESTIGATION

Hospital/Ward	Location	Type	Beds
Barncoose, Carn Brea	Redruth	Long stay, geriatric	21
Barncoose, Jenkin	Redruth	Acute geriatric	19
East Cornwall, Female	Bodmin	Acute	13
Edward Hain	St.Ives	Acute, convalescent	14
Falmouth & District, Albert Collins	Falmouth	Pre-convalescent & Dermatology	20
Penrice	St.Austell	Maternity	24
Poltair	Penzance	Long stay, geriatric	37
Treliske, Ward 5	Truro	Acute, medical	17

West Cornwall Hospital, Penzance also cooperated in the trial of the new design of prescription sheet.

confirm that Miss Stone's findings still applied after a lapse of 18 months;

ascertain to what extent the problems she reported were appreciated by the nursing staff;

determine the degree of uniformity of procedures within the group, and establish that the sample units chosen did not differ widely from the group as a whole.

A 'closed' questionnaire was used to minimise the effect of variations in the grades of staff involved, the time involved in its completion and for ease of analysis*. Questionnaires were marked with a code to identify the hospital concerned but the contributing nurses remained anonymous. Most questions required only a ✓ or a single figure and the information collected referred to:

the status of the respondent and the type of case nursed;
practical details of the administration of drugs;
the interpretation of prescriptions;
the recording of administrations;
the difficulties encountered on medicine rounds.

The replies were analysed using a punchcard system and a full report prepared. This report was circulated to all the nurses involved and a summary was sent to all medical and senior nursing staff in the hospitals concerned: this summary was later published in the Nursing Times[10].

THE INTRODUCTION OF THE WEST CORNWALL SYSTEM

The main aim of the system is to improve patient safety. Subsidiary aims are to improve the pharmaceutical service to the small hospitals and to encourage economy in the use of drugs.

The system is threefold:

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* The questionnaire is available from the King's Fund Hospital Centre 24 Nutford Place London W1H 6AN

1 a prescription sheet designed to be used for the prescribing and selection of drugs to be administered and the recording of such administrations

2 a procedural booklet containing guidelines for all concerned with the prescribing, administration or supply of drugs giving the procedures which would be regarded by the authorities as 'safe'

3 a visiting pharmacist service designed to supply information and to assist the nurse in the interpretation of prescriptions and the control of stock drugs on the ward

The design of the prescription sheet was developed from information gained from the questionnaire to nursing staff, the sources of error observed during the first error rate determination and a study of the sheets in use in other hospitals. Before the investigation a very simple form of 'treatment sheet', see Appendix B1*, had been used for prescribing in most of the small hospitals, although an improved 'prescription sheet', see Appendix B2, designed by Mr Carrington for use at the Royal Cornwall Hospital (Treliske) had been adopted by some of the small hospitals in the eastern half of the county. In Miss Stone's report two sheets were proposed, one for acute and one for long-stay patients. A modification of these sheets, see Appendix B3, which resembles the sheet introduced and used successfully by the London Hospital[19], was produced and introduced for a trial period of one month on an acute medical ward at Treliske. The trial was unsuccessful, due partly to a lack of space for the number of drugs prescribed and partly to the apparent complexity of the prescribing section compared to the sheets in use previously. A modification of the sheet designed by Mr Carrington was then prepared, see Appendix B4, which incorporated a section where the nurse would record the drug administered.

Copies of both sheet designs, Appendices B3 and B4, were circulated to all the medical and nursing staff concerned, together with a draft procedural booklet incorporating instructions for using the sheets. After discussions at various meetings, the procedures laid down were accepted and it was agreed to introduce the second design of sheet for

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* Appendix B1 is included in the backflap together with the other sheet designs, Appendices B2 to B7.

a one-month trial on a medical ward at West Cornwall Hospital, and if this was successful, for a 12-month trial in the sample units. The introduction of these new sheets into the sample units involved the rewriting of existing prescriptions and the author spent three days in each unit to iron out initial difficulties. Introduction to the whole sample took one month, after which the author acted as visiting pharmacist to the sample units paying them weekly/twice weekly visits.

The sheet in Appendix B5 incorporates the modifications suggested after the evaluation of sheet B4 and is being introduced throughout the Cornwall Clinical Area.

The prescription sheet

The subsequent discussion refers to the sheet included as Appendix B4. The following four conditions had to be fulfilled by the design chosen:

1 It had to be suitable for all types of patient. The development of two sheets, one for acute and one for geriatric cases, would have been unsatisfactory as some units have both short and long-stay patients.

2 It had to conform to the recent standardisation of documents on paper size A4 and the punch-hole placing determined by the 'notes' folders in which the prescription sheet would be filed after the patient's discharge.

3 The patient's name and hospital number had to be clearly visible at all times: they appear on the front cover, in the top right-hand corner of the prescribing section and at the head of each continuation sheet.

4 Concise instructions on using the prescription sheet should appear on the front cover.

The prescription sheet contains eight sections.

1 Details of previous medication on the front of the prescription sheet. This section is infrequently used, but has proved valuable where patients were undergoing investigations which required the use of more than one sheet. It can be used to record which antibiotics or antihypertensives have been tried at home if the patient is admitted to hospital for further treatment of the same condition. This section, together with those for 'Drugs to take home' and 'Exceptions to prescribed orders', ensures that a complete picture of the patient's medication is easily accessible to all concerned. Details relating to drug usage were previously recorded in numerous and varied locations[10].

2 Drug idiosyncrasies situated in a prominent position and large enough to include several items. Such idiosyncrasies are being reported with increased frequency.

3 Details of the patient alongside the drug idiosyncrasies section (and reversed in position in sheet B5 so that automatic printing machines may be used). Full details of the patient should be entered but the information requested shows some duplication. It is intended that each unit should use those spaces most applicable: for example, some general practitioners prefer to use the NHS number rather than the 'hospital number' for easier cross reference to their surgery files, and 'date of birth' is of more value than 'age' for babies in the maternity unit. The whole section will accommodate addressograph labels if available.

4 Prescribing section taking up the remainder of the left-hand sheet and the top section of the right-hand sheet. Confusion with proprietary and approved drug names often arises as does a lack of essential information in some prescriptions but it is hoped that the introduction of headed columns will minimize these. The columns are placed in what is considered to be the most logical sequence for entries and it should require the minimum of effort to produce complete prescriptions. The first error rate investigation revealed that only one in three prescriptions required action on any one medicine round but all have to be read. The prescribing section has been subdivided into sub-sections

headed: 'As required prescriptions'; 'Regular prescriptions'; and 'Once only and Premedication drugs', in an attempt to reduce this work and clarify the prescribing.

Abbreviations are variously interpreted by nurses, even within the same unit, and Times of administration columns were introduced to encourage the doctors to be more specific in their instructions.

The Date cancelled column is placed at the extreme right of the sheet to encourage the continuance of the cancellation line across the unused recording columns rather than just through the prescription.

The annotation of each prescription with the approved name of the drug and any calculation involved in determining the dose to be administered, is done, where necessary, by the visting pharmacist. On sheet B4 this annotation was entered in the Pharmacy use column, but in sheet B5 it is intended that such annotations shall be made alongside the prescription and the pharmacy use column will contain only the initials of the visting pharmacist reviewing the prescription and arranging the supply of any drugs required.

Some prescribers tend to order medication at regular intervals, but to expect the nurse to use her discretion as to administration, dependent upon the patient's condition and other factors. The introduction of the As required prescriptions sub-section is an attempt to help the doctors to fulfil their responsibility and indicate clearly to the nurse those drugs, and patients, to which such discretion may be applied. Drugs ordered to be given at set times if required, as well as drugs ordered when required, with a minimum interval between doses, may be included and hence the times of administration columns extend through this section.

5 Administration records Replies from the questionnaire to nursing staff indicated a need to introduce an administration record section. Staff shortages necessitate nurses carrying out medicine rounds singly and initialling the sheet as each dose is given introduces a useful form of self checking. Medicine rounds are frequently interrupted and recording administrations reduces the risk of omissions, or duplication of doses on resumption. The increased mobility of patients in geriatric

hospitals, with the introduction of day rooms away from the ward, has increased the difficulties of medicine rounds and recording provides a means of checking that no patient has been missed at the end of each round.

The method of recording administrations is designed to give the maximum safety with the minimum of writing. It provides information on whether a dose has been administered and by whom. In the 'As required' prescription subsection, nurses are asked to enter the time of administration above their initials if this does not correspond to a routine medicine round.

Omissions form a large proportion of medication errors and are often due to indistinctly written or cancelled prescriptions, or the nurses' failure to report refusals or other non-administrations of medication. The initialling of the prescription after each administration helps in locating the prescriptions which are still in use. The use of 'R' to indicate medication refused and 'X', with an explanation in the 'Exceptions to prescribed orders' section, to indicate a drug not given provides a concise way of reporting known omissions. An 'X' in the 'As required' prescription subsection indicates 'not required' and no further explanation is necessary.

Courses of treatment of specified length were often inadvertently extended, or shortened, because of miscalculation of dates. The method of recording introduced provides a simple means of checking the exact number of doses already administered.

6 Exceptions to prescribed orders The routine prescribing of suitable aperients, analgesics or night sedation on admission in the 'As required' prescription section, is encouraged, but it was accepted that nurses may need to administer such drugs on the sister's authority without prior reference to the busy general practitioner. To ensure that all administrations are recorded a section was included entitled 'Exceptions' to prescribed orders, intended for nursing use only, where records of such 'nursing administrations' could be made.

This section is also used to record the details of any omissions of medication prescribed in the Regular prescriptions subsection.

7 Drugs to take home This section, which completes the main prescription sheet, is rarely used in the small hospitals. It will become of greater value when the use of the sheets is extended to the hospitals with pharmacy departments where it will avoid the transcription of items required to a pharmacy order.

8 Continuation sheets for the recording section These pose a considerable problem, especially in long-stay units. Self adhesive sheets align more easily at first but are single sided and become unwieldy after eight to ten weeks so that the prescriptions must be rewritten. It was decided to have double sided loose sheets (with five days per side, later increased to seven) which could be removed and filed in the patient's notes as required. Storage of these sheets is a problem in long-stay units. Prescription sheets are required to be kept for six years after discharge, but the medical records subcommittee considered that as the start and termination dates of each treatment appear on the prescription sheet, the continuation sheet represents only a transitory document and may be destroyed six months after the date of the last entry it contains, unless otherwise requested by the doctor.*

There is no consistency in the location of the prescription sheets on the wards. In units where they are kept at the foot of the patient's bed, 'London Hospital' chart-holders have proved satisfactory, although the addition of a retaining strap through the punching to support the continuation sheet is an advantage, see illustration 2 (overleaf). In other acute units where the sheets are kept in sister's office or on the medicine trolley, standard ring binders are a simple and economical means of storage. In long-stay units, where the same prescription sheets may be in use for several years, some protection from handling and spillage is required.

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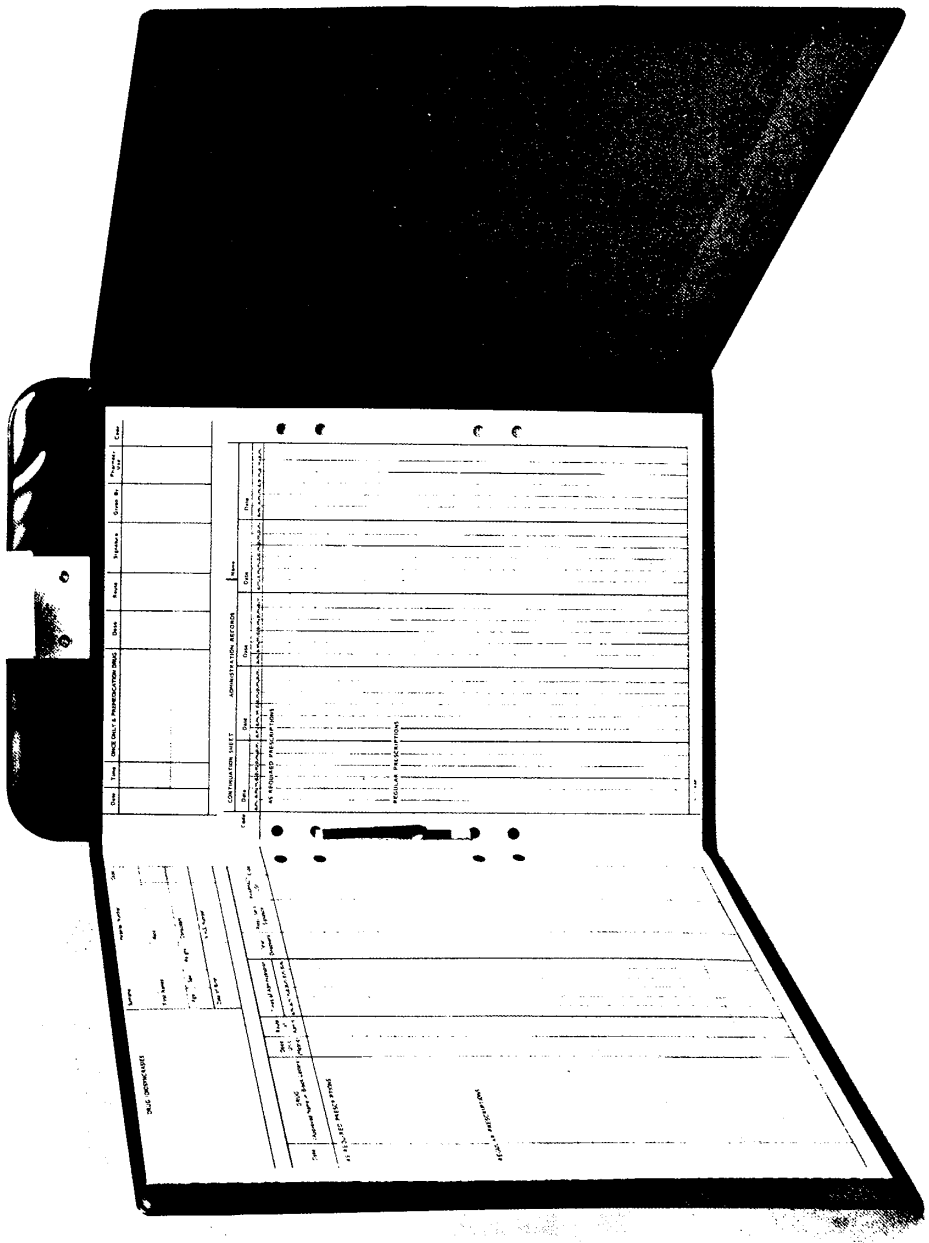
* In the author's opinion the legal position on this point needs clarification nationally.

Illustration 2 The bed-boards used to hold the prescription sheets

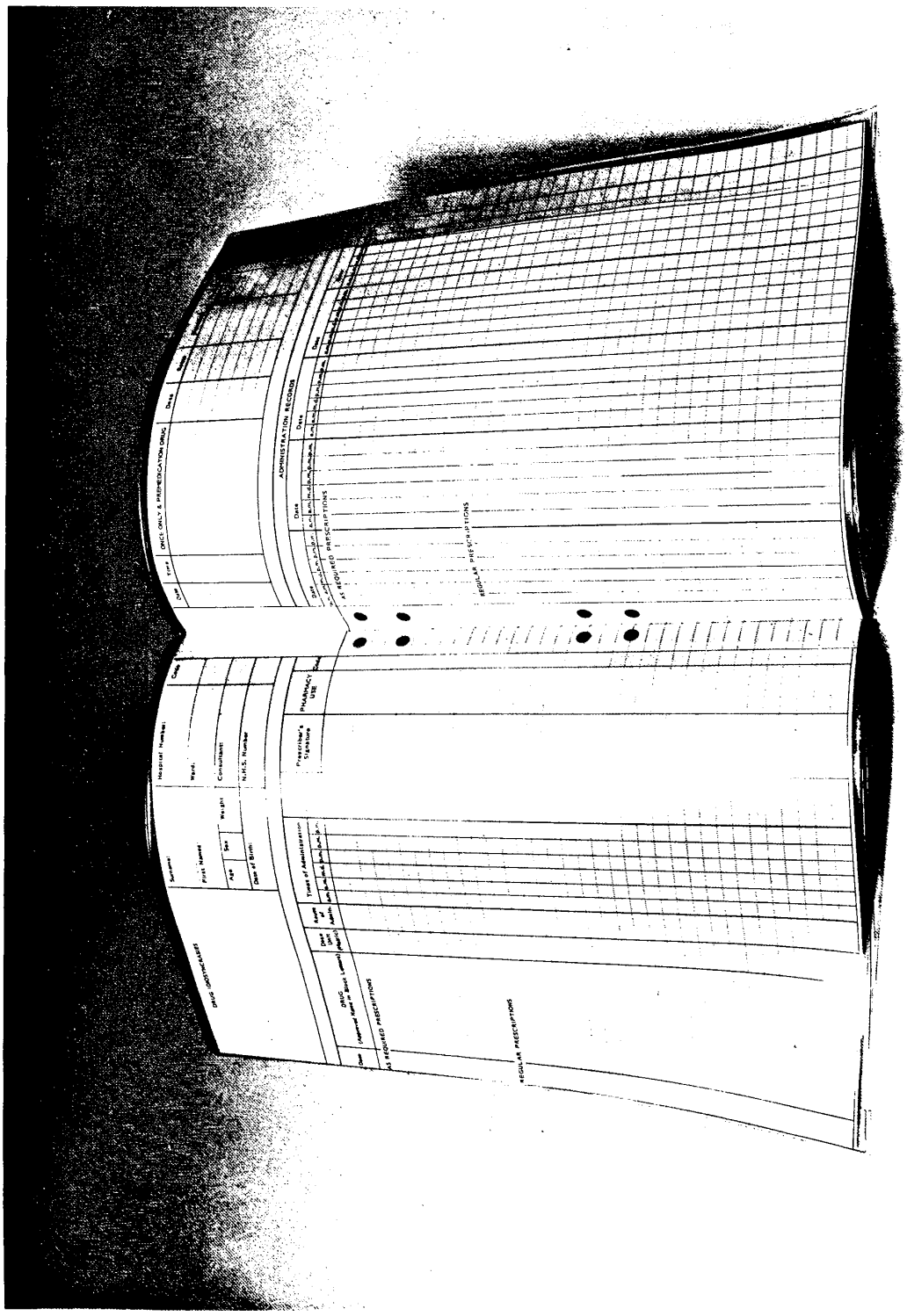


We used plastic envelopes, illustration 3 (overleaf), in which the recording section is permanently exposed and the prescribing sections and date cancelled column are inserted under flaps, the larger of which can be folded back for prescriptions to be entered. The envelopes can be stored in standard ring binders and continuation sheets are easily inserted, or removed from the centre of each.

Difficulties were reported in tracing the correct line across the prescription sheet for recording the administration or cancelling a prescription and that the cancellation column was not fully exposed when continuation sheets were in use. Two modifications have therefore been included in sheet design B5: the lines are numbered on both edges of the prescription sheet and along the centre margin of the continuation sheet and the continuation sheets are 'tumble' printed so that it is possible to have only one punched margin for both faces. These modifications were subject to a successful trial on both wards at East Cornwall Hospital.

Lack of space in various sections was reported but unfortunately the section concerned varied from unit to unit. The layout made it difficult to prescribe intravenous fluids, sliding scale insulin and rapidly changing analgesic doses in terminal cases and this may account for the lack of space reported in some cases. Separate adhesive sheets were prepared to solve these specialised problems, which could be attached to the main prescription sheet when required. The bulk and filing of continuation sheets were presented as problems but these will be lessened a little by the increase in the number of days per sheet included in the new design (B5). The width of the lines in the As required subsection has been increased following complaints that there was insufficient room to enter both the time of administration and the nurses' initials in the existing boxes. A difficulty was reported in tracing the last dose of a drug given only infrequently but no solution to this has yet been suggested. All modifications and additions were discussed by the Steering Committee who recommended that the final design, see Appendix B5, together with supplementary sheets for intravenous fluids and medication with rapidly changing dosage, see Appendices B6 and 7, be submitted to the Regional Printing Department so that printing costs could be estimated, see Appendix B.

Illustration 3 The protective covers for the prescription sheets in long-stay units



The Procedural booklet

The information to be included in the procedural booklet was determined by collecting details of existing procedures from various sources including:

replies to the questionnaire to nursing staff;
the West Cornwall manual of nursing procedures;
procedure manuals of other hospitals; and
observations made during the first error rate determination.

The details collected were discussed with the pharmacists of the West Cornwall clinical area and those procedures which fulfilled statutory requirements, were practised by the majority of the hospitals in the area and were acceptable to the pharmacists, were written into the draft form of the procedural booklet. The draft was revised to include several modifications suggested by the nursing and medical staff, and was then approved for adoption on a group basis. The procedural booklet,*Guidelines for all involved in the ordering, prescribing and administration of drugs, was introduced into the sample units in October 1970 after the second error rate determination had been completed.

The booklet is a set of guidelines aimed at promoting a safe system: it is not intended to be a set of rigid rules to be followed regardless of circumstances. The following four points were considered during its production.

1 In order to encourage its use, the booklet is pocket sized and the information is arranged in separate sections for medical, nursing and pharmaceutical staff, although this results in some duplication in the text.

2 Replies to the questionnaire from more junior members of the nursing staff revealed their need to have details of procedures which are second nature to more experienced staff, in a permanent and easily

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* See back flap

accessible form. The booklet aims to provide all necessary information on accepted procedures and drug usage to all hospital personnel. It is hoped that it will be of considerable assistance in the training of staff and will help those coming into the group to adapt more quickly to new conditions and practices.

3 The amount of authority relating to the administration of drugs which the doctor delegated to the nursing staff, and the qualifications of the staff to whom this was extended, varied from unit to unit and it was considered necessary to lay down limits of responsibility to protect the more junior staff from excessive demands, see booklet sections 2-6; 3-6; 3-9; 9-1 and 9-2.

4 Observations of numerous prescription sheets during the error rate determinations revealed a clear need for standardisation in the writing of prescriptions. Detailed instructions on the use of the new prescription sheets are included in the booklet: it is hoped that this will remind the doctor to include all necessary information clearly and at the same time help the nurse to interpret the prescription when written.

The first three sections of the booklet are mainly intended for medical staff. The extensive explanations in sections 1 and 2 of the new style of prescription sheet from the prescriber's viewpoint could probably be reduced to a summary form in later editions, when the prescription sheets are fully established throughout the area. Reported methods of dealing with verbal or telephone orders, drugs which a patient may bring into hospital, automatic time limits on antibiotic courses, and so on, were so varied that it was obvious that procedures must be agreed, put into writing, and adopted on a group basis, see section 3.

Agreement was obtained from the nursing and medical staff to limit those drugs which can be given at the nurse's discretion without reference to the doctor, in order to avoid the unauthorised administration of potent drugs by inexperienced staff, see addendum 3.

Alternative procedures, to reduce the amount of writing, have been suggested in the case of 'Standing Orders'; for example, if a doctor wishes digoxin to be omitted always if the pulse rate falls below 70, he may indicate this on each patient's prescription sheet when the drug is prescribed, or he may give a written 'standing order' to the sister in charge that such a ruling shall apply to all his patients.

Sections 4 to 10 are mainly intended for the nursing staff. Section 6 contains the legal requirements, and their interpretation, which apply to drugs controlled by the Dangerous Drugs Act, 1965[8] and the special recording required locally for certain Schedule 4 drugs liable to misuse.

Difficulties of ordering by, and supply to, the small hospitals have resulted in unacceptable practices of storage, transference and labelling of drugs at ward level. Removal of the cause is the first consideration but a reminder of the correct procedure is always advantageous. The responsibility of the ward staff for the drugs in their charge is defined.

Since publication of the procedural booklet, it has been found that sub-section 9-3-5, 'the storage of drugs in medicine trolleys', is impracticable in some units where a high proportion of sedatives and tranquillisers controlled by Schedule 4B of the Poisons Rules[21] are in use. In subsequent editions the second sentence of this paragraph will be amended to read, 'Any drugs subject to special control and recording should be kept in the inner, locked compartment within the trolley'.

Section 10 sets out the recent recommendation regarding the drugs which a patient brings into hospital[15] although not all the hospitals in the area are in agreement with it and can produce detailed information as to the dangers which may arise through its adoption.

Sections 11 and 12 are designed to help the pharmacist interpret and use the prescription sheet correctly and carry out the duties of visiting/ward pharmacist as fully as possible.

Addendum 1 will become obsolete after a few years when the metric system is fully established, and the remaining four will need constant revision. Additions to, or removals from, the list of approved oral medicines should be arranged by discussion at the local nursing officers conference and kept on a group basis. The table of common drug interactions will need constant up-dating if it is to retain its value and continue to be an incentive to the medical profession to carry and use the booklet.

The Visiting pharmacist scheme

This is an extension of ward pharmacy to small units situated at some distance from the main hospital. It is the type of service which may become necessary in many groups where the ancillary services are being centralised in a new district general hospital, if smaller units are not to plead isolation as an excuse for lack of progress. In the West Cornwall area many of the units are equivalent in size to a single ward of the main hospital and the advantages which the service can offer must be balanced against the time and money spent on travelling. The aim of a visiting pharmacist service is to improve patient safety by ensuring that:

prescriptions are easily interpreted by the nurse in terms of the labels on the stock containers;

stock is maintained in good condition and at a suitable level by regular checks on its age, storage conditions and labelling;

and the staff possess all the information necessary on the drugs in stock to enable them to be used intelligently.

Secondary to this aim, and arising from the way in which it is achieved, is an improved relationship between the staff of the supplying pharmacy and the medical and nursing staff of each unit together with an economy in drug costs.

A visiting pharmacist service was introduced for a trial period in order to determine the need, acceptability and cost of this increased pharmacy involvement in the smaller hospitals. From March until the

end of May 1970, only the sample units, see Table 3, were visited and many of the problems encountered arose from the new prescription sheets which had been introduced. In June 1970, the service was extended to cover 16 hospitals (17 units) and for three months these were visited once or twice weekly. All prescriptions in these units were seen by the pharmacist on each visit, problems of stock or supply tackled and any relevant information supplied to the medical or nursing staff. All journeys and visits were timed, the number of new prescriptions seen on each visit recorded and any problems discussed were noted. At the end of the period the information gained was analysed and used to produce a specimen timetable for such a service on a permanent basis.

The author worked full-time as sole visiting pharmacist for these six months. This makes the investigation atypical as the opportunity for personal incompatabilities was more restricted than in a departmental service and the very limited involvement of the visiting pharmacist in the work of the pharmacy departments reduced the scope of the stock control aspect of the service.

Table 4 (overleaf) illustrates the type and number of problems encountered during the trial period. Full details of all problems encountered should continue to be recorded on a permanent basis as they give an indication of possible deficiences in the pharmaceutical service which would not otherwise be detected. The detailed reporting of queries received, together with answers supplied, builds up a useful source of reference.

The duties of a visiting pharmacist can be summarised as follows:

1 To establish a good working relationship with other members of the hospital team. He should be able to listen and advise as well as check and control. He should become aquainted with hospital routine and make his visits fit this as well as the pharmacy timetable.

2 To check and annotate as necessary with dosage calculations, alternative names, etc. all prescriptions on each visit.

TABLE 4 SUMMARY OF PROBLEMS ENCOUNTERED DURING SIX MONTHS AS A VISITING PHARMACIST

Total number of visits made	293
Information required	138
Problems of supply/non-delivery	104
Problems concerned with the new prescription sheets	39
Problems detected by the pharmacist from the prescription sheet/medicine round	31
Stock checks (routine or requested)	22
Delivery of urgent orders	20
Interactions/side effects reported	7
Total	361

3 To refer to the doctor, either directly or through the sister, any incompatibilities or discrepancies detected.

4 To discuss with the nursing staff any problems arising from drugs in use and to provide information on their action and side effects if requested. It would be an advantage if the pharmacist accompanied the nurse on a medicine round occasionally to see some of the practical difficulties of administration first hand, as these are often not reported because no solution is anticipated. He should also take the opportunity of meeting the night staff whenever possible as they tend to feel very cut off; problems and solutions are not satisfactorily transmitted through a third party.

5 To arrange the supply of drugs required on an individual inpatient basis or for the patient to take home. Details of such drugs should be written directly onto the appropriate label so that the possibility of transcription errors is minimised.

6 To collect information from medical and nursing staff on any unusual side effects they have observed and to report these to the Committee on the Safety of Medicines, with the doctor's approval, if necessary. Regular discussions between visiting pharmacists on incidents reported can give a clearer picture of their severity and frequency.

7 To sort out any problems associated with the supply or non-delivery of drugs ordered.

8 To supervise the ward/hospital stocks, storage conditions and so on, and to carry out the statutory three monthly inspection of poisons.

9 To be the contact at the base hospital for the staff of the outer hospitals when telephone communications are necessary.

10 To ensure that all newly appointed staff know the procedures for dealing with drugs and the use of the prescription sheets.

Table 5 (overleaf) illustrates the work load on the visiting pharmacist in the various types of hospital based on a total of 293 timed visits over a period of six months. The proposed intervals between visits were arrived at by balancing the work to be done, represented by the number of new prescriptions to be checked and annotated, and the number of problems arising per visit, against the need for continuity of contact between the nursing staff and the pharmacist and the time involved in travelling to and from each unit.

TABLE 5 SUMMARY OF THE TIME AND WORK INVOLVED IN PHARMACY VISITS

averages	whole group	acute units (small)*	acute geriatric units	long-stay geriatric units	maternity units
number of units	17	7	2	6	2
time per bed (mins)	0.73	0.93	0.96	0.4	1.02
new scripts/visit	10.5	14	15	3.5	11
problems/visit	1.3	1	0.7	1.0	1.1
frequency of visits					
now		1/2 weekly	weekly	weekly	weekly/ monthly
proposed		weekly	weekly	fortnightly	weekly

* Camborne-Redruth Hospital; Royal Cornwall Hospitals, City and Treliske; Tehidy Hospital and West Cornwall Hospital were not included in this part of the survey as they had pharmacy departments at its commencement. St Mary's Hospital, Isles of Scilly was also excluded.

In acute units where the new prescription sheets were in use and many annotations were necessary, the time per bed was 1.25 minutes, compared with 0.78 minutes in units still using the old-style sheet, see Appendix B1, where no annotations were possible. Suitable adjustments for this were made in working out the timetable for which it was assumed that all units would have sheets requiring annotation. Map 2 (overleaf) illustrates the proposed visiting pattern for the area. It is not proposed that these timetables should be rigidly adhered to: one of the most important features of a visiting pharmacist service is its flexibility, staff must be given time to broach their difficulties in their own way.

Of the 22 hospitals in the area, four have pharmacy departments (one of these on a part-time basis only), 12 would be visited weekly, five fortnightly and one (St Mary's Hospital, Isles of Scilly), three-monthly. At these intervals it should be possible for the pharmacist to see every prescription sheet at least once during the patient's stay in hospital with the exception of emergency admissions of very short stay and admissions to St Mary's which he can only visit infrequently. Once every three months a complete half day would be required at each unit for stock checking in addition to normal visiting.

It is proposed that four pharmacists should share the visiting duties outside the main hospitals as shown in Table 6 (overleaf, following map). The hospitals to be visited by each pharmacist are dictated by the geography of the area in the West Cornwall Group, but in a more compact area it might be possible to group the hospitals by type so that each pharmacist could specialise.

A minimum of nine pharmacists, with adequate supporting staff, would be required to provide the service to the group as a whole, assuming the remainder of the work remains at the present level. This is an increase of one pharmacist on the present establishment to cover the extra work imposed by visiting the small hospitals regularly.*

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* Since this investigation was completed, St Lawrence's Hospital, Bodmin has amalgamated with the West Cornwall Group. The pharmacist from this large psychiatric hospital is willing to act as visiting pharmacist to East Cornwall Hospital, Bodmin. This will reduce the travelling time and expense of the visiting pharmacist from Truro but help may have to be supplied for work at St Lawrence's in exchange for the extra duties. An additional pharmacist will therefore still be required in the group as a whole, making a new minimum establishment of ten.

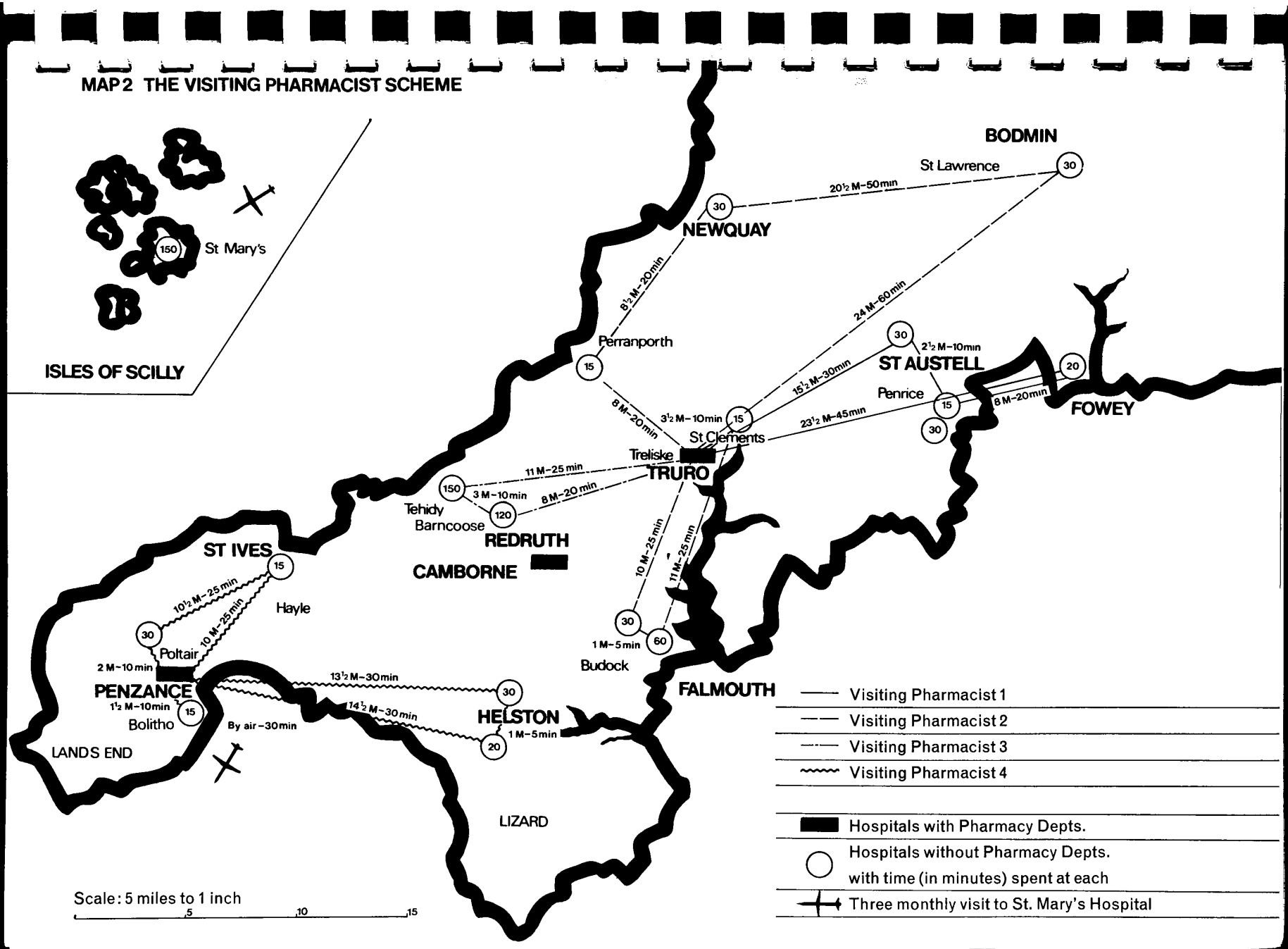

MAP 2 THE VISITING PHARMACIST SCHEME
ISLES OF SCILLY
St Mary's
150
BODMIN
St Lawrence
30
20½ M–50min
NEWQUAY
30
8½ M–20min
Perranporth
15
24 M–60min
30
2½ M–10min
ST AUSTELL
15½ M–30min
Penrice
15
8 M–20min
20
FOWEY
23½ M–45min
30
8 M–20min
3½ M–10min
15
St Clements
Treliske
TRURO
11 M–25 min
150
3 M–10min
8 M–20 min
120
Tehidy
Barncoose
REDRUTH
CAMBORNE
ST IVES
15
10½ M–25 min
10 M–25min
Hayle
30
Poltair
2 M–10 min
10 M–25 min
10 M–25min
30
1 M–5min
60
Budock
FALMOUTH
PENZANCE
1½ M–10min
15
Bolitho
13½ M–30min
30
14½ M–30 min
HELSTON
1 M–5min
20
By air–30min
LANDS END
LIZARD
Scale: 5 miles to 1 inch
5
10
15
Visiting Pharmacist 1
Visiting Pharmacist 2
Visiting Pharmacist 3
Visiting Pharmacist 4
Hospitals with Pharmacy Depts.
Hospitals without Pharmacy Depts.
with time (in minutes) spent at each
Three monthly visit to St. Mary's Hospital

TABLE 6 VISITING PHARMACIST'S TIMETABLE

pharmacist	1	2		3		4
base hospital	Treliske	Treliske		Treliske	West Cornwall	
number of hospitals visited*	3/4	2/3	2/3	2	2/3	1/2
time involved	1 half day per week	2 half days per week		1 day per week	2 half days per week	
day **	Friday	Thursday	Tuesday	Wednesday	Thursday	Tuesday
mileage/trip***	50	61	26	22	23	28
mileage/year	2,600	4,500		1,150	2,650	

* Where alternative figures are indicated they represent hospitals visited weekly/fortnightly.

** The days indicated were chosen because of local conditions. The factors considered include which day the consultant/practitioner visits the unit - later the same day or the following day are optimum times for visiting; operating days in small units - these should be avoided as all senior staff are involved and not available for discussion; days on which busy out-patient clinics are conducted should be avoided.

*** The mileages stated represent those for the longest trip in each case, the mileage on the alternate week will show a slight reduction in most cases.

The West Cornwall nursing officers' conference in November 1970 was asked to discuss the visiting pharmacist service; they were appreciative and wished it to continue. This wish, supported by a recent Department of Health circular HM 70(36)[15], encouraged the Medical Executive Committee to accept the idea of such a service on a permanent basis.

The review of the system

The West Cornwall system has undergone continuous evaluation since its introduction in March 1970 and details of the results obtained and the modifications introduced to eradicate the problems detected, are discussed in the next chapter. In addition, towards the end of the trial period, during November and December 1970, opinions on the value and acceptability of the new systems were sought. A second questionnaire was circulated to medical and nursing staff in the sample units requesting information on:

the usage of the procedural booklet;

the extent of the nurses' responsibility and whether the sheet design defined this adequately;

the value of recording administrations and the proposed method of doing this; and

any difficulties encountered or modifications required, see page

The response from the medical staff was somewhat disappointing, both in numbers and information supplied, but much constructive criticism was received from the nursing staff.

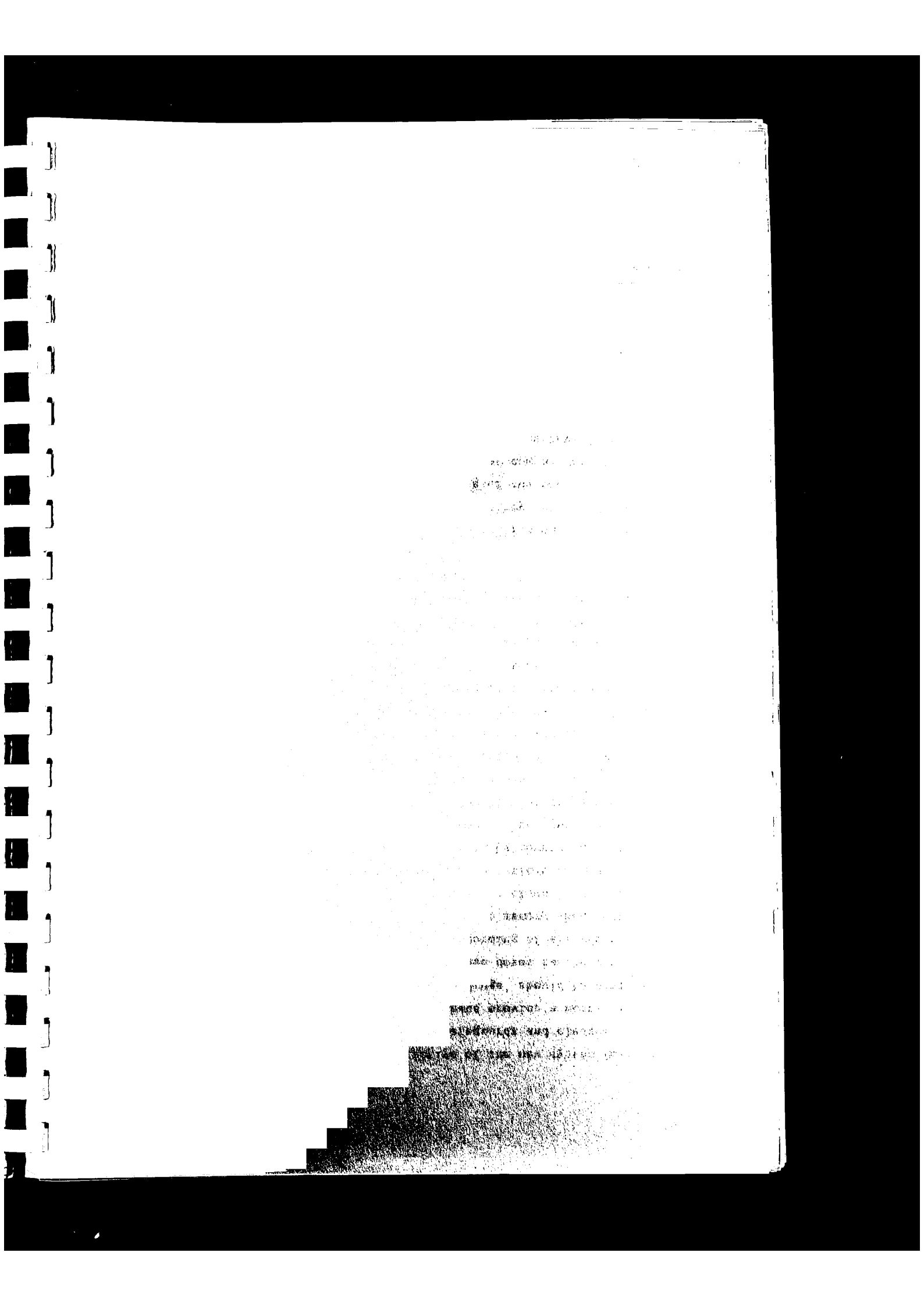
The medical staff were of the opinion that the procedural booklet was useful, especially the drug interactions table, whilst admitting that they consulted it only infrequently. They thought that the new prescription sheets were rather complicated and too insistent on detail under conditions where medication is in the hands of capable, responsible staff as distinct from the conditions which obtain at home. However, the majority were in favour of all decisions regarding medication being taken by the medical staff and considered that the sheet design offered them a satisfactory means of indicating their instructions.

The nursing staff seem more appreciative of the new system feeling that it provides them with additional safeguards and clearer prescriptions. The new prescription sheets provide a means of establishing whether or not 'As required drugs' should be administered, because the frequency of previously recorded doses can be considered alongside the patient's condition. The recording of all administrations means that the nurse no longer has to rely on memory when returning to an interrupted medicine round. The time involved in signing for routine administrations of vitamins, or iron tablets seemed excessive to some nurses, but they agree that it could be counterbalanced by cutting out the duplicate records still made in the nursing records (Kardex) or Scheduled Poison register. One comment arose when the use of the patient's own drugs was being discussed which is outside the scope of this investigation but is of considerable importance: "As the patient's own drugs often have to be used for one or two administrations until either the doctor can be contacted to identify them, or until supplies are obtained, there is an urgent need for the name and strength of the drug and full instructions to appear on the label; not just 'The Tablets, as before'. This problem assumes even greater magnitude in a holiday area such as West Cornwall, where the patient's own doctor may be several hundred miles distant." It is in fact a problem of national significance.*

It was reported that recording each administration when given had considerably increased the time required to carry out a medicine round. This comment was valid for the early stages of the new system and some permanent increase is to be expected, but comparison of the average times recorded during the error rate determinations reveals that it is not excessive.

time / round	1969 - 22 min;	1970 - 29 min;	1971 - 21 min.
time / patient	1969 - 70.4 sec;	1970 - 90.9 sec;	1971 - 79.9 sec.
time / administration	1969 - 58.2 sec;	1970 - 61.5 sec;	1971 - 60.6 sec.

* Agreement has now been reached between the medical and pharmaceutical professions on the labelling of dispensed medicines with the name of the preparation.



The low figure for the overall time per round in 1971 may be due to unusually light prescribing at this time, but comparisons of the times per patient and times per administration show that the initial increases are being reduced as the nurses become more familiar with the new routine.

The West Cornwall system must be kept under constant review and the procedures and documents involved modified as difficulties, and possible improvements, are detected. Sheets B5, 6 and 7 represent modifications required after 12 months usage and these will be in use throughout the group in the near future. Several suggestions for improvements to the procedural booklet have also been received. A loose leaf format would have advantages in that single sheets, rather than the whole booklet, could be replaced when isolated procedures are changed and additions to the drug interactions table could be inserted more easily. The various sections intended for the different professions could be more clearly separated, possibly by printing on differently coloured paper. The visiting pharmacist service has yet to be tried out on a full time permanent basis and the timetables and staff commitments will need revision in the light of experience. Some method of maintaining contact between the pharmacy and the small hospitals during periods of staff shortage must also be worked out. It may be possible to come to some arrangement whereby the pharmacist carrying out the statutory poisons inspection makes himself known to all the staff in that hospital and instructs them to ask for him when telephoning the central pharmacy with queries so that some degree of personal contact is maintained.

During the two years of this investigation a reduction in the number of administration errors in the sample units has been demonstrated and an even more responsible attitude towards drugs has developed. The amount of information on drugs requested from the pharmacy departments has increased and the staff have become critically aware of the different standards applied to the control of drugs in various situations within the hospital service. The introduction of the West Cornwall system, it is claimed, is responsible for a major part of the improvement reported and with continued cooperation between all branches of the health team the standard of medication should continue to rise as the system is extended throughout the group.

4 THE EVALUATION OF THE WEST CORNWALL SYSTEM

The evaluation was twofold; an estimation of errors occurring at ward level and a comparison of the prescribers' use of the new prescription sheets after 6 and 12 months, in the West Cornwall clinical area as represented by the 'sample units'.

The error rate determination

The first error rate determination was undertaken in September 1969 to confirm Miss Stone's findings quantitatively and to provide a basis against which the effect of any new system could be measured. The second determination was carried out in September 1970 when the new prescription sheets and visiting pharmacist service had been in operation for six months and when the work load on the sample units would be similar to that during the previous investigation. The results were analysed to ascertain how the system was progressing and where modifications were required. A third error rate determination was carried out after a further six months' usage of the West Cornwall system to investigate the effect of familiarity on sheet usage and the use of the standard procedures recommended in the procedural booklet on patient safety.

An error was defined as any deviation from the prescriber's written instructions which occurs between the writing of the prescription, the administration of the drug and the recording of that administration. The errors were subdivided into:

administration errors, including unavoidable omissions if these were not recorded;

prescribing error where the nurse could not carry out the prescriber's instructions on the information available without putting the patient at risk;

transcribing errors, from the notes to the prescription sheet, the prescription sheet to the medicine list/card or the prescription sheet to the pharmacy order;

recording errors, correct administrations incorrectly recorded or records omitted where they are required by law or accepted procedure;

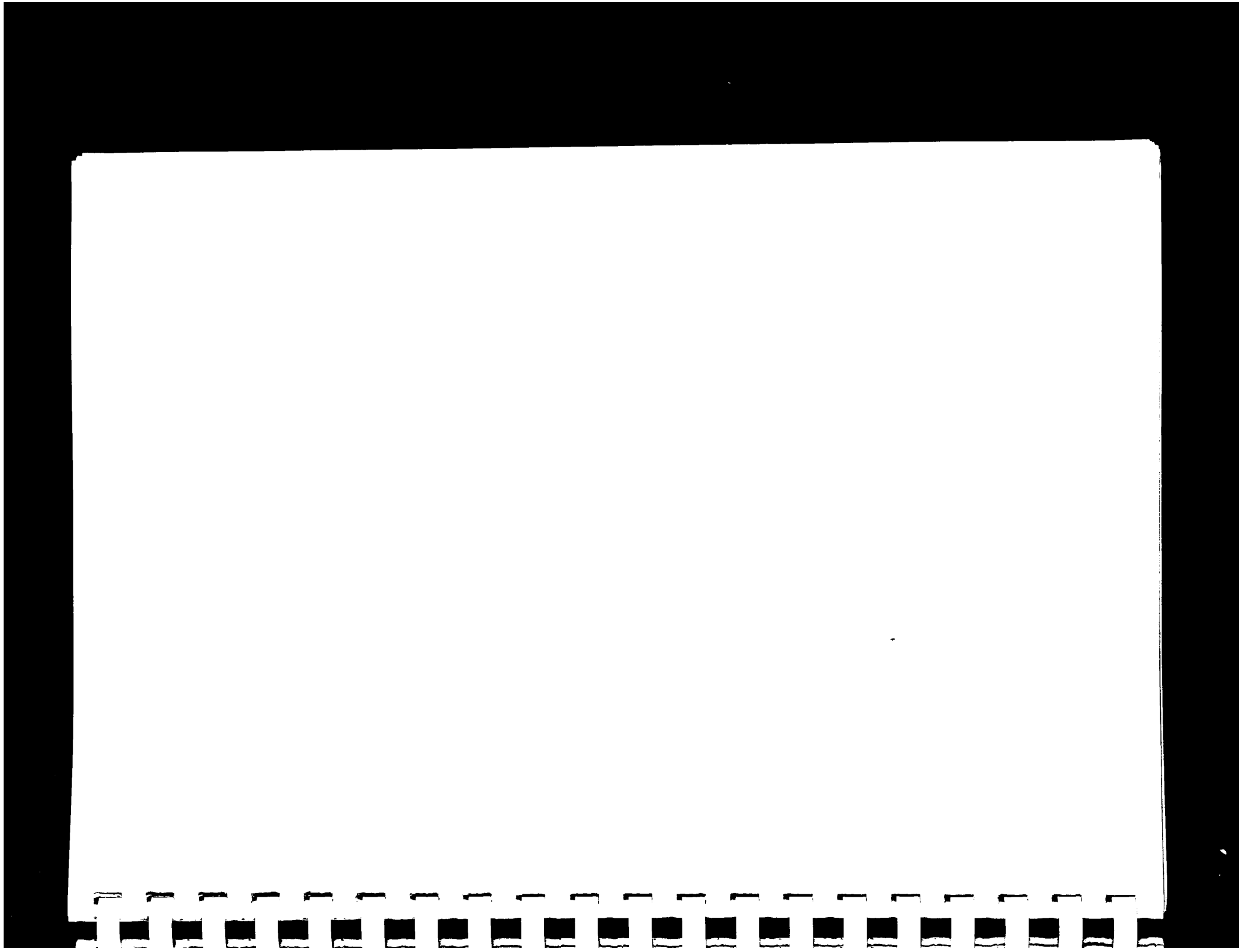
errors of supply, where the drug, or form supplied led to an error of administration.

Errors were detected by direct observation. Details of the drugs given on 15 medicine rounds in each of the eight sample units were recorded at the time of administration, and at the end of the week these were compared with copies of the prescription sheet for each patient. Discrepancies were noted, classified and counted; any records made by the nursing staff were noted and compared with the administration records made by the author.

During the error rate determinations all medicine rounds were timed and details of sheet usage were recorded in the second and third investigation.

Any errors detected during the course of a medicine round were not commented upon or corrected unless they represented a danger to the patient, as such interference would have influenced the nurses' actions on subsequent rounds. At least two rounds involving the night staff were observed in each unit so that the recording of night sedations was included in the investigation.

No record was made of the nurses responsible for the medicine rounds and as many staff as possible were involved to prevent any feeling of victimisation. It was constantly stressed that the systems, not the staff, were being evaluated and in order to remove any feelings of interdepartmental interference, a nursing tutor accompanied the observer on at least one round in each unit and checked the copy prescriptions from which errors were detected.



The effect of the presence of the observer is difficult to assess[3, 4] but it was felt that this would be minimised if the observer was present on the ward continuously throughout the week, not just at medicine-round times, and that it should be of similar magnitude in each of the three investigations.

The method of detecting and classifying errors was written down in detail so that the determination could be reproduced accurately on each occasion and the same criteria used in borderline cases.*

No indication of the findings was given to the staff concerned until after the second error rate determination and the difference between the first and second error rates can fairly be claimed to be due to the introduction of the new system. The difference between the second and third rates may have been influenced by greater familiarity with the new system and by attempts on the part of the nursing staff to remove other sources of error revealed by previous investigations.

Three distinct error rates are reported for each determination:

1 the number of errors per administration, a straight comparison of the mistakes made in the actions taken;

2 the number of errors, excluding recording errors, per administration, this provides a fairer comparison between the determinations in 1969 and 1970/1. Records were only required for a minority of administrations in 1969 but all administrations should have been recorded in the later determinations so the possibility of error has been considerably increased. Recording errors rarely represent a danger to the patient;

3 the number of errors per opportunity for error, that is the number of prescriptions to be read, interpreted and acted upon. This figure gives a clearer picture of the circumstances under which the errors arose than the number of administrations made, as less than one in three of all prescriptions read required an administration but all involved a decision.

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* Details of the method may be obtained from the author, Miss S Ellis, Pharmacy Department, Hospital for Women, Coventry Place, Leeds LS2 9NR.

TABLE 7 THE ERROR RATE DETERMINATION

Data Collected	date of determination 1969	1970	1971
sample units involved	8	8	7
number of medicine rounds observed	115	121	103
number of patients involved	178	171	126
range of patients involved per round	10 - 37	13 - 37	11 - 22
prescriptions read	8,643	10,732	7,858
administrations made	2,641	3,400	2,172
administrations required*	2,864	3,682	2,281
errors observed	396	357	188
recording errors observed	13	67	34
Results			
percentage errors per administrations required	13.8	9.7	8.2
range of such errors within the sample	7.9-27.4	4.9-26.6	3.0-12.1
percentage errors, other than recording errors, per administration required	13.3	7.9	6.8
range of such errors within the sample	7.7-26.7	3.6-25.0	2.2-10.3
percentage errors per opportunity for error	4.6	3.3	2.4
range of such errors within the sample	2.1-10.7	1.5-13.8	0.8-3.2
percentage reduction in errors, 1969-1971			
per administration required		40.6	
other than recording errors, per administration required		48.9	
per opportunity for error		47.8	

* Administrations required is the total administrations made plus any recorded omissions.

The figures given in Table 7 (previous page) show the error rates for the sample as a whole and the range of errors encountered within the sample for each determination.

Table 8 (overleaf) gives details of the medicine rounds in the sample units in an attempt to illustrate the background to the errors detected. Considering that for each prescription read the nurse must decide whether or not an administration is required, select the correct drug from a medicine trolley containing all the different drugs in use and administer the correct dose to between 10 and 37 patients on four or five rounds each day, the opportunities for error are incredible. The lengths of the medicine rounds reported and the percentage error rates achieved in 1971 illustrate how successfully the nurses now deal with this problem.

The reduction in error rates between 1969 and 1970 can be attributed largely to the introduction of the new prescription sheets, which standardised prescribing and simplified the interpretation of prescriptions by the nursing staff, and to the annotation of prescriptions with approved names, dosage equivalents and so on by the visiting pharmacist. The reduction in total errors was not high but at the time of the 1970 determination prescribing was very heavy and the decrease in error rate was appreciable. The further reduction in errors between 1970 and 1971 was partly due to a closer adherence to the procedures laid down in the procedural booklet and partly to an increased awareness of the situations which were leading to errors. Discussions, with the staff in the sample units, of the results of the determinations carried out in 1969/70 led to a closer control of medicine rounds and the removal of factors causing errors which were outside the scope of this investigation. The attitude of all staff towards drug administration has become more responsible since the occurrence of errors was pointed out to them.

Table 9 (overleaf, follows Table 8) shows the type of error detected during the three determinations. Few of the errors were of a dangerous nature and on only four occasions was it necessary for the observer to intervene and prevent or correct an administration. A tolerance of ten percent was allowed on dosage to allow for conversions from the imperial to the metric system in 1969, and from solid to liquid dose forms in all three

TABLE 8 AN INDICATION OF THE WORK INVOLVED IN ADMINISTERING DRUGS*

sample units	average number of patients	average number of scripts read per round	average number of administrations per round	number of different drugs in use	number of rounds per day	length of medicine rounds in minutes
Poltair geriatric hospital	37**	154	44	91	5	9-40.4-91
Carn Brea long-stay ward	21	124	35	33	5	9-32.3-62
Jenkin geriatric ward	18	94	33	33	5	12-31.7-54
Edward Hain acute hospital	11	36	10	30	4	3-10.6-23
Female ward East Cornwall acute hospital	10	30	15	38	4	5-13.9-28
Ward 5, acute medical RCH (Treliske)	16	71	26	67	4	18-32.6-53
Penrice maternity hospital	20	29	26	16	4	6-15.7-25
Albert Collins ward, Falmouth hospital	19	81	18	50	5	5-18.5-45

* These figures were compiled from information collected during three separate weeks during the two year period of the investigation.

** This hospital has now been divided into two distinct units for the purposes of medicine rounds.

TABLE 9 DETAILS OF THE ERRORS DETECTED

type of error	number detected 1969	1970	1971
wrong drug given (including drugs given to wrong patient)	24	35	6
wrong dose given ($\pm$ 10%)	54	42	28
wrong time of administration ($\pm$ 1 hour)	9	32	14
wrong frequency of administration ($\pm$ $\frac{1}{4}$ agreed interval)	5	-	4
drug (or dose) not available	21	36	26
patient refused (refusal not recorded)	31	15	1
unprescribed administrations or omissions for patient's benefit (action not recorded)	66	23	10
drug not administered, reason unknown	106	68	46
dose duplicated, or extra dose given	14	2	-
dose administered after prescription expired	7	1	-
unauthorised drug given*	13	12	-
incomplete prescriptions	16	9	11
unconfirmed verbal prescriptions	10	6	7
transcription errors	3	-	1
error in recording, administration correct	9	17	2
recording omission **	4	50	32
substitution errors (by pharmacy or nursing staff)	3	9	-
wrong drug supplied	1	-	-
TOTALS	396	357	188

* These include unprescribed S1/S4 drugs in 1969 and any drug not included on the approved list in the procedural booklet in 1970/71, unless confirmed by the doctor later.

** Legally required record, or witness in 1969. Any record in 1970/71. In 1971 most of the omissions referred to entries in the Exceptions to Prescribed Orders section of the sheet.

determinations. It was necessary to allow a tolerance of one hour on the time of administration prescribed because of the length of the medicine rounds in the larger geriatric units. The observer used her discretion in omitting other time errors, for example, the night when sedations were delayed for two hours so that patients could watch 'the fight' or when diuretics ordered for Friday were delayed until Saturday to prevent embarrassment during the ward communion service.

During the 1969 determination the author observed that nurses frequently administered, or omitted, medication after making a considered decision that this was in the patient's best interest. Such actions constitute an error under our definition but in order not to produce misleading figures, these were placed in a separate class as were omissions due to refusal, or rejection of the medication by the patient. Errors in these classes were not counted if details of the action taken were recorded on either the patient's record (Kardex) in 1969 or on the prescription sheet in 1970/71.

The significance of the types of error detected is difficult to establish but the following details may be of interest.

Wrong drug given Once during each of the 1969 and 1970 determinations drugs were proffered to the wrong patient. The administrations were prevented by the observer but the drugs involved were included in the totals for this section: similar incidents did not arise in 1971. Other errors resulted from the substitution of a second drug when the one prescribed was not available or when the nurse considered a milder analgesic to be sufficient. Confusion between the various names used for vitamins and aperients were responsible for most of the remainder. Annotation of the prescription sheets by the visiting pharmacist and an insistence on a written prescription before administration, or substitution have contributed to the reduction in this type of error: the need to annotate prescriptions for vitamins and aperients was not appreciated prior to 1970.

Wrong dose given It is necessary to stress, to both medical and nursing staff, that a clear dose is as important as the name of the drug and the times of administration. There is a tendency to give one tablet from the stock bottle whatever the dose ordered and

calculations involving a change from milligrams to grams present great difficulty: for example, a prescription for 'Tab Aspirin 1.2 G' was only correctly interpreted once during eight administrations; the tablets were selected from a bottle labelled 'Aspirin Tablets, 300mg'. Miscalculations of this nature may be further reduced by annotating alongside the prescription rather than in the pharmacy use column, see Appendix B5. Some errors in this class arose because one tablet of night sedation was given where two were ordered. This practice still persists and the medical staff should be encouraged to prescribe a variable dose in the as required section of the prescription sheet where they intend the nurse to vary the dose according to the response.

Wrong time of administration These errors were usually the result of an ambiguously placed tick or involved a drug prescribed at a specific time which differed from that used previously when it was ordered 'daily'. Several drugs ordered at specific times in relation to meals were given on routine medicine rounds which did not fulfil the instructions: such instructions present difficulties under current staff levels. No time errors were recorded because of medicine round delays.

Wrong frequency of administration These are rare and usually arise with drugs ordered for administration at prolonged intervals or on alternate days. It is important to stress that ALL columns of the prescription sheet be examined before an administration is made.

Drug, or dose not available In units at some distance from the base hospital, three or more errors of omission may be recorded before the delivery of non-stock items can be effected. It would be advantageous to continue the arrangement whereby drugs can be obtained from local retail sources in an emergency in the interests of economy and for the benefit of the patient. Some errors refer to stock items temporarily unavailable either because the pharmacy were awaiting delivery or because the nursing staff had not anticipated an increase in usage when ordering. Further errors arose when the transport schedules were rearranged without sufficient notice to either the pharmacy or the receiving hospital, or both, and the resulting delays in supply can only be prevented by closer cooperation between departments in future.

Rationalisation of the stock held in and the supply to the hospitals, under the control of the visiting pharmacist, could reduce the incidence of these errors still further.

Patient refused medication This type of error can never be eliminated but the introduction of a simple system of recording such refusals in 1970 has resulted in more complete records.

Administration or omission for the benefit of the patient
A considerable reduction in this type of error has been achieved because the doctors are using the 'as required' subsection of the prescription sheet for drugs to be given both 'if' and 'when' required. If the nursing staff continue to make the appropriate entries in the 'exceptions to prescribed orders' section for omissions of drugs prescribed in the regular subsection such errors should disappear. Where entries for a particular drug become frequent the medical staff should be requested to rationalise the situation by an entry, or cancellation on the main prescription sheet.

Drugs not administered, reason unknown This class of errors has decreased largely because prescriptions still current can be detected more easily by back reference along the line of previous signatures in the administration record.

Dose duplicated or extra dose given It is no longer possible to misinterpret frequency instructions and examination of the administration records indicates whether or not a dose has been given, so this class of errors has disappeared.

Dose administered after the prescription has expired The nursing practice of crossing out the prescription as soon as it expires and marking the administration record 'course complete' has reduced these errors and the administration records provide a means of ensuring that the patient receives 20 doses rather than an approximate five days course.

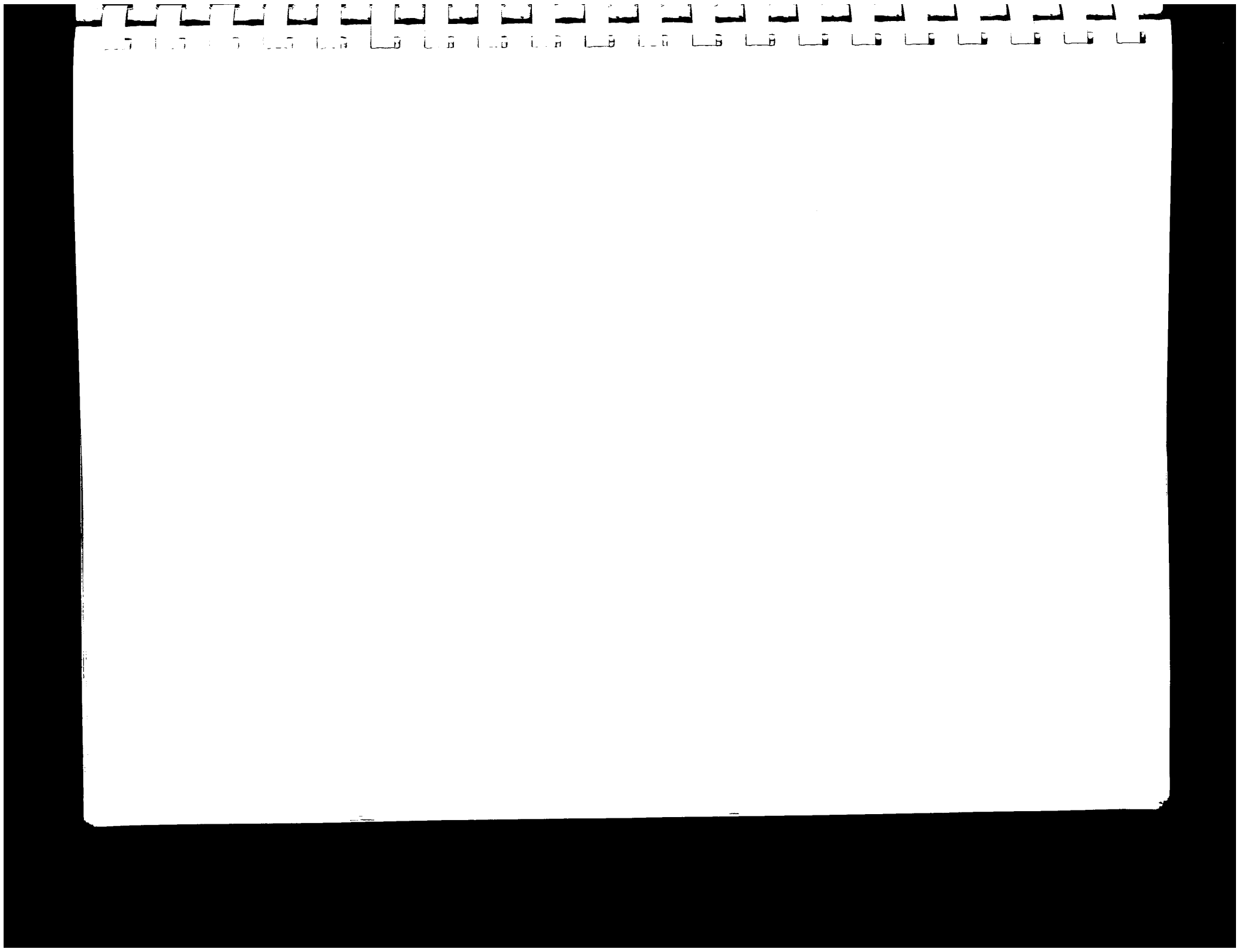
Unauthorised medication administered The narrowing of the range of drugs which may be administered without a prescription has not led to an increase in these errors, but it is common for the record of the administration to be omitted. The major proportion of these errors in 1970 resulted from the practice adopted by some nurses, and not others, of giving unprescribed vitamins with antibiotics.

Incomplete prescriptions Several dose omissions were reported, possibly due to the fact that the prescription sheet asks for a 'metric dose' and the prescriber was unsure of the strength of the tablets: all other details were complete. In several prescriptions the dose was given as '1 tablet' where more than one strength exists and different quantities of drug were given at different times. Only cooperation on the part of the medical staff can reduce these errors.

Unconfirmed verbal prescriptions These unfortunately are still occurring and resulting in intermittent administrations although they now refer more frequently to alterations in medication than to new prescribing.

Transcription errors These can now only arise when prescriptions are rewritten or when an unusual drug is ordered from the pharmacy incorrectly resulting in confusion to both supplier and user: they occur only rarely.

Recording errors Instances of misplaced initials were not recorded unless they caused confusion on subsequent rounds because the difficulty of tracing lines across the sheet was appreciated. More important, in 1970, several administrations were signed although the patient later refused the dose and at other times the amount administered was not that ordered but no indication of this appeared on the sheet. Few such incidents arose in 1971, possibly the nursing staff have realised that the records are only of value if they are complete and correct.



Recording omissions In 1970 omissions occurred both in the administration records and in the exceptions to prescribed orders section, but in 1971 they were confined to the latter. Records are still duplicated in the 'Kardex' in some units and the value of having all records relating to the administration of drugs on one sheet must be continually stressed.

Substitution errors These include unauthorised substitution of drugs by both nursing staff and the pharmacy department. It was discovered that the substitution, by the pharmacy, of one drug for another over a long period has led to the nursing staff considering them to be the same rather than alternative forms of similar medication; any such substitution must always be clearly explained. Nursing substitution was usually committed with the best of intentions, for example, attempts to cut down the amount of night sedation administered by giving one sedative and one mild analgesic thus satisfying the patient's demand for 'two tablets to sleep'.

In one instance the substitution of the approved name for the more instance proprietary name led to the administration of the wrong drug and in a second case a bottle was found to contain tablets of a different strength from that stated on the label, but such errors were rare.

Analysis of sheet usage

Table 10 (overleaf) illustrates the way in which the new prescription sheets were being used after six and twelve months. The high number of drugs ordered in the as required section results from a combination of two policies: firstly, that all patients should be written up for a suitable aperient and night sedation in this section, on admission, and secondly, that in geriatric units the nursing staff should be allowed to use their discretion on the administration of sedatives and tranquillisers. The once only drug section is rarely used because the small hospitals constituting the sample do not deal with surgical cases except in the preconvalescent stage. The use of the exceptions to prescribed orders section has been maintained in some units but has lapsed in others. Entries usually consist of nursing administrations

TABLE 10 ANALYSIS OF SHEET USAGE

		year 1970	1971
number of sheets seen		164	144
total drugs prescribed or entries made	as required prescriptions	322	336
	regular prescriptions	802	768
	once only drugs	15	28
	exceptions to prescribed orders	311	325
range of lines used per sheet	as required prescriptions	0-2-10	0-2-12
	regular prescriptions	0-5-20	0-5-22
	once only drugs	0-3	0-3
	exceptions to prescribed orders	0-26	0-26
sheets rewritten	full	7	14
correctly placed prescriptions	items	92.8%	95.8%
	sheets involved	84.8%	73.6%
prescriptions requiring annotation		42.5%	44.7%
exact dosage not stated		17.8%	18.1%

of aperients, mild analgesics or cough linctus; omissions of drugs on isolated instances because of the patient's condition or absence from the ward or omissions because the drug was not available. Frequent checks on the latter by the visiting pharmacist could prevent problems of supply reaching serious proportions.

The range of lines used per sheet indicates that the arrangement proposed for prescription sheet design B5 of ten lines in the as required section, 20 lines in the regular section and six lines in the once only section, will be satisfactory in most cases. The sheets which had to be rewritten were mostly those of patients in long-stay units who have been in hospital throughout the survey. Because only isolated units were involved in the survey, sheets have had to be rewritten on patient transfer and this proved an excessive burden on the medical staff of Ward 5, Treliske, where patient transfer between wards is frequent: Ward 5 reverted to the old style of sheet after the 1970 determination until the whole of Treliske is using the new style of sheet.

The standard of use of the new sheets has not varied greatly between 1970 and 1971 and is quite high. The number of drugs prescribed in the regular section and then marked 'prn' is gradually diminishing but there has been little change in the number of prescriptions lacking accurate dosage or using proprietary names. Because it is pharmacy policy to have the approved name in the most prominent position on the label, a considerable amount of annotation is still required; regular visits by a pharmacist are essential to maintain this.

5 SUBSIDIARY STUDIES

No pharmacy department, or pharmacist, is infallible but it is important that they can be seen to apply all possible safeguards in the handling of drugs between their purchase and their receipt at the subsidiary hospitals; drugs are potentially dangerous the moment they are manufactured not only at ward level. The strict control over the administration of drugs, described in chapter 3, was introduced through the agency of the pharmacy departments. Any incidents which suggest carelessness in the pharmacy departments give rise to feelings of resentment amongst the nursing staff as only their capability and trustworthiness appear to be in question.

It is often suggested that the filling of orders is not suitable work for qualified pharmaceutical staff, but it is the pharmacist's duty to accept the responsibility for the work carried out by supporting staff. The nursing staff have no means of checking the identity of material supplied and have to trust the pharmacy department to supply the correct drugs and information; failure to do this on several occasions not only undermines that trust but gives the nurse feelings of insecurity or even fear for her patients' safety.

Ordering

At the present time orders are written in order books printed in duplicate, each sheet having a lower section reserved for Scheduled drugs, and are signed by the sister, or her deputy, in charge of the ward at time of ordering. These order books are dealt with in several ways:

1 The complete book is sent to the pharmacy. This leaves the hospital without details of the drugs ordered for 48 to 72 hours and may lead to the duplication of orders or a lack of essential supplies unless a further transcription of the order is made. Some units were using two order books concurrently which makes the tracing of orders and costing difficult. The top copy order is retained in the pharmacy

and the book containing the carbon copy, marked with details of the drugs supplied and the signature of the supplying pharmacist, is returned to the hospital so that each has full details of the transaction.

2 The top order only is sent to the pharmacy. This avoids the need for two order books or transcription of the order, but a sheet of paper is more easily mislaid or damaged and there is no copy order to return with the drugs. Returning the order with the drugs for signing as a receipt removes the problem but often leaves the pharmacy with incomplete records.

3 The top copy order is retained in the hospital and the book containing the carbon copy is sent to the pharmacy. The same difficulties arise as in the second method but to these is added the danger that an unreadable carbon copy may give rise to errors in supply. This method should be discontinued.

The simplest solution to all these problems would be to have the order books printed in triplicate and all sheets perforated. The book containing the top order and the first copy would be sent to the pharmacy and the second copy retained in the hospital as a record. The clear top copy would be used as a basis for supply and be retained in the pharmacy whilst the first copy now containing all details of the drugs supplied would be returned to the hospital and signed on receipt.

The recent report on 'Measures for controlling drugs on the wards'[15] recommended that one person should have the responsibility for all ordering. This is satisfactory where drugs are supplied to each ward individually, but presents difficulties where a central stock serves several small wards and departments. That these difficulties can be overcome is shown by one 26 bed unit with two wards and a casualty department where a 'wants list' is kept in the stock room to which each sister has access: the senior sister responsible for ordering checks this list and the stock levels when writing out the order. Possibly centralisation in this way could be practised by other small units, thus cutting down the number of 'ward boxes' involved and easing the space problem at the base hospitals.

Because of the large volume of work involved there has been a tendency to disregard discrepancies between order and supply. Where quantities different from those ordered are dispensed, explanations are rare and yet it takes very little extra effort to mark the copy order 'pre-packed in 50's only' or 'all available' and such consideration would be rewarded by increased cooperation. Nursing staff do NOT order by whim and it should not be assumed that an unusual drug or quantity is a mistake; a telephone enquiry for an explanation would save both ill-feeling and the need for emergency deliveries later. Drugs not supplied were often marked 'not available, please reorder'. This practice is now being discontinued as it is surely a function of the pharmacy department to arrange the supply of drugs temporarily out of stock as soon as possible without a further order and to give the hospital some indication of when delivery may be expected on the copy order. Drugs not usually stocked are a different matter: here a telephone call would elicit the urgency with which the drugs are required and whether an available alternative would be acceptable.

Smith[20] has described the refilling of ward boxes as more efficient and less space consuming where the wards are supplied with a printed list of common stock items on which to order and he sees no reason why such a system should not be extended to small satellite hospitals. Opinions on the value of such a system in the West Cornwall area vary. Experience with similar lists for central sterile supplies and groceries reveals that there are often more non-list items than listed ones. There are problems because of the small size and varied nature of the hospitals involved and the basic stock lists prepared during this survey show that even if the list contained 200 items it would only cover approximately 75 percent of the items ordered during a three month period by the small hospitals. Some of the nurses felt that such a printed list would help them to interpret prescriptions but this would be a dangerous practice. The system has considerable advantages if extensive prepacking is undertaken and the prepacked items can be stored in the order in which they appear on the list. The possibility of using such a list should be borne in mind as the pharmacy department at Treliske expands, and it is hoped that the stock lists developed during this survey may provide a useful basis for its compilation.

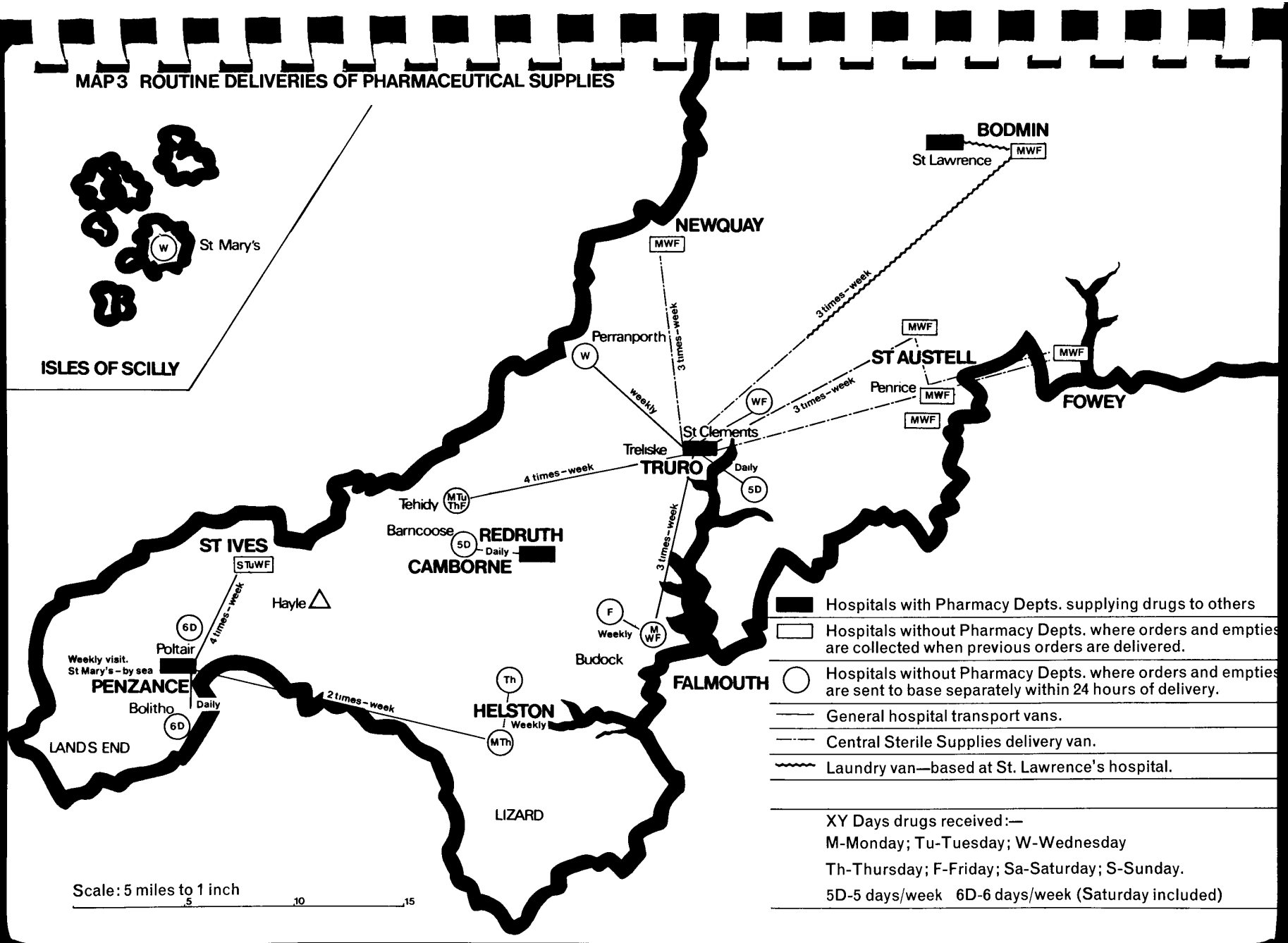
Supply

Map 3 (overleaf) illustrates the varied means of transport involved in the delivery of drugs to the small hospitals. The ward boxes often have to be left unattended for considerable periods either in loading bays or in the delivering vans, and it is therefore essential that they are securely locked on both outward and return journeys. It has been recommended that the drivers should sign for the 'locked box', as distinct from its contents, at the start of each journey as an additional security check, but this is a somewhat controversial step.

The frequency of deliveries is satisfactory in most units but the practice of collecting orders and empties at the time of delivery without any overlap can present difficulties. If there is no opportunity for the nursing staff to check the drugs delivered and reorder any which are not received, but still required, a whole week may elapse between the order first being placed and the patient receiving his first dose unless an emergency delivery is arranged. This problem could be solved by arranging the driver's schedule so that he spends sufficient time in each unit for the drugs delivered to be checked and any necessary alterations made to the new order.

Emergency deliveries of drugs ordered by telephone between normal deliveries can usually be covered by some form of hospital transport. In exceptional cases drugs may be sent by taxi or public transport and guidelines have been laid down in the procedural booklet, see section 8-2, for acknowledging receipt, or non-delivery of drugs sent in this way. Local pharmacists also cooperate in supplying drugs required urgently.

Supplies of drugs to take home present a serious problem in units with resident medical staff who are not eligible to issue EC 10 prescriptions. It is not practicable for the prescription sheet to be sent to the pharmacy as it would be absent from the ward during at least two medicine rounds. The nursing staff have been told that they should not issue drugs from ward stocks to patients leaving the hospital but unfortunately the practice persists because of the lack of a satisfactory alternative. The lack of adequate information with drugs supplied in this way has recently led to complaints from welfare


MAP 3 ROUTINE DELIVERIES OF PHARMACEUTICAL SUPPLIES
ISLES OF SCILLY
St Mary's
W
BODMIN
St Lawrence
MWF
NEWQUAY
MWF
3 times-week
3 times-week
Perranporth
W
weekly
WF
3 times-week
ST AUSTELL
MWF
Penrice
MWF
MWF
MWF
FOWEY
St Clements
Treliske
TRURO
Daily
5D
4 times-week
Tehidy
MTu ThF
Barncoose
5D
REDRUTH
Daily
CAMBORNE
3 times-week
ST IVES
STuWF
4 times-week
Hayle
6D
Poltair
Weekly visit.
St Mary's - by sea
PENZANCE
Daily
Bolitho
6D
LANDS END
F
Weekly
M
WF
Budock
FALMOUTH
Th
HELSTON
Weekly
MTh
2 times-week
LIZARD
Scale: 5 miles to 1 inch
5
10
15
Hospitals with Pharmacy Depts. supplying drugs to others
Hospitals without Pharmacy Depts. where orders and empties are collected when previous orders are delivered.
Hospitals without Pharmacy Depts. where orders and empties are sent to base separately within 24 hours of delivery.
General hospital transport vans.
Central Sterile Supplies delivery van.
Laundry van—based at St. Lawrence's hospital.
XY Days drugs received:—
M-Monday; Tu-Tuesday; W-Wednesday
Th-Thursday; F-Friday; Sa-Saturday; S-Sunday.
5D-5 days/week 6D-6 days/week (Saturday included)

and convalescent homes in the area. The problem needs further investigation but four possible solutions have been suggested:

1 The doctor could prescribe the drugs to be taken home in the appropriate section of the prescription sheet and the sister in charge would then transcribe this onto a pharmacy order and send it to the pharmacy for dispensing. This system has been used in part of the group but transcription errors were common and the practice is being discouraged.

2 The visiting pharmacist could arrange for the supply of the drugs prescribed in the drugs to take home section of the prescription sheet by transferring the details to appropriate labels and dispensing from these on his return to base. Such a system would be expensive as it would require at least thrice weekly visits by the pharmacist throughout the area and even then could not provide for casualty, non-resident patients.

3 The resident doctors could be empowered to issue EC 10 (HP) prescriptions which could be dispensed at a local pharmacy. Even if prescriptions are issued only to cover the minimum period between the patients' discharge from hospital and their obtaining a prescription from their own general practitioner, it can prove more expensive than hospital dispensing.

4 Pads of prescription forms, printed in triplicate on NCR paper and with an adhesive strip across the top, could be provided on which drugs to take home could be prescribed. The top copy would be sent to the pharmacy where it would be dispensed and retained, the second copy could be sent with the discharge letter to the general practitioner and the third copy attached to the drugs to take home section of the prescription sheet to complete the records. Such a system would enable the pharmacy to fulfil its responsibility to the patient but it would be necessary for the doctor to give 48 hours notice of discharge wherever possible.

No satisfactory solution to the problem of casualty prescriptions in the small hospitals has been suggested. Prepacked containers of commonly used items would ease the work of the nursing staff but they still have to assume the responsibility for interpreting the prescription and ensuring that the patient receives all necessary instructions regarding the medication prescribed.

Stocks

The distances between the small hospitals and the supplying pharmacy make it impossible for the pharmacist to exercise any supervision over individual patient's treatment or for the prescription sheets to be sent to the pharmacy for dispensing. These hospitals therefore have to operate entirely on 'stock' drugs which places all the responsibility for obtaining supplies, interpreting the prescription, selecting the correct drug and administering the correct dose onto the nurse. It is important that stock inspections by a pharmacist should be regular and thorough so that incidents arising from the confusion of drugs stored in overful cupboards or from the use of out-dated material can be reduced to a minimum.

A list of the stock held should be available both in the pharmacy and in the ward/hospital where the stock is held as recommended in the Guide to Good practices in Hospital Administration[17]. This stock list should be kept up to date by the visiting pharmacist and should show the name, form and strength of the drugs held, together with the number and size of packs considered to be adequate stocks under normal circumstances. A swift comparison between the packs in stock and the list when ordering would make this process simpler and more rational. The list should also be available to medical staff who would thus be encouraged to prescribe from stock by the 'approved' name.

The number of patients treated in general practitioner hospitals is small, but the variety of drugs in use may be wider than in a large ward where the conditions being treated are closely related and the patients are under the supervision of a single doctor or team of doctors.

It would be preferable to have one basic stock list applicable to the wards throughout the whole group which could be used in the development of a printed order form and in planning prepacking programmes. Supplementary stock lists for each hospital, agreed by the medical, nursing and pharmaceutical staff, would be necessary and should consist only of drugs used frequently: items would be added to, or removed from this list by the visiting pharmacist as the prescribing patterns change. A specimen basic stock list was prepared from an analysis of drugs ordered over a period of 12 months and supplementary lists for each sample unit at March 1971 were attached. The high number of different drugs in use during a single week in each unit, see Table 8, explains why the basic stock list contains 200 items and the supplementary lists between 10 and 27 items.

Where one central stock serves two or more wards it is necessary for all stock to be in duplicate and frequently prescribed drugs in triplicate. This can lead to the hoarding of a considerable amount of dead stock when prescribing patterns change and the size of the packs should be kept as small as possible. All packs are dated when packed, or issued, and bear an expiry date where appropriate. This facilitates stock control by the nurses and should make it easier for the visiting pharmacist to convince them that the usage of a particular drug has fallen to a level at which it should be removed from the stock list or the number of packs held reduced. Each sister should be responsible for the stock in use on her ward, usually kept in the medicine trolley, but one person should be responsible for maintaining the central stock at a suitable level; she should not dispense drugs from a bulk pack or transfer drugs from one container to another for use on the wards.

Pack sizes should be as uniform as possible to facilitate costing and a range of 10's; 25's; 50's and 100's would seem the most practical. The size of pack chosen for any particular drug should be related to the dosage of the drug, the usual length of a course of treatment or the average length of stay per patient. Preferably it should approximate to one week/course of treatment for one or two patients according to the frequency with which it is prescribed. The large amount of prepacking entailed can be carried out by unskilled labour with the aid of a mechanical tablet counter.

The packs of certain drugs considered to be liable to misuse must always be accurately counted so long as the practice of keeping detailed records and a running stock balance on the ward persists. A mechanical means is essential to maintain this accuracy with the large number of packs involved. The keeping of such records is of doubtful value because the range of drugs covered is small and anomalies exist, for example, 'nitrazepam' is recorded while 'diazepam' is not. When the new prescription sheets are in use throughout the group, and if the pack size is kept small, it will be possible to trace all the tablets administered from a particular bottle by reference to the administration records on the current prescriptions over a period of one week: few hospitals have an average length of stay less than this so additional records will be unnecessary.

Storage

Most of the hospitals in the group now have lockable medicine trolleys which reduce the difficulties of medicine rounds considerably. Where trolleys cannot be used because of the layout of the hospital, for example, the absence of lifts in split level hospitals, or the overcrowding of beds within the ward, small boxes with pull-out trays* are being tried.

The introduction of medicine trolleys has produced a demand for the standardisation of drug containers. Tablet containers must fit the sloping trays without obscuring the row behind and must be labelled so that they occupy the minimum space when the label is facing forwards. At the same time they must be stable, even if not closely packed, in the trolley when it is moved around the ward. Of the several types of labelling tried, printed labels are the most satisfactory whilst typewritten labels are preferred to handwritten ones provided that the type is of sufficient size to be seen without stooping: the trolley shelves upon which the bottles are placed are below waist level in most cases. Medicine trolleys are considered indispensible once they have been introduced into a ward but it is important to remember that

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* Supplied by Raaco Storage Systems (UK) Ltd 52 High Holborn London WC1

their usefulness is considerably reduced if they are allowed to become overful; they should contain only the drugs in use on the ward on that day. Difficulties arise if a wide variety of liquid medicines are in use because the space allowed for these is small and the labels are unavoidably obscured. It is essential that medicines are not dispensed in bottles previously used for propreitary products. These often have a distinctive cap, the only part of the bottle clearly visible in the trolley, and because the nurse associates a particular cap and drug mistakes in medication can arise. So many of the new drugs introduced are subject to control under Schedule 4B of the Poisons Act[21], that it is essential that all drugs be clearly marked with their poisons classification using a label standard throughout the group.

Medicine cupboards for the storage of drugs not in current use on the wards are not satisfactory in all units although complying with the legal requirements. They were frequently not purpose built and it is difficult to arrange stock systematically which leads to overstocking, or missed doses of medication. Even in units with purpose built medicine cupboards many of them are of an old design in which the allocation of space to the various classes of drug is no longer suitable. The replacement of these storage facilities with smaller but more modern medicine suites could produce considerable economies in drug wastage. Few drugs which require refrigeration are used in the small hospitals but it is not satisfactory that drugs should be stored amongst the food in the domestic refrigerator. In larger units where the usage of such drugs is still low, refrigerators should be provided on a 'floor' or 'block' basis and one ward sister, or nursing officer, designated to be responsible for the stock held. The visiting pharmacist could operate a topping up system to assist the nurse in charge and prevent the wastage which occurs when material is allowed to go out of date.

No claims are made as to the practicability of the solutions put forward in this chapter. They represent the author's own ideas and are included here in the hope that they may stimulate other ideas in those facing similar problems elsewhere.

6 PROBLEMS REQUIRING FURTHER INVESTIGATION

The extension of the West Cornwall System to psychiatric hospitals*

The amalgamation of two adjacent hospital management committees has resulted in the addition of a large psychiatric hospital to the original West Cornwall group. The West Cornwall system was devised for use in acute, maternity and geriatric units and further investigation will be necessary into its application in psychiatric units. Some modifications will probably be required to cover the problems of the higher mobility and diminished responsibility of the patients and the need for frequent 'leave' prescriptions in such a large unit.

Ward stocks

The problems of maintaining ward stocks at a suitable level are universal but in this area they are exaggerated by the distances between the small hospitals and the pharmacies. The 48 hours which elapse between the ordering and receipt of a drug ordered in the routine way, coupled with an apparent reluctance on the part of some nurses to telephone orders for extra deliveries, has resulted in the hoarding of items no longer in use 'in case they are needed'. In the interests of economy some means must be found of increasing the nurses' confidence in the supply system, of encouraging them to return drugs when a patient is discharged and of lessening the burden of stock maintenance.

Label and pack design

This is a problem frequently ignored by pharmacists. The pack and label should be considered at all stages of use: in store in the supplying pharmacy; during packing procedures; during storage in the

* This problem is being investigated at St Lawrence's Hospital, Bodmin by Mr R J Greene.

ward cupboards, and eventually in the medicine trolley; during administration procedures, and when returned for refilling or replacement. Such a study should have a practical bias and the results should satisfy the existing situation rather than a theoretical ideal whilst encouraging progress towards that ideal.

Drug information at ward level*

The need for more information on drugs at ward level is accepted by all members of the hospital team. The opinions of all grades of staff in all types of unit should be canvassed to determine the nature of the information required, the range of drugs to be covered, the form in which the information should be supplied and where it should be located. Discussions with senior nursing staff in the sample units revealed unexpected priorities. First, information on administration, such as the amount of fluid which should accompany a drug, whether crushing of tablets would affect their activity, whether drugs should, or should not be given at the same time. A close second came information on side effects and the various formulations in which drugs are available rather than the clinical or pharmacological action and dosage. Junior staff may have a different set of priorities but whatever information is included must be supplied in a clear, concise and simple form. Until the medical profession uses entirely 'approved' names in prescribing it should contain a cross-referenced index of both 'approved' and 'proprietory' names.

Medicine rounds

The times at which medicines are administered vary widely between hospitals and even between wards within a hospital. A detailed investigation combining a study of the time/action relationship of drugs with a study of ward routine, could produce a more logical and scientifically based daily timetable which could be recommended for adoption on a national scale. The modern practice of encouraging a rapid return to mobility for convalescent and geriatric patients and

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* This problem is under investigation by a working party of the Guild of Hospital Pharmacists.

an increase in the number of day-rooms available, has made medicine rounds both longer and more complicated, especially in units where the prescription sheets are kept at the foot of each bed. A study of both medicine and doctor's rounds along O & M lines could prove useful in reducing the work involved.

Geriatric medicines

During the observation of medicine rounds in geriatric units it was apparent that the administration of drugs, particularly in tablet form, was often distressing for the patient, time consuming for the nurse and sometimes unsuccessful. Cooperation between medical, nursing and pharmacy staff and the pharmaceutical manufacturers is needed for an investigation designed to determine the patient acceptability of, nursing preference for, and clinical improvement after the administration of different formulations of the same drug to both hospitalised and domicilary patients. Such a study could provide information leading to an improvement in geriatric care.

Drugs to take out of hospital

There is a considerable problem, in this area, in arranging supplies of drugs to patients attending casualty departments or being discharged from a ward where there is a resident medical staff but no pharmacy department. Drugs which are to be taken away from the hospital should be packed in waterproof, airtight containers and be clearly labelled with the instructions for each individual patient. A means by which the area pharmaceutical service can achieve this still has to be discovered.

Many other problems relating to the prescribing, supply and administration of drugs still exist and the process of postulating solutions, introducing improvements and modifying those improvements in the light of experience should be a continuous one. Many problems arise through a lack of communication and cooperation between the staff of the various grades and professions, and the success of the present investigation is due entirely to the cooperation which the author received from all the staff of the West Cornwall Area.

APPENDIX A

THE WEST CORNWALL SYSTEM AND RECENT RECOMMENDATIONS CIRCULATED BY THE DEPARTMENT OF HEALTH

These recommendations are contained in the report of the Working Party on the Hospital Pharmaceutical Service (Noel Hall)[16] and in the report of a joint subcommittee of the Standing Medical, Nursing and Pharmaceutical Advisory Committees on Measures for Controlling Drugs on the Wards.[15] (In giving cross references the following abbreviations are used:

NH The Noel Hall report[16]

CD Measures for Controlling Drugs on the Wards[15]

R The present report of the West Cornwall System).

It may appear that there is no direct correlation between the work described in the present report and the recommendations included in the Noel Hall report the former being concerned with the prescribing, administration and distribution of drugs outside the pharmacy department and the latter with the organisation of the pharmacy department and pharmaceutical services. However if we accept that the general principles described in the Noel Hall report should be applied wherever drugs are in use in the hospital service and that the pharmacist's responsibility extends outside his own department it becomes important to establish that the West Cornwall System will form an acceptable part of the new style of pharmaceutical service envisaged.

Unit of organisation	
NH 4.16 4.18 R p 42	The West Cornwall System has been devised to provide an improved pharmaceutical service to a number of small hospitals from one main, central pharmaceutical department and two subsidiary ones and will form a basis from which an area pharmaceutical service as envisaged in the Noel Hall report can develop. The staff commitment involved to carry out the system is comparable to the staff levels suggested in that report.

Provision of patient services

NH 4.13

R p 14
21
26

The Noel Hall report contains the following statements: 'The way in which patient services are provided, and their location, must be related to the hospital situation... Whilst each hospital needs access to pharmaceutical advice we do not consider that every hospital requires a full time pharmacist... In the case of small hospitals pharmaceutical supplies would be provided from a larger hospital whose own pharmaceutical staff would visit the dependent hospitals as required'. The investigation reported in this document was designed to determine the hospital situation, in the West Cornwall clinical area, the degree of access to pharmaceutical advice required by the smaller hospitals and, based on these findings, to determine the best method of providing a pharmaceutical service throughout the area.

Research aspects

NH 5.13

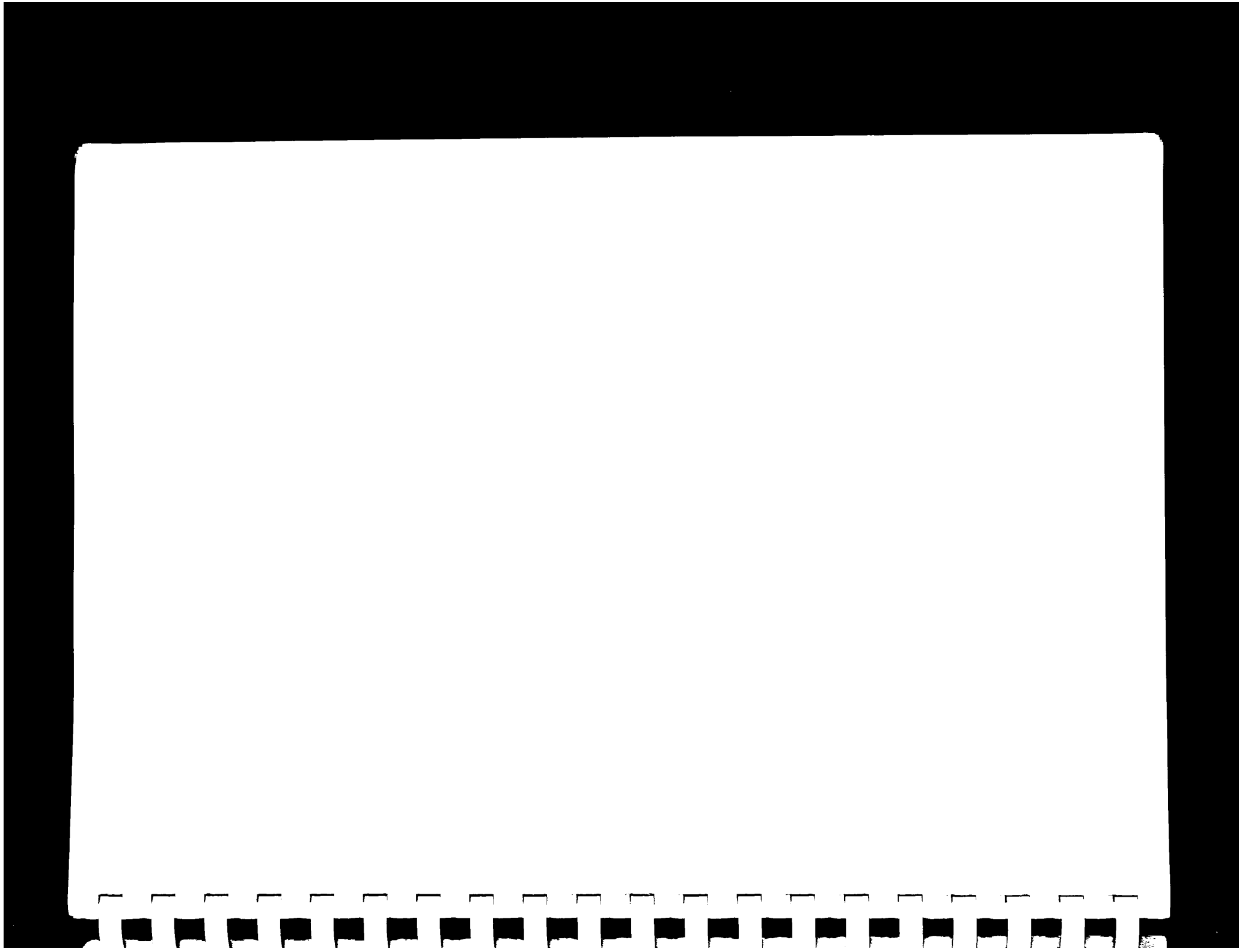
The whole investigation carried out, together with the constant review which will be necessary to ensure that the system keeps pace with modern developments, forms the type of research topic commended to pharmacists by the Noel Hall report because the aims are the development of cooperation and a safe system of working within the area.

Safe systems of work

NH 5.13
5.14
5.20

R Chap. 3

Safe systems of work must be established for the handling of drugs in the ward situation as well as in the pharmacy department. I feel that the West Cornwall System satisfies the pharmacist's responsibility for instituting such a safe system in that it is directed by the pharmacy department through the media of the new prescription sheet and procedural booklet and controlled by the visiting pharmacist.



Ward/visiting pharmacists

NH 3.9

CD 7
8

R p 37

Both sets of recommendations contain a statement that ward visits by a pharmacist are useful and the Noel Hall report goes so far as to suggest that ward pharmacy will be a major factor in the future development of the pharmaceutical service. Considerable importance is attached to this aspect of the West Cornwall system and attempts have been made to show how a balance may be struck between the ideal of continuous contact between the different professions in the ward situation, staff commitments and the expense involved in providing a visiting pharmacist service to small hospitals.

Deployment of staff

NH 5.15
4.14

R p 42

The Noel Hall report considers it important that the pharmacist should maintain an awareness of clinician's needs and local requirements and that this can be achieved by the deployment of pharmacists throughout the area according to predetermined needs: this confirms my opinion that it is necessary to have several bases for the visiting pharmacists. These bases may act as intermediate supply depots and advisory stations only, in the same way as do the decentralised pharmacies developed in some larger American hospitals, with manufacturing and pre-packing being carried out centrally by technical staff.

Duties appropriate to training

NH 5.13

R p 40

The Noel Hall report states that 'it is essential that pharmacists should be employed on duties appropriate to their professional training'. This leads me to suggest that at each base the pharmacist should be supported by a technician to carry out the routine duties of supply and distribution and to stress the point made in Chapter 3 of the present report that the visiting pharmacist's duties should be split between several pharmacists so that travelling time remains secondary to the time spent on pharmaceutical duties in the hospitals visited.

Administration errors CD 3 R Chap. 4	The present report contains details of the errors in administration of drugs detected during the investigation and records the reduction in the number of such errors occurring after the introduction of the West Cornwall system. The report on Measures for Controlling Drugs on the Wards contains various specific proposals designed to cut down such errors and to encourage economy in the use of drugs many of which parallel the measures introduced in the West Cornwall area.
Prescription sheet design CD 4 5 R p 28	The report on Measures for Controlling Drugs on the Wards does not contain a specific design of prescription sheet which should be used but lists certain requirements which all sheets should fulfil. The West Cornwall prescription sheet fulfils all those requirements with the exception that there is no separate section where variable dose drugs may be prescribed. An adhesive sheet is available if the dose is very variable but the majority of such drugs can be accommodated in the regular section of the prescription sheet. The West Cornwall prescription sheet has proved acceptable in both acute and long-stay hospitals and I consider that it would be suitable for all types of hospital.
Ward procedures CD 10 R p 34	The procedures suggested in the West Cornwall procedural booklet are comparable to those suggested in the report although minor modifications have been made to fit local conditions of geographical distribution and the variety of hospital units involved.
Ward stock lists CD 9 11 R p 66 67 68	Stock lists are available for the various hospitals but the extensive nature of the stock held makes them unsuitable for inclusion in the stock cupboards of each ward and makes regular stock review an important aspect of the visiting pharmacist's duties. The increased provision of standard prepacked containers from the group hospital has distinct advantages in

hospitals where all drugs are supplied as stock in that packs contain standard amounts and are always clearly labelled.

Transport of drugs within the ward
CD 16
R p 68

The use of lockable ward drug trolleys is highly recommended by the Report on Measures for Controlling Drugs on the Wards and they are appreciated by all hospitals where they are in use. The present report contains a suggested means whereby similar advantages can be gained in those hospitals where trolleys are impracticable.

Legal requirements
CD 13
15
R back flap

The relevant information from the regulations concerning the control of poisons in hospital is restated in the report and has been included in the West Cornwall procedural booklet. There has been some resistance to the enforcement of some of the signing procedures used in other hospitals in the maternity units and clarification by the Midwive's Board of the statement contained in the Aitken report could help to solve this problem.

Patient's own drugs
CD 18
R p 36

The recommendation contained in the report has been included in the West Cornwall procedural booklet against much opposition from the nursing staff. They put forward forceful arguments backed by examples of the dangers which can ensue from the return of medication no longer required to the patient, or his relatives but until the legal position is clarified we felt that the instruction should stand.

I feel that the West Cornwall System satisfies the requirements of a pharmaceutical service as envisaged in these two reports and that it is sufficiently flexible to allow development as the demand upon it increases or to allow modifications for local conditions if it is adopted for use in other groups.

APPENDIX B

PRESCRIPTION SHEET DESIGNS

The prescription sheets contained in this appendix illustrate the development in design which has taken place in the West Cornwall Area.

Sheet 1 represents the original treatment sheets used in this group which were still in use in some of the small hospitals at the start of the project.

Sheet 2 represents the design introduced by Mr Carrington when the new Royal Cornwall Hospital (Treliske) was opened and later brought into use in some of the small hospitals of the Truro sub-group.

Sheet 3 represents the first design developed during the present project: this design was unsuccessful in preliminary trial.

Sheet 4 represents the design introduced into all the sample units for trial. The evaluation of the West Cornwall system was carried out using this sheet and at the time of writing this report (March 1971) they are still in use. The two copies included are from an acute and long-stay geriatric ward respectively and show quite clearly the difficulties which exist in long-stay units with heavy prescribing.

Sheet 5 represents the final sheet design developed during the project which it is hoped to introduce throughout the West Cornwall group.

Sheets 6 and 7 represent sheets designed to accommodate prescriptions for IV therapy or intensive therapy involving frequently changing doses. They are shorter in length than the main sheet so that both may be attached to the main prescription sheet, by the adhesive strip at the head of each, with the headings showing, at the same time.

On an estimated annual usage of 40 000 prescription sheets; 100 000 continuation sheets and 10 000 specialised sheets the cost of printing these would be in the region of:

Prescription sheets	£83 - 95 for 10 000
Continuation sheets	£75 - 84 for 25 000
Specialised sheets	£13 - 16 for 2500

from the South Western Regional Hospital Board, Printing Department. Prices as quoted in March 1971.

Printing of the early trial sheets was carried out by the printing department at the King's Fund and the sheets used over the twelve month period in the sample units by the South Western Regional Hospital Board, printing department and I am grateful to the staff of both for the excellent printing and helpful service which they provided.

FOR ACTUAL SHEETS B1 to B7 see under back flap

(Appendix B4 ACUTE and Appendix B4 LONG STAY have been reproduced half full size)

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Appendix B5

CORNWALL HOSPITAL MANAGEMENT COMMITTEE

PRESCRIPTION SHEET

Name	Hospital Number

DATE OF ADMISSION

Day	Month	Year

DATE OF DISCHARGE

Day	Month	Year

DETAILS OF PREVIOUS MEDICATION

Drug	Dose	Directions	Duration of Treatment

FOR THE SAFETY OF THE PATIENT.

DOCTOR.

1. Use Approved Names, BLOCK LETTERS, Metric Dosage, English Instructions and Avoid Abbreviations.
2. ANY CHANGES in your drug therapy MUST be ordered by a NEW PRESCRIPTION, do NOT alter existing instructions.
3. DISCONTINUE a drug by drawing a line, in red, through both the prescription and the unused recording panels. Enter the date of cancellation in the final column.
4. Prescribe intravenous drip therapy and anticoagulant therapy on the separate charts provided. An indication that such therapy is being administered may be entered on this sheet but no administration records would be necessary.

NURSE.

1. Check the entries in EVERY section to avoid omissions.
2. Use the grid on the right-hand sheet to record each dose, at the time it is given, by initialling the appropriate box. Note any permitted variation of amount given or time of administration above your initials.
3. Enter the dates, and times of administration across the top of the sheets as required. Sufficient space for recording 7 days' treatment is provided and continuation sheets may be inserted as required.
4. In the event of an administration being OMITTED enter 'X' in the recording panel in place of your initials and enter FULL DETAILS of the omission in the EXCEPTIONS TO PRESCRIBED ORDERS section on the reverse of the sheet. The entry of 'X' is sufficient for drugs prescribed in the AS REQUIRED section.
5. Details of any administrations made on the authority of the Sister in Charge without a written prescription from the doctor should also be entered in the EXCEPTIONS TO PRESCRIBED ORDERS section.

Weight	Consultant:
	Number N.H.S.:

DRUG (...ed Name in BLOCK LETTERS)	Dose	Route	Times of Administration 7 A.M.	9 A.M.	1 P.M.	5 P.M.	10 P.M.	Other Directions	Dr.'s Initials	Pharmacy Use	Code
PRESCRIPTIONS											

...ESCRIPTIONS			Times of Administration 7 A.M.	9 A.M.	1 P.M.	5 P.M.	10 P.M.				

ADMINISTRATION RECORDS

	Date					Date					Date					Date					Date					Date					Date	
	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m

AS REQUIRED PRESCRIPTIONS

1
2
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10

REGULAR PRESCRIPTIONS

	Date					Date					Date					Date					Date					Date					Date	
	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m

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FOR NURSING USE ONLY

EXCEPTIONS TO PRESCRIBED ORDERS

Date	Time	Drug (Approved Name) & Dose	Initia's	Reason

DRUGS TO TAKE HOME *(Maximum Supply 7 Days)*

Drugs To Take Home Only	Dose (Metric)	Times Per Day	Number of Days

Date	Signature	Pharmacy Use

Sheet No.

REGULAR PRESCRIPTIONS.

AFFIX CONTINUATION SHEET HERE

19 Month Day

Tick Times Required or enter Variable Dose.

DATE	DRUG(Approved Name)		am am md
DOSE(Metric)	ROUTE	PHARMACY USE	pm
VALID PERIOD	SIGNATURE		pm pm
DATE	DRUG(Approved Name)		am am md
DOSE(Metric)	ROUTE	PHARMACY USE	pm
VALID PERIOD	SIGNATURE		pm pm
DATE	DRUG(Approved Name)		am am md
DOSE(Metric)	ROUTE	PHARMACY USE	pm
VALID PERIOD	SIGNATURE		pm pm
DATE	DRUG(Approved Name)		am am md
DOSE(Metric)	ROUTE	PHARMACY USE	pm
VALID PERIOD	SIGNATURE		pm pm
DATE	DRUG(Approved Name)		am am md
DOSE(Metric)	ROUTE	PHARMACY USE	pm
VALID PERIOD	SIGNATURE		pm pm
DATE	DRUG(Approved Name)		am am md
DOSE(Metric)	ROUTE	PHARMACY USE	pm
VALID PERIOD	SIGNATURE		pm pm
DATE	DRUG(Approved Name)		am am md
DOSE(Metric)	ROUTE	PHARMACY USE	pm
VALID PERIOD	SIGNATURE		pm pm
DATE	DRUG(Approved Name)		am am md
DOSE(Metric)	ROUTE	PHARMACY USE	pm
VALID PERIOD	SIGNATURE		pm pm

VARIABLE DOSE PRESCRIPTIONS.
(Use when Dose varies from Day to Day).

		DATE														
		TIME	DOSE	GIVEN BY	DOSE	GIVEN BY	DOSE	GIVEN BY	DOSE	GIVEN BY	DOSE	GIVEN BY	DOSE	GIVEN BY	DOSE	GIVEN BY
DATE	DRUG(Approved Name)															
ROUTE	PHARMACY USE															
	Dr's. SIGNATURE															
DATE	DRUG(Approved Name)															
ROUTE	PHARMACY USE															
	Dr's. SIGNATURE															

SHEET No.

DRUG IDIOSYNCRACIES

APPENDIX B3

SURNAME			HOSPITAL NUMBER
FIRST NAMES			WARD
AGE	SEX	WEIGHT	CONSULTANT

DATE	TIME	ONCE ONLY & PREMEDICATION DRUGS	DOSE	ROUTE	SIGNATURE	GIVEN BY	PHARMACY USE

AFFIX CONTINUATION SHEET HERE.

AS REQUIRED PRESCRIPTIONS.

(Include drugs to be given at unusual intervals e.g. alternate days, weekly etc. and at non-medicine round times e.g. local applications, medical gases.

19 Month Day →

Please state maximum frequency of administration.

Prescription	Time	Given by	Time	Given by	Time	Given by	Time	Given by	Time	Given by	Time	Given by	Time	Given by
DATE / DRUG (Approved Name) / DOSE(Metric) / ROUTE / DIRECTIONS / PHARMACY USE / SIGNATURE														
DATE / DRUG(Approved Name) / DOSE(Metric) / ROUTE / DIRECTIONS / PHARMACY USE / SIGNATURE														
DATE / DRUG(Approved Name) / DOSE(Metric) / ROUTE / DIRECTIONS / PHARMACY USE / SIGNATURE														
DATE / DRUG(Approved Name) / DOSE(Metric) / ROUTE / DIRECTIONS / PHARMACY USE / SIGNATURE														
DATE / DRUG(Approved Name) / DOSE(Metric) / ROUTE / DIRECTIONS / PHARMACY USE / SIGNATURE														
DATE / DRUG(Approved Name) / DOSE(Metric) / ROUTE / DIRECTIONS / PHARMACY USE / SIGNATURE														

APPENDIX B2

PRESCRIPTION SHEET

HOSPITAL	
CONSULTANT	
WEIGHT (KG) 68 [illegible] 1"	WARD

Date Started		DRUG (Approved Name in Block Letters)	Dose Unit (Metric)	Route of Admin	a.m.	a.m.	m.d.	p.m.	p.m.	p.m.	Other Directions	Prescribers Signature	Date Canc'ld
~~31/10/69~~		~~SINEQUAN~~	~~25 mg~~	~~oral~~		~~8~~		~~1~~	~~6~~		~~daily~~	~~[illegible]~~	12/11/69
31/10/69		MOGADON (NITRAZEPAM)	Tab I or II	oral						10	nocte	[illegible]	
31/10/69		BECOSYM (ANEURINE COMPOUND STRONG)	Tab I	oral		8		1	6		daily	[illegible]	
~~5/11/69~~		~~VIBRAMYCIN~~	~~200 mg~~	~~oral~~				~~1~~			~~one dose~~	~~[illegible]~~	11
~~6/11/69~~		~~VIBRAMYCIN~~	~~100 mg~~	~~oral~~				~~1~~			~~7 days~~	~~[illegible]~~	6.11.69
~~6.11.69~~		~~[illegible]~~	~~600 mg~~	~~"~~	~~8~~			~~12~~	~~6~~		~~for 7 days~~	[illegible]	
6.11.69		SLOW K	I	"	8			2	6		for 7 days	[illegible]	
9.11.69		CERUMOL	drops				ears		6d			[illegible]	
11/11/69		FURADANTIN (NITROFURANTOIN)	100 mg	ORAL	8		12		5	10	with meals or milk for 7 days	[illegible]	
11/11/69		INJ MAXOLON	10 mg	I.M.		9					stat	one dose [illegible]	
28.11.69		Prednisolone	10 mg	oral	1 am 7.30 am							[illegible]	
MON ~~30/[illegible]/69~~		~~Ascorbic Acid~~	~~420 g~~	~~oral~~	~~at 8 am~~							[illegible]	
TUE ~~2 Dec 69~~		~~Ascorbic Acid~~	~~420 g~~	~~oral~~		~~8 am~~						[illegible]	
WED ~~[illegible] 69~~		~~Vit A [illegible]~~	~~500,000 U~~	~~for breakfast~~								[illegible]	
~~8.12.69~~		~~Ascorbic Acid~~	~~420 g~~	~~o~~		~~8~~			~~[illegible]~~			[illegible]	[illegible]
~~22.12.69~~		~~Multivite Capsules~~	~~I~~	~~o~~		~~7~~				~~10~~		[illegible]	
24.12.69		[illegible]	5 mg	o	7		12		6			[illegible]	
~~24/12/69~~		~~[illegible]~~	~~5 mg~~	~~IM~~			~~12 stat~~				~~+ repeat x1 if necessary~~		
~~29/12/69~~		~~[illegible]~~	~~250 mg~~	~~O~~	~~7~~		~~12~~		~~6~~	~~10~~		~~[illegible]~~	

DRUG SENSITIVITY

EQUIVALENTS ONLY

WEIGHT	1/600 grain	1/300 grain	1/100 grain	1/60 grain	1/20 grain	1/8 grain	1/6 grain	1/4 grain	1/3 grain	1/2 grain	3/4 grain	1 grain	1 1/2 grain	2 grain	3 grain	5 grain	8 grain	10 grain	15 grain
	100 mcg	200 mcg	600 mcg	1 mg	3 mg	7.5 mg	10 mg	15 mg	20 mg	30 mg	50 mg	60 mg	100 mg	125 mg	200 mg	300 mg	500 mg	600 mg	1 G

VOLUME	5 minim	7½ minim	10 minim	15 minim
	0.3 ml.	0.5 ml	0.6 ml	1.0 ml

Due to reformulation the terms "teaspoonful" and "tablespoonful" are obsolete. THEY HAVE NO METRIC EQUIVALENT. New formulations contain the medicament(s) in 5 ml or 10 ml doses and a METRIC MEDICINE MEASURE MUST BE USED. DOSES BELOW 1 milligramme SHOULD BE PRESCRIBED IN MICROGRAMMES AND BELOW 1 GRAM IN MILLIGRAMMES.

mcg — microgram
mg — milligram
gr — grain G — gram
ml — millilitre

Appendix B6

I.V. THERAPY ORDER/RECORDING SHEET – CORNWALL HOSPITAL MANAGEMENT COMMITTEE

W/C/655

Attach by gummed strip to top of back page of prescription/recording sheet.

Date	I.V. Fluid/Blood	Volume	Running Duration	Dr.'s Initials	Drugs to be added	Dose	Added By				Bottle put up by	Time	
							Bot. 1	Bot. 2	Bot. 3	Bot. 4		Started	Finish

Mr. Mrs. Miss	Name	Hospital Number	Ward	Sheet Number

[illegible] SHEET – CORNWALL HOSPITAL MANAGEMENT COMMITTEE

Appendix

THIS SHEET TO BE USED FOR SUCH MEDICATION AS 'SLIDING-SCALE INSULIN' OR PROGRESSIVELY INCREASING ANALGESIA ETC.

DO NOT USE FOR ROUTINE MEDICATION.

Attach by gummed strip to top of back page of prescription/recording sheet.

W/C/854

PRESCRIBER'S INSTRUCTIONS				RECORDS OF ADMINISTRATION							
Start Date	Drug (Approve Name in Block Letters)	Dose and Initials (Route, maximum frequency, etc.)	Dr.'s Initials	Date	Time	Dose	Given By	Date	Time	Dose	

Name	Hospital Number	Ward	Sheet Number

APPENDIX B1

Treatment Sheet

Name .... Ward *II* .... Reg. No. ....

Date	Activity, Investigations	Diet, Treatment
2/10/69	Oedema	~~Tab. Saluric i b.d~~
	Sudden & severe chest pain	~~twice weekly~~
15/10/69	? Coronary.	~~Rx Morph gr 1/4 P.R.N.~~
		~~Largactil evening. P.R.N.~~
13/11/69	~~– Buglyn syrup~~	Rest
	~~– pen tin 250mg 6 H~~	
	~~+ 7 day~~	
7/10/69		~~Tab. Slow K. b.d.~~
8/10/69	Overweight	~~T. Ponderax~~
		~~i morn & evening.~~
20/11/69	Lacks interest in life	1 glass of beer on Sunday.
22/12/70	Weight now 9 st 6 lb.	~~Reduce Ponderax to~~
		~~i morn.~~
15/6/70	Weight 8 st 8	Stop Ponderax

First Names:	Ward: Female
Age: 71 · Sex: F · Weight:	Consultant:
Date of Birth: 29 8 1899	N.H.S. Number

DRUG (Approved Name in Block Letters)	Dose Unit (Metric)	Route of Admin.	Times of Administration (a.m. / a.m. / m.d. / p.m. / p.m. / p.m.)	Other Directions	Prescriber's Signature	PHARMACY USE	Code
[AS REQ]UIRED PRESCRIPTIONS							
[REGULA]R PRESCRIPTIONS							
Tab. DIGOXIN	0.25	o	9, 5		[illegible]		1
~~Tab. FRUSEMIDE~~	40	o	9				2
Tab. POT CHLOR	600	o	9				3
Tab. [illegible]	25	o	9, 1, 5				4
Tab. Frusemide	80	o	9				5

CONTINUATION SHEET — ADMINISTRATION RECORDS — Name

Code	Date 11-3-71	Date 12	Date 13	Date 14	Date
AS REQUIRED PRESCRIPTIONS					
REGULAR PRESCRIPTIONS					
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]		
3	[illegible]	[illegible]	[illegible]	[illegible]	
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5				[illegible]	
6					
7					
8					
9					
10					
11					
12					
13					
14					

...ne	Drug (Approved Name) & Dose	Initials	Reason
...S.p.	Mist Kaolin 15mls	RB	Loose stools
...	Sandral tabs. ii	[illegible]	Patient vomiting.
...	Sandral	[illegible]	Patient says it makes her feel sick.
	Sandral	M.R.	Patient says they make her feel sick
	Sandral	[illegible]	" " " "
...am	Mascalon	[illegible]	} Not given as patient began
...m	Mascalon	[illegible]	} eating meal
...	Indocid, Slow K, Ponazin (penickin)	[illegible]	vomited immediately after taken.

TAKE HOME

Drugs To Take Home Only	Dose (Metric)	Times Per Day	Number of Days

Signature

Pharmacy Use

WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE

PRESCRIPTION SHEET

FOR THE SAFETY OF THE PATIENT.

DOCTOR.

1. Use Approved Names, BLOCK LETTERS, Metric Dosage, English Instructions and Avoi...
2. ANY CHANGES in your drug therapy MUST be ordered by a NEW PRESCRIPTION, do NO... instructions.
3. DISCONTINUE a drug by drawing a line, in red, through both the prescription and the ... panels. Enter the date of cancellation in the final column.
4. Prescribe intravenous drip therapy and anticoagulant therapy on the separate charts provide... that such therapy is being administered may be entered on this sheet but no administratio... be necessary.

NURSE.

1. Check the enteries in EVERY section to avoid omissions.
2. Use the grid on the right-hand sheet to record each dose, at the time it is given, by initialling... box. Add the amount given, if this may be varied, and the time of administration in the... section if this does not correspond to a time listed, above your initials.
3. Enter the dates, and times of administration across the top of the sheets as required. Suff... recording 5 days' treatment is provided and continuation sheets may be inserted as required.
4. In the event of an administration being OMITTED enter 'X' in the recording panel in place... and enter FULL DETAILS of the omission in the EXCEPTIONS TO PRESCRIBED ORDERS... reverse of the sheet. The entry of 'X' is sufficient for drugs prescribed in the AS REQ...
5. Details of any administrations made on the authority of the Sister in Charge without a writ... from the doctor should also be entered in the EXCEPTIONS TO PRESCRIBED ORDERS sec...

Name	Hospital Number

DATE OF ADMISSION

Day	Month	Year
19	7	1968.

DATE OF DISCHARG...

Day	Month	...

DETAILS OF PREVIOUS MEDICATION

Drug	Dose	Directions	Duration of T...

Age	Sex	Weight	Consultant:
85	F.		
Date of Birth: 20-6-1884.			N.H.S. Number

DRUG (…oved Name in Block Letters)	Dose Unit (Metric)	Route of Admin.	6 a.m.	8 a.m.	m.d.	2 p.m.	6 p.m.	10 p.m.	Other Directions	Prescriber's Signature	PHARMACY USE	Code
…D PRESCRIPTIONS												
…nadol	Tab II	oral		6 hourly for pain					if necessary	[illegible]	[illegible]	
…elldorm Tab	650 mg	oral						10	if necessary	[illegible]	[illegible]	
…ULCOLAX	I	oral					✓	[illegible]	for constipation	[illegible]	[illegible]	
…laxolon	10 mg	I.M		for vomiting					one dose if necessary	[illegible]	[illegible]	
…AXOLON	10 mg	[illegible]		for vomiting					once daily	J.V.		
…RESCRIPTIONS												
…[illegible]	25 mg	oral		7.30			5.30		daily	[illegible] 8/5/71		
…[illegible]	Tab I	oral		✓			✓	✓	daily	[illegible]		
…abolin	Tab I	oral		✓					daily	[illegible]	[illegible]	
…[illegible]	80 mg	oral		✓					daily	[illegible]	[illegible]	
…[illegible]	Tab I	oral		✓					daily	[illegible]		
…low K	Tab I	oral		✓		✓	✓		daily	[illegible]	[illegible]	
…[illegible] Pot. Citrate	15 ml	oral		✓		✓	✓		5 days	[illegible]		
…[illegible] Tab	0.5 g	oral		✓		✓	✓		5 days	[illegible]	[illegible]	
…[illegible]	10 ml	oral		✓		✓	✓		5 days	[illegible]		
…[illegible]	[illegible]	oral		✓		✓	✓		3 days	[illegible]		
…[illegible]	II [illegible]	oral		✓			✓		7 days	[illegible]		
…[illegible]	[illegible]			[illegible]					4 days	[illegible]		
…[illegible]	[illegible]	oral		✓		✓	✓		[illegible]	[illegible]		
…latin	40 mg	oral		✓					daily	[illegible]	[illegible]	
…entazin	2 mg	O		✓			✓		daily	[illegible]	[illegible]	
…[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	
…[illegible]	1 tab	O		8			6		daily	[illegible]	[illegible] 4/1/71	
…[illegible]	[illegible]			8		[illegible]			5 [illegible]	[illegible]		
…[illegible]	[illegible]	[illegible]							[illegible]	[illegible]		

CONTINUATION SHEET — ADMINISTRATION RECORDS — Name

Code	Date June 21st						Date 22nd						Date 23rd						Date 26th						Date	
	7 a.m.	9 a.m.	m.d.	1 p.m.	5 p.m.	10 p.m.	7 a.m.	9 a.m.	m.d.	1 p.m.	5 p.m.	10 p.m.	7 a.m.	9 a.m.	m.d.	1 p.m.	5 p.m.	10 p.m.	7 a.m.	9 a.m.	m.d.	1 p.m.	5 p.m.	10 p.m.	7 a.m.	9 a.m.

AS REQUIRED PRESCRIPTIONS

REGULAR PRESCRIPTIONS

(Initials entered in several administration columns.)

CONTINUATION SHEET — ADMINISTRATION RECORDS | Name | Hosp. No.

AS REQUIRED PRESCRIPTIONS

	Date					Date					Date					Date					Date					Date				
	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m
1																													
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													

REGULAR PRESCRIPTIONS

	Date					Date					Date					Date					Date					Date				
	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m	7 a.m	9 a.m	1 p.m	5 p.m	10 p.m

ADMINISTRATION RECORDS

ate					Date					Date					Date					Date					Date					Date					C
9	1	5	10		7	9	1	5	10	7	9	1	5	10	7	9	1	5	10	7	9	1	5	10	7	9	1	5	10	
a.m	p.m	p.m	p.m		a.m	a.m	p.m	p.m	p.m	a.m	a.m	p.m	p.m	p.m	a.m	a.m	p.m	p.m	p.m	a.m	a.m	p.m	p.m	p.m	a.m	a.m	p.m	p.m	p.m	

REQUIRED PRESCRIPTIONS

GULAR PRESCRIPTIONS																														
ate					Date					Date					Date					Date					Date						
9	1	5	10		7	9	1	5	10	7	9	1	5	10	7	9	1	5	10	7	9	1	5	10	7	9	1	5	10	
a.m	p.m	p.m	p.m		a.m	a.m	p.m	p.m	p.m	a.m	a.m	p.m	p.m	p.m	a.m	a.m	p.m	p.m	p.m	a.m	a.m	p.m	p.m	p.m	a.m	a.m	p.m	p.m	p.m