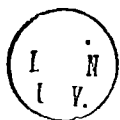


APPENDICES



APPENDIX I

Professionalisation of Hospital Pharmacy: The Role of Clinical Pharmacy

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Review Article

ABSTRACT

The professional status of hospital pharmacy in the United Kingdom is changing. The development of clinical pharmacy, a set of proactive roles in which pharmacists help ensure appropriateness of drug use, is one contributory factor. A review of the literature revealed that clinical pharmacy has professionalised pharmacy by contributing to the development of a body of expert and indeterminate knowledge. It could also lead to fragmentation of hospital pharmacy with resulting deprofessionalisation. Other factors are important. The National Health Service reforms, general changes in professional roles and in society pose risks of deprofessionalisation due to increased managerial power, encroachment by new professions and patient empowerment. They also offer opportunities for further professionalisation by the development of new roles. We conclude that clinical pharmacy is the most important factor influencing the changing professional status of pharmacists; it is the principal means for pharmacists to expand their territory and increase their professional status.

Key words: Clinical Pharmacy; Great Britain; Hospital pharmacy; Pharmacists, hospital; Professions; Review.

Introduction

Pharmacy developed as a profession in the United Kingdom (UK) in the 19th Century. Initially, almost all pharmacists worked in their own or other pharmacists' shops. However, the newly-founded voluntary hospitals began to employ them in the second half of the 19th Century. Few pharmacists were attracted to a hospital career until the middle of this century due to poor pay and working conditions. Improvements in both of these have enhanced the status and appeal of hospital pharmacy as has the growing perception of the potential contribution which hospital pharmacists can make to patient care [1]. In the 1970s and 1980s, the work of hospital pharmacists expanded to encompass a new set of roles, collectively known as "clinical pharmacy services". Clinical pharmacy is seen by some authors as having promoted the professionalisation of pharmacy [2,3]. Since its development has coincided with significant changes in the National Health Service (NHS) and in the

status of health professions in general, the relative effect of clinical pharmacy on the professional status of hospital pharmacy merits examination.

The aims of this paper are to outline the development of clinical pharmacy in UK hospitals, to consider published evidence of professionalising and de-professionalising forces on UK hospital pharmacy, and to define actions that we think the profession should consider if it wishes to further professionalise. Following a brief description of pharmacy within the theories of professions, the article focuses on hospital pharmacy, considering the effects on professional status of clinical pharmacy and other forces, such as the NHS reforms, changing professionals roles and patient empowerment.

The development of clinical pharmacy in the United Kingdom

In the UK, clinical pharmacy first developed in the hospital sector. Although clinical pharmacy has several definitions [4-9], a recent suggestion that it is "*about the optimal use of drugs, ensuring that those reaching the patient are safe, effective, offer value for money and quality of life*" [10] adequately reflects its current meaning in the UK. It originated from a service known as "ward pharmacy" which had evolved in response to concerns about the safe use of drugs in hospitals in the 1960s. Errors were reported in the process leading to the administration of drugs to patients in hospitals [11]. It was suggested that these could be due to the number and ambiguity of prescriptions [11], transcription of prescriptions by nurses [12], the increased number of drugs on the market and the increased complexity of prescribing [13]. The introduction of patient-specific drug charts [14,15] improved the situation [15,16]. Deployment of pharmacists to the wards to provide a drug supply service was also thought necessary and was associated with a reduction in the incidence of discrepancies between prescribed and administered drug therapy [17]. Nurses and doctors frequently consulted with the ward pharmacist about medicines and their use [17] thereby increasing the status of the ward pharmacist. Ward pharmacy was commended by the Department of Health in 1974 [18]

After its inception in the late 1960s, the ward pharmacy service gradually expanded and several new services were initiated, including drug information and therapeutic drug monitoring. These new, proactive roles were termed clinical pharmacy services. Their provision was endorsed by the UK Department of Health in 1988 as a means of increasing the cost-effective use of medicines and enhancing patient care [7]. Hospital pharmacists appear to have taken on these new clinical roles willingly since clinical pharmacy is now available in most UK NHS hospitals and most UK Schools of Pharmacy provide post-graduate courses in the subject. Hospital pharmacy has become more appealing, salaries have increased [19] and the career is viewed as attractive by new graduates.

Pharmacy as a profession – Theoretical aspects

Several theories have been advanced to explain the features that distinguish occupations from professions. Most include lists of characteristics which an occupational group must possess to be a profession, such as a tradition of service to the individual, a technical knowledge base, an altruistic nature [20], monopoly powers [21], specialized training and education, formal examinations of competence of members, and the presence of a professional organisation and a code of conduct [22]. These theories have been criticised. Most present professions in a utopian light [21] and reflect the profession's view of themselves. They presume that "true" professions, exhibiting these characteristics to varying degrees, actually exist (or have existed in the past). None recognise that, in practice, the behaviour of professionals frequently is at odds with professional traits. Most are based on analyses of a few professions hence are not applicable to the majority of professions [23].

Pharmacy is not well-described by these theories because it is not considered to have a duty to individual patients and there are doubts regarding pharmacy's knowledge base [24]. It has been claimed that the knowledge that professions possess should be largely indeterminate to maintain a social distance between professional and client and to assure status and respect for the profession [25]. The assertion has been made that pharmacy's knowledge base is too pre-

cise and systematic to be indeterminate [24]. The theories also justify professional status on the basis of professions' importance to the structure of society [26]. Pharmacy, however, does not currently appear to command such status perhaps because society perceives pharmacists' work as being less prestigious than that carried out by other groups such as doctors.

A more recently developed theory better explains the position of pharmacy in the hierarchy of professions. "Occupational control" [23], proposes that pharmacy, the less professionalised occupation, is dominated by the more professionalised occupation of medicine [24]. It suggests that the medical profession dominates or limits pharmacy since the doctor retains control over the drug treatment of patients; pharmacists supply medicines on the doctor's orders hence do not have full autonomy over their area of practice [24,27].

Although this theory explains many of the characteristics that prevented pharmacy attaining full professional status under the previously described theories, it has a number of limitations. It does not allow for the division of pharmacy into several branches whose practitioners behave in different ways nor for changes in practice over time within these branches. In the UK, pharmacy consists of two main branches, community and hospital pharmacy. Community pharmacists are self-employed or employees of retail pharmacy companies. They work from shops where, in addition to the dispensing and sale of pharmaceuticals, a wide variety of commercial products are sold. Community pharmacy is recognisably different from hospital pharmacy in the UK. Currently, community pharmacy is primarily involved in the supply of pre-packaged medicines and the provision of advice on drug use to patients, although it has recently acquired new roles such as the provision of pharmaceutical advice to nursing and residential homes and the supply of medicines which were formerly prescription-only.

In contrast, hospital pharmacy has acquired numerous additional roles, such as the provision of advice to health professionals and the control of drug use. For the present, at least, the greater development of clinical pharmacy in the hospital sector justifies separate consideration of the basis and extent of hospital pharmacy's professional status. The net effect of clinical pharmacy and other factors, such as the NHS changes, is an

alteration in hospital pharmacy's status from that of a group occupationally limited by doctors.

Influences on the professional status of hospital pharmacy

Clinical pharmacy has been viewed as a professionalising force in hospital pharmacy [2]. The acquisition of new roles has increased the prestige of hospital pharmacists' work, their power within the hospital structure and their professional status. These changes have had important effects on the power balance between professions. Other changes, which are outlined here and discussed in detail in subsequent paragraphs, have also been significant.

In the UK, the NHS has undergone successive radical changes with implications for the professions. It is likely that the most recent NHS changes will have the greatest effects on professional power. In addition, notable changes in society and in the position of professionals in society have taken place in recent decades. Technological advances, increased consumer power and the increasing emphasis on knowledge have modified the power and status of professions and raised the threat of deprofessionalisation (a reduction in professional status and power). This may occur as a consequence of increasing bureaucracy and the exertion of greater external control on professions, the growth in knowledge necessitating specialisation and the resultant fragmentation of a profession, or the development of new professions that will try to encroach upon the territory of older professions [28]. In contrast, there is a view that increased knowledge is not a threat to professions but that technical knowledge is increasing in importance as a means of controlling and managing social and political matters and will stimulate professionalisation [29]. These conflicting opinions remain to be resolved.

The effect of clinical pharmacy

Before the introduction of ward pharmacy, hospital pharmacists mainly manufactured, procured and dispensed drugs [1]. The original purpose of ward pharmacy, to provide a pharmacist on the wards to initiate the drug supply process, did not aim to professionalise hospital pharmacy since the relationship between doctors and pharmacists

regarding the prescribing of drugs remained unchanged; doctors still prescribed and pharmacists supplied on their command. Nevertheless, changes were being initiated. Claims that pharmacists could provide a consultancy service at the point of prescribing [15] were being substantiated since ward pharmacists were providing doctors and nurses with advice on medicines and their use [17]. Reports began to emerge of hospital pharmacists intervening to have patients' medications changed to more appropriate choices [30-32]. Recent studies have corroborated this [33-35]. Currently, hospital doctors still prescribe but pharmacists assist in the choice of drug regimen thereby establishing partnership with the doctor in the provision of patient drug therapy. Ward pharmacy gave hospital pharmacists access to patient-specific information enabling them to use their indeterminate knowledge to advise doctors on drug use. It also facilitated consultation between pharmacists and doctors on such issues. Thus ward pharmacy has professionalised hospital pharmacy by decreasing its domination by the medical profession. It has engendered clinical pharmacy, which has further reduced medical control over pharmacists in the area of drug use.

Clinical pharmacy involves pharmacists in roles entailing interaction with patients and other health care professionals [4]. Services to patients include the identification of those in need of education, counselling or additional monitoring of their drug therapy and the provision of the appropriate services. These functions are performed separately from, although in collaboration with, other health care professionals demonstrating the professional traits of independence [23] and a duty to the individual patient [20]. Hospital pharmacists provide health care professionals with independent advice that is well accepted [30,33,34]. Surveys indicate that other health professionals hold those providing clinical pharmacy services in high regard [36,37]. Doctors, clinical pharmacologists and managers have recognised pharmacists' expert knowledge in the area of drug use by including them in Drug and Therapeutic Committees and formulary and drug policy-making groups [38]. More recently, hospital pharmacists have begun to prescribe for patients within a team framework in cooperation with doctors [39] and have become involved in multidisciplinary teams [40,41]. The increased trust pla-

ced by health professionals in pharmacists and the recognition of pharmacists' expertise in the area of medicine use accords with the increase in indeterminacy of pharmacists' knowledge [25] and has resulted in enhanced professional standing for hospital pharmacy.

Explanations, other than professionalisation, may be advanced for changes in the activities of hospital pharmacists. Activities in the drug use and policy-making domains might represent pharmacists seeking to control expenditure on drugs solely to preserve their numbers and a degree of financial autonomy since they, until recently, invariably held the drug budget. An equally plausible view is that the control of expenditure on medicines has freed resources for the development of clinical pharmacy services. Furthermore, where pharmacy has relinquished control of the drug budget no evidence exists that this has caused deprofessionalisation.

It has been argued that the roles adopted by hospital pharmacists were those delegated to them by doctors [24] and that clinical pharmacy has facilitated occupational limitation of pharmacy by the medical profession; this may be so. An equally plausible explanation is that many of the tasks in question, such as education and patient medication counselling, were seldom provided by doctors [27], and pharmacists merely acquired these roles. It is impossible, however, to deny opportunism in the adoption of certain roles such as therapeutic drug monitoring. It could also be claimed that pharmacists will remain professionally limited unless they assume responsibility for prescribing. This view is outdated since a prescription is now the end product of a decision-making process which draws on the skills of both doctor and pharmacist, having regard to the particular needs of the patient and to joint pharmacy-medical drug policies, and is rarely an autonomous decision made by one doctor. Although the pharmacist may not be present when every prescribing decision is made, their skills are utilised via drug policies and as a consequence of prescription review, which occurs routinely in almost every NHS hospital in the UK [42].

Hospital pharmacists' education has altered radically in recent years. In response to the demands of clinical pharmacy practice, pharmacy education is now more specialised and most Schools of Pharmacy offer postgraduate courses in clinical pharmacy

In addition to facilitating the extension of clinical pharmacy services, the enhanced level of education may be seen as a professionalising force because it increases pharmacy's knowledge base and the indeterminacy of its knowledge [20,22,25]. This knowledge base overlaps to an extent with that of medicine but is distinct due to differences in education and training and professional focus.

Nevertheless, there may be some drawbacks. As the field of clinical pharmacy grows and clinical pharmacy knowledge expands, hospital pharmacists may specialise in one or more areas of practice and the profession may become fragmented and deprofessionalised [28]. It remains to be seen whether or not this danger materialises. A more obvious danger is that post-graduate education and training may be severely curtailed in the new market-driven NHS with detrimental effects on professional development [43].

The effect of the NHS Reforms and increasing managerial control in the NHS

Recent changes in the NHS have had far-reaching effects on several professions [44-47] including pharmacy. "Working for Patients" [48] and the "White Paper on Primary Care" [49] have radically changed the way in which health care is delivered in the UK. The former has enabled hospitals and general practitioners (GPs), respectively, to become independent providers and purchasers of health care and initiated the purchaser-provider split; the latter has shifted the emphasis in the funding and provision of health care to the primary sector. Both have had implications for hospital pharmacy, not all of which are positive.

Spiralling costs have led to a reassessment of the ways in which health care is provided. One common strategy is to reduce staffing levels. A reduction in the number of hospital pharmacists would cause a contraction in clinical pharmacy services rather than reducing the ability of the pharmacy department to provide patients with medicines. This would deprive hospital pharmacists of those components of pharmacy that have contributed most to their enhanced professional status and leave a core of technical functions. Cost cutting may reduce in-service education [47] and alter pharmacists' roles with negative effects on professional status. Pharmacists are relatively expensive and the high costs of clinical phar-

macy services, may lead to reallocation or loss of some roles, particularly if pharmacists fail to demonstrate the contribution that their services make to the provision of cost-effective health care [50].

Any transfer of roles is threatening because it reduces professional territory [28], but the nature of the lost roles will determine the net effect on professional status. The key issue is the extent to which pharmacy retains roles that demonstrate its possession of indeterminate knowledge. If the forfeited roles are those that do not require the skills and knowledge of a pharmacist, this change will de-skill certain tasks leaving the professional standing of pharmacy unaltered. Further professionalisation may actually be facilitated by role expansion into areas of practice more appropriate to pharmacists' skills and knowledge.

Tasks that, we suggest, could be delegated include much routine dispensing, some technician training, some patient counselling, almost all stock control and management, and routine computing. Technicians are already performing these tasks at some hospitals [51] and, in several others, tasks have been automated [52,53]. In contrast, if the lost roles are those that pharmacists appropriately perform, such as control of drug use, the provision of drug information and many of the newer clinical pharmacy roles, deprofessionalisation may occur. Nurses pose particular threats since they are less expensive to employ and appear to be extending their roles in areas pertinent to pharmacists. Nurses will soon be permitted to prescribe [54,55] and are increasingly involved in pain control teams and self-medication (self-administration) schemes.

The development of computer programs that contain pharmaceutical knowledge in areas such as drug interactions and patient counselling [53] may also be considered a threat. Freidson [56] argues that the ever-present gap between available knowledge and that which is stored on computers, and the retention of professional control over the nature of stored knowledge and its use, will prevent computer technology exerting a deprofessionalising influence on medicine. A similar argument pertains to pharmacy. Technical information on drugs and their pharmacology can readily be stored using information technology without consequent loss of professional status since pharmacy will retain the indeterminate knowledge, the ability to use such codified computer in-

formation to determine appropriate treatment for patients. The individuality of patient's needs and their response to medicines remain the strongest reasons why software will not replace pharmacists.

The redistribution of resources from secondary to primary care as a result of the NHS changes may offer opportunities for hospital pharmacy to further professionalise. Government concern about accelerating expenditure on medicines in primary care and general practitioner prescribing, illustrated by the recent extension of a list of drugs not paid for by the NHS, has provided openings for hospital pharmacists to advise Family Health Services Authorities (FHSAs) and GPs on methods of controlling drug expenditure and improving prescribing habits, and in the creation of formularies [7]. Efforts to reduce hospital costs by enabling ill patients to return home sooner than they would have in the past and to receive complex drug treatments in the primary care sector have led to a requirement for pharmacists to provide an input into the care of these patients. Evidence exists that hospital pharmacists are expanding their activities in primary care [57]; FHSAs, for example, are employing hospital pharmacists as pharmaceutical advisors. These developments also provide an opportunity for hospital and community pharmacists to collaborate and use their respective skills for the benefit of patients in moving closer to the ideal of seamless care.

The devolution of management within hospitals, with the creation of clinical directors responsible for their specialty's drug budget has led to the need for pharmacists to provide assistance with drug budget control. Previously, pharmacy held the drug budget in most hospitals and strove to keep expenditure to a reasonable level. The change in budgetary control has led to pharmacists becoming advisors on the judicious use of medicines [58], rather than the inspectorate of the drug budget, and has provided opportunities for role development.

Increased managerial control in the NHS has implications for the professions and for hospital pharmacy. The expanded role of managers in the UK NHS, consequent on the Griffiths Report [59], represents a growth in bureaucracy that poses threats of deprofessionalisation [28,60] for hospital pharmacy as well as for other health care professions [44,47,61]. The most recent NHS reforms have further strengthened manage-

rial control of the NHS and reduced the power of the medical profession [62]. This reduction in medical power seems to have been a planned consequence of Thatcherism in the late 1980s since the medical profession were virtually excluded from their usual advisory role in NHS policy-making [62]. Hospital pharmacy appears to have escaped the effects of increased managerial control as yet; it is unlikely to continue to do so [50]. Hospital pharmacists may increasingly move into hospital management and could potentially modulate the effects of managerial power on pharmacy. This advantage may be negated, however, if pharmacists in management positions become insensitive to pharmacy issues and lose their identity as pharmacists among their professional colleagues.

Effect of general changes in professional roles

The role of the medical profession and of health care occupations and professions allied to medicine have altered in the 1980s. New professions have emerged and established professions have extended their roles [24,45,47] causing competition amongst professions and the encroachment of newer professions upon the territory of established ones. Hospital pharmacy will have to protect professional territory from encroachment by nurses and, possibly, from clinical pharmacologists (on whose territory it is claimed clinical pharmacists have already encroached [27]). To further professionalise, hospital pharmacy will have to consider taking on certain roles presently performed by doctors and may have to compete with nurses [63], amongst others, for these.

The increased importance of technical knowledge in modern society as a means of controlling and managing social and political matters has been claimed as a professionalising force [29]. This conflicts with views on the importance of indeterminate knowledge in maintaining professional status [25] but the resolution of this argument is beyond the scope of this essay. Nonetheless, some implications for hospital pharmacy warrant mention. Since technical knowledge can be acquired by education, some para-medical occupations, many of whom now require their members to possess a university degree, could threaten pharmacy's territory. An enhanced level of education may lead to demands for increased professional status from the para-medical occupa-

tions. Project 2000 (which aims to ensure that by the year 2000 all British nurses will possess a university degree) has had this effect on nursing [45]. Whilst it can be claimed that pharmacists, too, have augmented their education and increased their professional status, increases in the status of other professional groups could result in intense competition for roles currently held by pharmacists.

Effects of changes in society in general

Society has changed radically in the past two decades. Rapid technological advances have facilitated the replacement of humans by machines in many areas of production. Much of pharmacy's role in the production and compounding of medicines had been lost by the 1970s [2] but subsequent technological progress has further reduced its professional territory. Automation, in particular, has had profound effects on many aspects of production and delivery of medicines in the hospital sector forcing pharmacy to re-consider its professional role. Hospital pharmacists have recently adopted new roles [39,40] but the effects of automation and other technologies on professional status are still unclear.

The status afforded by society to health care professions has changed [24,45,47]. The power balance between professional and client has altered; consumers have gained and, arguably, professions have lost power. Patients are better educated and they have become empowered by documents such as 'The Patient's Charter' [64]. They no longer defer to doctors [62] and it is claimed that patient empowerment has reduced the status of medicine [65,66]. Changes in the patterns of morbidity and mortality have encouraged the redirection of resources from curative to preventative medicine. This has led to patients assuming greater responsibility for their health and having increased input into decisions about their care. It is thought that this has also reduced doctors' power [67]. Patients, increasingly, are rejecting interventionist medicine in favour of a more holistic approach and their mistrust of doctors is increasing [47]. In addition, the medical profession in Britain has aroused suspicions of protectionism and restrictive practices. Areas of concern include professional fees charged in private practice and control of the award of specialist status. Increasing scrutiny of these issues may further reduce their status in the public's eyes.

Although it is still unclear if a reduction in medical power has actually taken place in the UK, these events raise the spectre of loss of professional power for other professions. In community pharmacy, the Consumers Association's recent report suggesting that the quality of advice given by community pharmacists was poor and that proposals to extend their advisory role should take this into consideration [68] provoked an angry and defensive response from the profession [69,70]. Perhaps this signifies pharmacy's fearful perception of the power of the patient to determine professional status. Increased consumer power could pose threats in hospital pharmacy if the customer does not value the pharmacists role but it could also provide an opportunity for role extension, particularly in the areas of patient information and education. Iatrogenesis, due to negligence in the use of medicines, is still common [71] and patients now demand a reduction in the risks associated with the use of medicines. Thus there is ample opportunity for hospital pharmacists to expand their efforts into areas of expressed patient need, collaborating, where appropriate, with their colleagues in primary care.

Discussion

Clinical pharmacy is a relatively new departure in hospital pharmacy. It has resulted in hospital pharmacists adopting new roles and providing services independently of the medical profession. Pharmacists are accepting the concept of responsibility to individual patients and the indeterminacy of pharmacy's knowledge base has increased. Consequently, medical domination of pharmacy has been reduced and patients, and other health care professions, now afford pharmacists greater professional status. But clinical pharmacy is a double-edged sword. It poses hazards of fragmentation due to specialisation. Specialisation is inevitable but the physical existence of sub-divisions within hospital pharmacy should not threaten professional status if pharmacists retain a central identity.

One of the gravest problem in pharmacy at present, we think, is the possibility that their identity is ambiguous and a core ideology is lacking. Hospital pharmacists have shown a lack of consensus regarding the roles which they perform [42,57] and the greater development of clinical pharmacy in the hospital sector may be emphasising intra-

professional differences. Arguably, until pharmacy decides its future professional role it will run the risk of deprofessionalisation in a competitive health service environment.

In the wider context of the NHS and society, changes have occurred which may serve to advance or restrain pharmacy's professionalisation. The NHS reforms have opened up new avenues of professionalisation in primary and secondary care both in the direct care of patients and as advisors to other health care professionals. However, the increase in managerial power in the NHS, along with the emphasis on stricter budgetary control, threaten to deprofessionalise hospital pharmacy by removing the clinical roles that have been acquired. Pharmacists can protect their status in the face of such challenges by examining the cost-effectiveness of the services that they provide. In addition, delegation of roles that are within the competence of ancillary and technical staff and automation of other suitable tasks will help retain and develop roles requiring pharmacists' professional input. This will facilitate the provision of more cost-effective hospital pharmacy services and guard against the loss of territory to other occupational groups. Encroachment by other professional groups will, however, remain a hazard of changes in professional roles in general and the growth of new professions whose status is increasing in a knowledge-driven society. Hospital pharmacy can further protect itself by delineating its professional boundary and by achieving consensus on its professional identity.

Finally, patient empowerment, consequent to societal changes, poses some threats of deprofessionalisation but is more likely to offer hospital pharmacists new roles and an opportunity to further professionalise. By acceptance of the patient's part in deciding on their health care needs, and by seeking to accommodate these within a professional framework, hospital pharmacy can continue to develop. The adoption of the concept of "pharmaceutical care" [72], where pharmacists primary duty is to the patient, is a step along this path.

Conclusion

The development of clinical pharmacy is one of several influences on the professional

development of hospital pharmacy in the UK. Although changes in the NHS and in society are also important, clinical pharmacy remains the pre-eminent influence; it has opened avenues of professionalisation enabling pharmacists to respond to the changing environment in the hospital sector in the UK today. With careful development of clinical pharmacy, challenges to the professional status of hospital pharmacy can effectively be overcome.

The successful future development of clinical pharmacy in hospitals requires greater consensus, both within the profession and within hospital pharmacy, on the essential role of the pharmacist. The profession in general must make difficult decisions about its professional role and territory. It needs to decide which roles can be delegated and which must be retained by pharmacists. We have suggested some answers for hospital pharmacy but this issue needs to be tackled both by the profession, to establish clearly its professional identity, and then by each of its branches, since practice varies significantly between each branch of pharmacy in the UK. Even within the UK hospital sector, clinical pharmacy has not developed uniformly and there is little published evidence of the contribution that hospital pharmacists make to the provision of cost-effective health care. Pertinent changes in the health care environment also need to be taken into account.

Although this paper concentrates on hospital pharmacy in the UK, the issues discussed have implications for the profession of pharmacy in all industrialised countries. We have indicated that there are marked differences between hospital and community pharmacy in the UK but these may not be so obvious elsewhere. The development of clinical pharmacy is, however, becoming an issue in most developed countries. Its nature may vary between countries but, as in the UK, it provides a means for pharmacists to change their role and their relationships with other professionals. The issues raised here regarding professional identity and development will therefore merit consideration when pharmacy in any country considers its professional development.

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APPENDIX II

The following are examples of letters of request and thanks sent to pharmacists during postal and focus group pre testing of the questionnaires. All were personally signed.

1. Letter of instruction for those helping with postal pre-testing.

London School of Hygiene and Tropical Medicine
(University of London)



Keppel Street, London WC1E 7HT
Tel: 071-636 8636 · Tel Direct: 071-9271444 · Fax: 071-436 3611

Department of Public Health and Policy
Health Services Research Unit

The Pharmacist,
Senior Clinical Pharmacist,
Pharmacy Department,
The Hospital,
Hospital Address,
Postcode.

Date

Dear Pharmacist,

This is a draft of the questionnaire which I intend to send to Principal Clinical Pharmacists (or their equivalent) in hospitals in England. There are separate similar questionnaires for Pharmacists in other parts of the United Kingdom.

I would very much appreciate if you could take the time to:-

1. Fill in the questionnaire.
2. Time yourself - How long did it take (approx)? minutes.
3. Comment on the questions with respect to wording/language, specificity, ambiguity, clarity etc.

4. Comment on the order in which the questions are asked.

5. Comment on the ease/difficulty experienced in answering the questions

Please write your comments on this sheet and return it plus the completed questionnaire to me as soon as possible. Thanking you in anticipation,

Yours sincerely,

Siobhan M Cotter
Siobhan M Cotter MRPharmS,
Clinical Research Pharmacist.

2. Letter of thanks to those helping with focus group pre-testing.

London School of Hygiene and Tropical Medicine
(University of London)

Keppel Street, London WC1E 7HT
Tel 071-636 8636 Tel Direct 071-9272466 Fax 071 436 3611



Department of Public Health and Policy
Health Services Research Unit

Ms P Pharmacist,
Senior Clinical Pharmacist,
Pharmacy Department,
The Hospital,
Hospital Address,
Postcode.

Date


Dear Ms Pharmacist,

Thank you for taking the time to see me onat.....

I found the discussion we had very enlightening. Your comments were most helpful and will assist me in the production of the next draft of the questionnaire.

Once again, thank you for your help.

Yours sincerely,


Siobhan M Cotter MRPharmS,
Clinical Research Pharmacist.

APPENDIX III

1. Results of the first pre-test (focus group).

1.1. **Participants.**

Six District Pharmaceutical Officers from the North West Thames Region pre-tested the first draft of the questionnaire.

1.2. **Results.**

1.2.1. **Some interesting verbatim comments:**

"I feel threatened by some of the questions .. I'm not going to tell you we don't provide a service .. I'll cheat.."

"I like the check list and the open part (of the questions)".

"I couldn't answer that .. it's too complicated".

"What's a 'target patient'? .. We've got to be able to understand the questions".

"What do you mean by 'role'? .. I'd think it's my business plan".

"I think some managers won't know what HC(88)54 is .. It hasn't made any visible changes anyway .. in my District the changes were already in place".

"(about HC(88)54) If you mean did it increase the amount of money given? or more staff? then ask that".

"What's a University Medical School Teaching Hospital?".

"I work in a Special Health Authority ..that's not included here".

(Regarding the question on opening hours) "A pharmacy can only be open or shut .. it can't be 'easily accessible to patients and staff' and not be open".

"Do you want to know the grades of staff visiting the wards?".

(On the question referring to the collection of adverse drug reaction data) "I've never worked in a hospital like that .. Pharmacists don't do that".

"You haven't dealt with the provision of financial information .. or clinical training or ward pharmacy training".

1.2.2. **Researchers summary comments:**

Helpful feedback was received from this group. Participants' views on clinical pharmacy were different from those of the researcher mainly because they were managers not clinical pharmacists. Participants got distracted by the wording of some questions, for example whether or not a hospital was a teaching hospital or how many pharmacists worked in the pharmacy. The researcher realised, after this meeting, that managers may be suspicious of questions inquiring about anything related to resources or workload. In addition, certain managers reacted in a hostile manner to questions about some specialist services, particularly if their hospital pharmacy did not provide them. The researcher assumed that these services might be provided by a minority of hospitals. Some managers indicated that they were reluctant to admit that they did not provide a service, even a rare, new or specialised service; they believed such an admission would be evidence of an inferior pharmacy service and they would be tempted to lie in their answers. This served to emphasise the importance of allaying fears of inferiority by carefully wording such questions. Useful insights were gained on managers' reactions to questions about clinical pharmacy services. They misunderstood the reasons for asking some questions, might answer hostile questions incorrectly and refuse to answer irrelevant questions. They suggested that some questions would be better asked of senior managers and others of clinical pharmacists.

1.3. Action consequent on the pre-test.

Question wording was changed to reduce the possibility of respondents reacting in a defensive fashion. The possibility of two questionnaires being required was considered. Subsequent pre-testing involved persons more similar to prospective respondents.

2. Results of the second pre-test (postal).

2.1. Participants.

Three regional clinical pharmacy specialists.

2.2. Results.

Respondents suggested asking demographic questions at the beginning of the questionnaire to help respondents complete later questions. The length of the questionnaire (10 pages) was considered to be excessive. One respondent thought that a list of contents, and a note stating that the results would be made available as soon as they were processed, should be included. Another thought that it might be better to specify at the start of any sub-section which might not be applicable to all pharmacies "*if the services concerned are not provided please go to page X*".

The wording of the questions was considered to be too complex, probably because more than one idea was being introduced in some questions, for example the frequency of ward pharmacist visits and the percentage of beds visited at each specified frequency were included in one question. One person considered the wording "*pompous and unfriendly*" and advised seeking advice on wording from a sociologist.

The concept of the "*percentage of beds served*", which had been used extensively, was considered to be unhelpful, beyond the scope of the information available to most respondents and a potential cause of a poor response to these questions. The idea had been borrowed from a questionnaire investigating clinical pharmacy services in the USA (Personal communication: Bond CL. 1989 American Society of Hospital Pharmacy National Clinical Pharmacy Services Survey). In several questions the choice of answers was thought to be inadequate. The large number of open questions was found to be off-putting. Pharmacists were happier ticking boxes in closed questions than writing replies. Where the researcher could not be certain that all possible answers were given as options, however, a closed questions that included an open section at the end was considered to be a good idea. A range of answers for the number of hours for which the pharmacy was open had been provided in the form of bands, for example "6-10 hours per day". The advice was that this style would cause the loss of valuable information without simplifying the questionnaire. Some questions were considered irrelevant, for example "At present is a formulary (or list of preferred medicines) in use at your hospital?" It was thought that the answer in all cases would be "yes". Conversations with pharmacists at meetings and conferences had revealed, however, that hospitals without formularies existed.

2.3. Action consequent on the pre-test.

Demographic questions were moved to the beginning of the questionnaire. Several questions containing more than one idea were expanded into two or more parts or questions. A sociologist was consulted regarding the optimal wording of questions. The use of questions from an American questionnaire was abandoned. Several questions containing closed and open sections were created and questions were simplified wherever possible.

3. Results of the third pre-test (postal and focus group).

3.1. Participants.

Two groups were used. Six Masters of Science (MSc) in Clinical Pharmacy graduates who held senior or middle grade clinical pharmacy posts in hospitals around London participated in a postal pre-test. Five of these returned completed questionnaires. Eight senior clinical pharmacists from England and Wales who held senior pharmacy management posts participated in a focus group discussion. It was felt that these participants most closely resembled prospective respondents.

3.2. Results.

Broadly speaking, the comments showed a difference in managerial experience between the MSc graduates and the senior clinical pharmacists.

Length.

Most thought that the questionnaire was too long (22 pages) and that this would adversely affect the response rate.

Topics.

Some felt that they lacked the knowledge to answer questions relating to management and to the nature and effect of changes over the preceding 2-5 years. They thought that these questions might be answered with greater ease and accuracy by a more senior manager, such as the District Pharmaceutical Officer (or equivalent). Certain questions, particularly those regarding services provided to patients, professionals and institutions in primary care, were felt to be difficult to answer because of the nature of the participants' responsibilities. It seemed that certain sections of the questionnaire would have to be omitted or the questions asked in the form of two separate questionnaires directed at different respondents. The latter option was recommended. The first questionnaire should inquire about clinical pharmacy services provided to primary care. It should be sent to District Pharmaceutical Officers (DPhOs) or their equivalents in the first instance with an option of passing the questionnaire on to a more appropriate respondent, possibly a Community Services Pharmacists, also being provided. The second questionnaire, asking about clinical services provided in hospitals, should be sent to Principal Clinical Pharmacists or the pharmacists responsible for clinical pharmacy services in individual hospitals. The ensuing discussion helped allocate questions to each of these questionnaires. It was thought that a question on the effects of *The Way Forward*²⁴ should be asked of the DPhO (or equivalent) since other pharmacists may not have been in post sufficiently long to know the answer. As in previous pre-tests, some questions were considered to be irrelevant.

(3) Clarity and comprehension.

Certain questions confused participants because the wording was *"too complicated"*. One participant said *"it reads like a politician's speech"*. A participant who had been involved in the Plain English Campaign thought, however, that the wording of the questionnaire was probably at the correct level; *"not too much jargon, not too colloquial"*. A few questions were misinterpreted. Some participants admitted that they did not understand a few questions. In a few instances a question was felt to include more than one idea.

(4) Arrangement of topics in the questionnaire.

The division of the questionnaire into sections was found to be useful but the headings were thought insufficiently prominent. Most found the sequence of topics agreeable.

(5) Question style.

A sociologist had recommended that the tone of some questions be made friendlier and had reminded the researcher that all hospital pharmacies may not provide the services mentioned in the questionnaire. The questions had subsequently been rephrased to indicate that the researcher thought that certain services may be provided only by a minority of pharmacies. This would help prevent feelings of inadequacy among respondents and so enhance the quality (and perhaps the rate) of response. The sociologist also suggested that a larger number of open questions inquiring about respondents' own opinions be included. Many pre-test participants disliked open questions; they felt that they *"disturbed their train of thought"* and such a style *"was intrusive"*, *"took too much time to think about and answer"*, *"made the whole thing too long"* and *"makes it look like we have to work hard to complete"*. They felt that these types of questions might elicit a better response in an interview survey. Any open questions retained in the postal questionnaire should be placed in a separate section at the end where *"we might try answering them if they were on the last two pages when we know we're nearly finished"*.

(6) Question wording.

Use of the 24-hour clock was advised to simplify coding. Some participants thought that the use of bands, such as 0-5; 6-10, for the numbers of staff employed would help respondents by providing closed instead of open questions but others thought that it would cause loss of valuable information. Some participants thought that staff numbers questions should ask for numbers of persons; others suggested requesting Whole Time Equivalents (WTEs). Some questions were insufficiently specific to obtain the required information whilst others were too specific, for example the term "New Drugs Panel" had been used in one question but participants said that other committees do its work in several hospitals. In some circumstances the questions, although clear, did not discriminate between different levels of service provision. Questions relating to practice research and education were thought to require greater discrimination between different levels of service provision.

3.3. Action consequent on the pre-test.

Two questionnaires were created, one to be sent to DPhOs and their equivalents and the other to the pharmacist responsible for clinical pharmacy services in individual hospitals. DPhOs were given the option of delegating completion of the questionnaire to a more informed respondent if appropriate. Questions were omitted unless they were considered essential. Those remaining were allocated to the two questionnaires resulting in two shorter rather than one long questionnaire. The researcher conceded that the depth of information originally hoped for could not be obtained without compromising the response rate. It was decided to obtain the in-depth information at interviews.

Section headings were removed. The questionnaire was no longer divided into sections since the depth of questioning did not require it. A column at the right hand side of the page, previously intended for use in the coding process, was removed and the space used to confine the questionnaire to fewer pages. Various other space-saving ideas were implemented. It became a *"miracle of miniaturisation"*. Each question concentrated on a single topic. Where there was more than one question asked about a topic, the question was divided into the required number of parts. Questions became mostly closed with an open section at the end. A few open opinion questions were retained in a separate section at the end of the questionnaire. Questionnaire wording was further simplified. Where a term or concept was likely to be misinterpreted, for example "audit", an explanation was provided when the term was introduced. Some questions were made less specific to prevent loss of information or omitted where there was serious risk of inaccurate information being gathered. Others were expanded upon to elicit more detailed and accurate information on service levels, for example the respondent was asked to list the current research projects or the word "formal" was inserted before provision to provide a degree of discrimination. In other cases discrimination was achieved by providing several categories of reply, for example none, very little, a moderate amount and lots. Opening hours were requested to be completed

according to the 24-hour clock and staff numbers were inquired about in terms of whole time equivalents as well as in the numbers of persons employed.

4. Results of the fourth pre-test (postal, and individual and group discussions).

Draft four consisted of two questionnaires:

- (a). Questionnaire I - to be sent to DPhOs or equivalents
- (b). Questionnaire II - to be sent to the pharmacist responsible for clinical pharmacy services in individual hospitals.

4.1. Participants.

Questionnaire I was discussed with two specialist pharmacists, a sociologist and a group of health service researchers. Questionnaire II was sent to six hospital clinical pharmacists, three of whom held senior positions, and discussed with a sociologist and a group of health service researchers.

4.2. Results.

Questionnaire I.

Questionnaire I consisted of 9 questions on 3 pages (see Appendix IV). Very few changes were suggested; most were concerned with question wording.

Questionnaire II.

Questionnaire II consisted of 27 (England, Scotland, Wales and Special Health Authorities) or 28 (Northern Ireland) questions on 6 and 8 pages respectively (see Appendix IV). Most respondents had few comments to make.

Scales.

A categorical scale had been used in some questions. It was thought better to define the categories.

Wording.

Some questions were considered to be ambiguous.

4.3. Action consequent on the pre-test.

A few questions in Questionnaires I and II were reworded and simplified. In general, the changes were few and minor. "Lots", a term used in a categorical scale in both questionnaires was defined in Questionnaire II as "greater than, or equal to, an average of 2 hours/week over the course of a year". Due to perceived difficulties in estimating with accuracy the exact number of hours per week that was devoted to any of the tasks inquired about in Questionnaire I the term were not defined there.

APPENDIX IV

1. Questionnaire I, inquiring about the provision of services, in Districts (and equivalents), by National Health Service hospital pharmacies to primary care.

**THE CLINICAL ROLE OF THE
HOSPITAL PHARMACIST**

**A NATIONAL SURVEY OF NHS
HOSPITAL PHARMACY SERVICE
PROVIDERS**

SERVICES PROVIDED TO PRIMARY CARE.

STRICTLY CONFIDENTIAL

Please return to:-

**S M Cotter, Clinical Research Pharmacist,
Room 32a Health Services Research Unit,
The London School of Hygiene & Tropical Medicine,
Keppel Street,
London WC1E 7HT.**

2. Questionnaire I continued.

The questions here ask about clinical pharmacy services provided to the primary health care area. I am specifically interested in those services

- provided by pharmacists employed in the hospital sector or
- provided using hospital pharmacy resources eg. Drug Information
- provided by Community Services Pharmacists (or similar) who use hospital pharmacy resources.

I ask about services such as advice, information, education etc., provided to:-

- GP's • Primary health care nurses • Community pharmacists • patients
- other health care professionals working in primary health care
- primary health care institutions.

The questions are of the "tick the box" variety with an open section to enable you to answer the question more fully or more accurately. I also ask some general questions at the end of the questionnaire. Finally, if you wish to make any comments or clarify any answers and there is insufficient space on the front of the page, please write on the back of the pages.

1. Pharmacists employed in the hospital service or pharmacists employed by the health authority may use hospital pharmacy resources to provide pharmacy services to General Practitioners. Please tell me if services of an advisory or educational nature are provided by your pharmacists.

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Advice to GP's on prescribing/prescribing policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advice to GP's on financial aspects of drug use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information to GP's on general drug-related matters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information service provided by the hospital Drug Information Department to GP's	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational service for GP's (including trainees)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other services of an advisory or educational nature - Please specify..

2. Pharmacists employed in the hospital service or pharmacists employed by the health authority may use hospital pharmacy resources to provide pharmacy services to nurses working in the primary health care area. Please tell me if services of an advisory or educational nature are provided by your pharmacists.

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Advice to Nurses on wound care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advice to Nurses on analgesia or on equipment used in Patient Controlled Analgesia (PCA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information to Nurses on general drug-related matters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information service provided by the hospital Drug Information Department to Nurses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational service for Nurses (including trainees)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other services of an advisory or educational nature - Please specify..

3. Questionnaire I continued.

3. Pharmacists employed in the hospital service or pharmacists employed by the health authority may use hospital pharmacy resources to provide advice, information or other help to patients in the community or to patients in primary health care institutions. Please tell me if your pharmacists provide any such services.

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Individual patient counselling for patients with drug-related needs eg. patients receiving TPN, patients on PCA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group sessions giving patients information on medication or on medication-related matters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group sessions giving persons in the community information on medication or on health care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other services of an advisory or educational nature - Please specify..

4. Pharmacists employed in the hospital service or pharmacists employed by the health authority may use hospital pharmacy resources to provide pharmacy services to Community Pharmacists. Please tell me if services of an advisory or educational nature are provided by your pharmacists.

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Advice to Community pharmacists on analgesia or on equipment used in Patient Controlled Analgesia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advice to Community pharmacists on Parenteral nutrition or on equipment used in parenteral nutrition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advice about patients with specific drug-related needs who are being discharged from hospital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information service provided by the hospital Drug Information Department to Community pharmacists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational service for Community pharmacists (including Pre-registration pharmacists)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other services of an advisory or educational nature - Please specify..

5. Pharmacists employed in the hospital service or pharmacists employed by the health authority may use hospital pharmacy resources to provide pharmacy services to other health care professionals working in the primary health care area. Please tell me if services of an advisory or educational nature are provided by your pharmacists.

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Information on general drug-related matters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information service provided by the hospital Drug Information Department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational service for Health Care Professionals other than GP's, Nurses and Community pharmacists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other services of an advisory or educational nature - Please specify..

6. Pharmacists employed in the hospital service or pharmacists employed by the health authority may use hospital pharmacy resources to provide pharmacy services to Primary Health Care Institutions eg. Residential Homes, Hospices, Nursing Homes etc. Please tell me if services of an advisory or educational nature are provided by your pharmacists.

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Advice on wound care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advice on sedation policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advice on analgesia and equipment used in Patient Controlled Analgesia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information on general drug-related matters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information service provided by the hospital Drug Information Department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational service for Health care personnel working in these institutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other services of an advisory or educational nature - Please specify..

7. This question asks about changes in pharmacy staff and resources. Please tell me:-
- (a). have any new posts been funded or has there been a shift of resources (staff or money) as a result of HC(88)54, The Way Forward for Hospital Pharmaceutical Services? No Yes
- (b). have any new posts been funded or has there been a shift of resources (staff or money) as a result of the Nuffield Report? No Yes
8. If any of your hospitals have recently become a trust, or is in the process of applying for trust status can you tell me if this has caused any shift in resources (staff or money)?
- Not applicable Yes applicable, but No it has not caused any changes in resources
- Yes applicable, and it has caused changes in resources - Please specify these changes
9. If you have any comments or views on the practice of clinical pharmacy which you feel are important, please write them here.

Thank you for taking the time to complete this questionnaire. I hope you found it interesting and worthwhile.

Siobhan Cotter, Clinical Research Pharmacist.

5. Questionnaire II, inquiring about the provision of clinical pharmacy services in National Health Service hospitals.

**THE CLINICAL ROLE OF THE
HOSPITAL PHARMACIST**

**A NATIONAL SURVEY OF NHS
HOSPITAL PHARMACY SERVICE
PROVIDERS**

STRICTLY CONFIDENTIAL

Please return to:-

**S M Cotter, Clinical Research Pharmacist,
Room 32a Health Services Research Unit,
The London School of Hygiene & Tropical Medicine,
Keppel Street,
London WC1E 7HT.**

6. Questionnaire II continued.

For most questions you need only tick one box. Some also include a space, labelled "Other" which will enable you to answer certain questions more fully or accurately. I have clearly indicated the few questions where more than one box may be ticked. Finally, if you wish to make any comments or clarify any answers and there is insufficient space on the front of the page, please feel free to write on the back of the pages.

The first few questions are about the hospital and pharmacy department. Then I ask about

- Ward pharmacy • Drug Information • Education • Drug Control
- Specialist Clinical Services • Clinical Trials • Research & Audit

and finish off with a few general questions. Feel free to consult with others, if necessary, to obtain information for the answers to any of the questions.

1. Please describe your hospital using the following terms. (Tick 1 box in each section).

- (a) Is it an? - NHS Trust Directly-managed Unit Part Trust, part Directly-managed
- (b) Is it? - Non-teaching Medical School Teaching

2. Please indicate, to the best of your knowledge, the approximate number of beds and wards in the hospital, both on-site and off-site, to which a pharmacy service is currently provided.

WARD TYPE	TOTAL NO. OF WARDS	TOTAL NO. OF BEDS	WARD TYPE	TOTAL NO. OF WARDS	TOTAL NO. OF BEDS
ITU/CCU			Long-stay Psychiatric & Mental handicap wards		
Day-care & 5 day/week wards			Other Long-stay wards		
Acute wards			Other wards		

- 3(a). Are pharmacy services provided by your pharmacy to units of the hospital which are off-site? No Yes
- (b). Are pharmacy services provided by your pharmacy to other NHS hospitals? No Yes

4. Please indicate the official pharmacy opening hours (using 24 hour clock times) on:-

Monday - Friday inclusive to Saturday to

Bank & official holidays to Sunday to

5. This question asks about your pharmacists. Please tell me...

- (a) how many pharmacists are employed in your pharmacy? ...persons equivalent to ...WTE's
- (b) for how many of your pharmacists is their highest qualification a:-

PhD MPhil MSc Post-graduate Diploma

(c) how many of your pharmacists are clinical specialists? eg. oncology specialist. (Clinical Specialist = pharmacist who spends ≥ 50% of their time on that work)

6. Please tell me if an out-of-hours pharmacy service is provided?

No Yes, by pharmacists on-call from home Yes, a Residency service

7. I would like to find out how pharmacy fits into the overall hospital management structure. Please indicate who the head of the pharmacy department reports to?

- A member of the hospital board A clinical director A service manager
- The Unit General Manager Another - Who?.....

7. Questionnaire II continued.

8. Please tell me who holds the drug budget? (You may need to tick more than one box).

The head of the pharmacy department The Unit General Manager

Held at Clinical Directorate/Care Group level Another - Who?.....

9. Please tell me how many pharmacists routinely work on the wards? ...persons ...WTE's

10(a) Would you say that patient medication charts of acute in-patients are routinely monitored in your hospital? No Yes

(b) If yes,
 (i) where is this usually done? On the ward In the pharmacy

(ii) for the majority of patients roughly how frequently is this routine monitoring of inpatient medication charts carried out? on:-

Monday-Friday: Twice daily Daily Not done Other - specify.....

W/E & Holidays: Twice daily Daily Not done Other - specify.....

11. Please tell me, do one or more of your pharmacists routinely accompany doctors on ward rounds (or case conferences) AND contribute to decisions on drug therapy?

No, never Yes, but only specialist pharmacists

Yes, many of our pharmacists do this Yes, all our pharmacists do this

12. Are medication charts of long-stay in-patients routinely monitored in your hospital?

No Yes, for the majority of patients this is done weekly or more frequently

Yes, for the majority of patients this is done less frequently than weekly

13(a). Some hospitals have an on-site Drug Information (DI) service. Please tell me if an on-site Drug Information service is available at your hospital?

No (b). From where is DI obtained? Local hospital Region

Other - describe..

Yes (c). How many pharmacists are designated to work in DI? ...persons ...WTE's

14. The amount and type of information that pharmacy departments provide varies widely. Please tell me if one or more of your pharmacists provide information in any of the following categories. (You may need to tick more than one box).

Compilation of clinical information on drug use

Compilation of financial information on drug use

Clinical information for formulation of prescribing policies

Clinical information for formulary decisions

Clinical information for evaluation of new products

Information for production of educational bulletins used by hospital staff

Information for the production of educational bulletins used by health care professionals outside the hospital

Information for the production of material used in patient education

Other information - please specify...

8. Questionnaire II continued.

15(a). Please tell me if your pharmacy routinely offers formal professional educational activities for your pharmacy staff. No Yes

(b). If yes, do any of these activities lead to a formal qualification? No

Yes, a Diploma Yes, an MSc. Other - please specify.....

(c). If education is provided, please describe the way in which it is provided and how much of each activity is done. Throughout this questionnaire, "lots" means "> 2 hours/week, averaged over the course of a year"

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Group teaching on the clinical use of drugs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clinical skills training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In-house clinical training course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use of peer review eg. ward pharmacy meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group learning where peer review is not used eg. journal clubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
By routine dissemination of printed or other learning material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other - please specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. One or more of your pharmacists may routinely provide formal educational activities for other health care professionals in the hospital (including off-site units). If so, please indicate how much of the activity is done.

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Group teaching for nursing staff (including students)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group teaching for medical staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group teaching for medical students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group teaching for other health care professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other - please specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17(a). Please tell me if there is a Drug and Therapeutics committee (or equivalent) in your hospital at present? No Yes

(b). If yes, how many pharmacists normally attend the meetings?

18(a). At present is a formulary (or equivalent) in use in your hospital? No Yes

(b). If yes, in the case of a request for a non-formulary drug for an individual patient in what percentage of cases would the drug be supplied?

0% 25% 50% 75% 100%

(c). Please tell me who is usually consulted when deciding whether or not the drug is supplied. (More than one box may be ticked).

No one Ward pharmacist Consultant/senior doctor

Prescriber A senior pharmacist Ward sister/senior nurse

The Drug & Therapeutics committee (or equivalent)

Other - please specify.....

9. Questionnaire II continued.

- 19(a). Please tell me if there are clinical directorates/care groups (or their equivalent) in your hospital at present. No Yes
- (b). If yes, is advice/information on prescribing regularly given to any of them? No Yes
- (c). If yes -
 (i) Is the advice/information provided to them by:- One pharmacist only
 Specific pharmacists for individual (or combinations of) directorates/care groups
 Other - please specify.....
 (ii) Does this involve a meeting with: A Clinical Director A Business manager
 Another - Who?.....

20. Some pharmacies may have the resources to provide some special clinical services.
 (a). If your pharmacy provides any of the services listed here to some or all wards (ie. to in-patients or day-patients), please indicate the nature of the service provided.

<u>SERVICE</u>	<u>NO SERVICE PROVIDED</u>	<u>SUPPLY SERVICE ONLY</u>	<u>ADVICE ON REQUEST</u>	<u>PART OF A TEAM</u>
TPN/Nutrition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cytotoxics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Central Intravenous Additives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Patient Controlled Analgesia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(b). If your pharmacy provides any extra help to doctors or health care professionals, caring for in-patients or day-patients, in the following areas please indicate the nature of this extra help.

<u>SERVICE</u>	<u>NONE</u>	<u>HELP/ADVICE ONLY ON REQUEST</u>	<u>ROUTINE SERVICE AVAILABLE</u>
TDM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Infection control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anticoagulation control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wound care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(c). If one or more of your pharmacists provide some of the following services routinely please tell me which services are provided, the patient categories served (eg. In-patient) and the types of patients served (eg. geriatric patients). (This question is continued overleaf).

Formal drug history-taking No Yes for: In-patients Day-patients Out-patients
 For what types of patients?

Formal self-medication schemes No Yes for: In-patients Day-patients Out-patients
 For what types of patients?

Formal patient counselling No Yes for: In-patients Day-patients Out-patients
 For what types of patients?

Formal group sessions educating patients about drugs/health care No Yes for: In-patients Day-patients Out-patients
 For what types of patients?

10. Questionnaire II continued.

CSM Yellow Card No Yes for: In-patients Day-patients Out-patients
 ADR Monitoring Scheme

If yes, does pharmacy ensure: CSM form is given to the doctor CSM form is filled in

Other formal ADR No Yes for: In-patients Day-patients Out-patients
 monitoring in addition to the CSM scheme

For what types of patients?

(d). Other clinical services which are provided routinely by your pharmacy to in-patients and day-patients - please describe

(e). Other clinical services which are provided routinely by your pharmacy to out-patients - please describe

21. Some pharmacies may contribute to research by helping with clinical trials.

(a). Please tell me if one or more of your pharmacists play a role in clinical trials which are carried out in the hospital? No Yes

(b). If yes, please indicate the roles commonly performed by pharmacy. (Tick as many boxes as necessary).

ROLE (IN-HOUSE TRIALS)	✓
Assess/plan the design	<input type="checkbox"/>
Assess drug safety & efficacy	<input type="checkbox"/>
Formulate drug	<input type="checkbox"/>
Assist in protocol design	<input type="checkbox"/>
Assist in randomisation	<input type="checkbox"/>
Package drug	<input type="checkbox"/>
Only supply drug eg. to clinics	<input type="checkbox"/>
Dispense drug	<input type="checkbox"/>
Assist in record keeping	<input type="checkbox"/>
Hold & break randomisation codes	<input type="checkbox"/>
Help monitor compliance	<input type="checkbox"/>

ROLE (DRUG COMPANY TRIALS)	✓
Assess design	<input type="checkbox"/>
Assess trial safety	<input type="checkbox"/>
Assess ethical issues of trial	<input type="checkbox"/>
Active member of Ethics Committee	<input type="checkbox"/>
Package drug	<input type="checkbox"/>
Only supply drug eg. to clinics	<input type="checkbox"/>
Dispense drug	<input type="checkbox"/>
Assist in record keeping	<input type="checkbox"/>
Liaise with company about trial	<input type="checkbox"/>
Help monitor compliance	<input type="checkbox"/>
Hold & break randomisation codes	<input type="checkbox"/>

Other roles - please specify..

22. A few pharmacy departments have the resources to carry out research. Please tell me

(a). if one or more of your pharmacy staff are actively involved in pharmacy practice research No Yes

(b). If yes, for how many of the staff involved is the research registered for a:-
 MPhil PhD Part of an MSc Part of a Diploma

(c). Please list the practice research projects which are currently being undertaken (continuing on the back of this sheet if necessary).

11. Questionnaire II continued.

23. Hospitals are becoming increasingly involved in audit. However, there is little information on how many hospital pharmacies are routinely involved in medical or clinical audit. In this questionnaire the following definition of audit is used:

Audit = the systematic, critical analysis of the quality of care involving setting and monitoring standards and changing practice.

(a) Please tell me if one or more of your pharmacy staff routinely provide information for, or otherwise assist in, medical audit? No Yes
(Medical audit = audit of the practices of doctors).

(b) If yes, please describe their contribution? ("Lots" is ≥ 2 hours/week, averaged over a year).

	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Provision of financial information on drug use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provision of information on problems encountered in the drug use process eg. prescribing errors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provision of information and assistance in setting prescribing policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provision of feedback on adherence to the agreed prescribing policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other roles in medical audit - please describe....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24(a). Please tell me if your pharmacy staff are routinely involved in clinical audit of the pharmacy department. (Clinical audit is audit of the practices of health care professionals) No Yes

(b). If yes, please specify these audits.

25(a). Please tell me if your pharmacy staff are routinely involved in clinical audit of other departments. No Yes

(b). If yes, please specify these audits.

26. This question asks about changes in pharmacy staff and resources. Please tell me:-

(a). have any new posts been funded or has there been a shift of resources (staff or money) towards clinical services as a result of HC(88)54, The Way Forward for Hospital Pharmaceutical Services? No Yes

(b). have any new posts been funded or has there been a shift of resources (staff/money) towards clinical services as a result of the Nuffield Report? No Yes


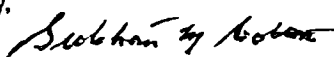
27. If you have any comments or views on the practice of clinical pharmacy which you feel are important, please write them here.

Thank you for taking the time to complete this questionnaire. I hope you found it interesting and worthwhile. Siobhan Cotter, Clinical Research Pharmacist.

APPENDIX V

The following are examples of covering and follow-up letters and a form sent to questionnaire respondents. All letters were personally signed.

1. Covering letter sent to District Pharmaceutical Officers and their equivalents. "District" was replaced by "Authority" or "Board" where appropriate.

London School of Hygiene and Tropical Medicine (University of London)		
Keppel Street, London WC1E 7HT Tel: 071-636 8636 · Tel Direct: 071-9272460 · Fax: 071-436 3611		
		Department of Public Health and Policy Health Services Research Unit
The District Pharmaceutical Officer, District Health Authority Offices.		Date
Dear Pharmacist,		
I am a pharmacist researching the present and future clinical roles of the hospital pharmacist. In this three year study, which is funded by the Department of Health and co-supervised by Dr. Nicholas Barber (School of Pharmacy, London) and Dr. Martin McKee (The London School of Hygiene & Tropical Medicine), I will investigate		
<ul style="list-style-type: none">◦ the clinical roles which hospital pharmacists have adopted◦ the clinical roles which you and others in the hospital service value and wish to maintain◦ novel clinical roles◦ methods of quality assurance in clinical pharmacy.		
The results of this national study into clinical pharmacy practice in the hospital sector will influence future policy decisions. In addition to providing valuable base line data on our profession's present contribution to patient care, the acceptability of clinical pharmacy amongst other hospital professionals will be evaluated and areas of future role development identified.		
The enclosed questionnaire, which asks about pharmacy services to the primary health care sector, forms the first part of this study. It has been sent to all District Pharmacists in England and Chief Pharmaceutical Officers in Scotland, Wales and Northern Ireland. I know that titles and responsibilities are rapidly altering at present and you may feel, after glancing through the questionnaire, that some member of your staff may be more directly involved in these areas of service provision. If so, please feel free to pass the questionnaire on to the most appropriate respondent in your opinion. If you decide to complete it yourself, please set aside enough time for the purpose (pilot studies show this to be approximately 10 minutes). I assure you that <u>the information which you provide will remain strictly confidential to me. At no stage will the identities of any person or hospital be disclosed.</u>		
The results of this study will take some months to analyze but will be published in the pharmacy press as soon as possible.		
I will be sending the next questionnaire, asking about pharmacy services within hospitals, to the principal Clinical Pharmacist (or pharmacist responsible for clinical services) in each hospital which provides a comprehensive pharmacy service. I hope you will provide me with their		
<ul style="list-style-type: none">• Name • Title and • Hospital address.		
I have enclosed a separate slip of paper for this purpose.		
I have just moved from the pharmacy service to do this research and I understand the enormous demands being made on your time especially in the present state of change in the NHS. However I think that now, more than ever, we need to demonstrate the contribution which we can make to enhanced patient care. I hope you think this research is of importance to our professional development and will find time to complete this questionnaire. Thanking you in advance for your cooperation - and for the time I know it will take to complete the questionnaire.		
Yours sincerely,		
		
Siobhan M Cotter MRPharmS Clinical Research Pharmacist.		
PS. If you require any further information please do not hesitate to call me on 071-927 2460 or write to me.		

2. Form sent to District Pharmaceutical Officers and their equivalents requesting names and addresses of respondents for Questionnaire II.

Please complete this form and return it to me in the addressed envelope provided.

Please fill in the name, title and hospital address of the **Principal Clinical Pharmacist** or the **pharmacist responsible for clinical services** in each hospital which provides a comprehensive pharmacy service ie. hospitals which have an on-site pharmacy having pharmacists among its staff during normal working hours and where advice on drugs is available in addition to a drug supply service.

NAME

TITLE

HOSPITAL

ADDRESS

.....

.....

NAME

TITLE

HOSPITAL

ADDRESS

.....

.....

NAME

TITLE

HOSPITAL

ADDRESS

.....

.....

NAME

TITLE

HOSPITAL

ADDRESS

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.....

3. Form sent to District Pharmaceutical Officers and their equivalents requesting names and addresses of respondents for Questionnaire II continued.

NAME

TITLE

HOSPITAL

ADDRESS

.....

.....

NAME

TITLE

HOSPITAL

ADDRESS

.....

.....

NAME

TITLE

HOSPITAL

ADDRESS

.....

.....

NAME

TITLE

HOSPITAL

ADDRESS

.....

.....

S Cotter, Clinical Research Pharmacist,
Room 32a, Health Services Research Unit,
The London School of Hygiene & Tropical Medicine,
Keppel Street, London WC1E 7HT.

4. Follow-up letter sent to District Pharmaceutical Officers and their equivalents. "District" was replaced by "Authority" or "Board" where appropriate.

London School of Hygiene and Tropical Medicine
(University of London)



Keppel Street, London WC1E 7HT
Tel: 071-636 8636 · Tel Direct: 071-9272460 · Fax: 071-436 3611

Department of Public Health and Policy
Health Services Research Unit

The Pharmacist,
District Pharmaceutical Officer,
District Health Authority Offices,
Address,
Postcode.

Date

Dear Pharmacist,

About a month ago I sent you a short questionnaire about your clinical pharmacy service to primary health care. I do not appear to have received a reply from you as yet so I hope you do not mind me contacting you again.

In case you did not receive the questionnaire, I have enclosed another copy.

If you have already posted the questionnaire to me, please disregard this reminder and accept my apologies for adding to your post tray!

If you have received the questionnaire but have not yet had time to fill it in, I hope you can find the 10 minutes or so which it takes to do this in the near future. We need a high response rate to make the results relevant and generalisable across the United Kingdom.

I recognise that this is a busy time for you but the results of this study will be of fundamental importance to hospital pharmacists in these changing times. The information gathered will influence future policy decisions and provide valuable data on our profession's present contribution to patient care.

If you have any questions about the survey or the project as a whole, or if I can help clarify anything with regard to the survey, please do not hesitate to contact me.

Yours sincerely,

Siobhan M Cotter MRPharmS
Clinical Research Pharmacist.

5. Covering letter sent to respondents to Questionnaire II (usually the Principal Clinical Pharmacist).

London School of Hygiene and Tropical Medicine
(University of London)

Keppel Street, London WC1E 7HT
Tel: 071-636 8636 · Tel Direct: 071-927 2460 · Fax: 071-436 3611



Department of Public Health and Policy
Health Services Research Unit

The Pharmacist,
Principal Clinical Pharmacist,
The Pharmacy,
The Hospital,
Hospital Address,
Postcode.

Date

Dear Pharmacist,

I am a pharmacist who has just moved from the hospital pharmacy service to carry out research on our role in that setting. I understand the enormous demands being made on your time but I think, that now more than ever, we need to spell out exactly what hospital pharmacists do to enhance patient care. At present, remarkably little is known about the huge variation in hospital pharmacy practice across the country and the way in which this is linked to differences in the size, type and history of the hospital. From the results of this study I hope to demonstrate the vast contribution which we can make to the present and future care of patients.

The enclosed questionnaire forms the first part of a three year study which is being funded by the Department of Health and carried out in collaboration with Dr. Nicholas Barber (School of Pharmacy, London) and Dr. Martin McKee (The London School of Hygiene & Tropical Medicine). **However, the detailed information which you provide will remain strictly confidential to me. At no stage will the identities of any person or hospital be disclosed.**

The results of this national study will influence future policy decisions. In addition to collecting valuable baseline data on our profession's contribution to patient care, this research will evaluate the acceptability of clinical pharmacy among other hospital professionals and pinpoint areas of future role development. The results of this questionnaire may take many months to analyze but will be published in the pharmacy press as soon as possible.

The questionnaire may look fearsome! However, it mainly consists of "tick the box" style questions with a few open questions. I have included a short guide to the questionnaire at the start which I hope will be of assistance to you. It is important that you set aside enough time to fill it in; pilot studies have shown this to be 25 - 35 minutes. Thanking you in advance for your cooperation - and for the time I know it will take you to complete the questionnaire.

Yours sincerely,

Siobhan M Cotter MRPharmS
Clinical Research Pharmacist.

PS. If you require any further information please do not hesitate to call me (at 071-927 2460) or write to me.

6. Follow-up letter sent to respondents to Questionnaire II. "District" was replaced by "Authority" or "Board" where appropriate.

London School of Hygiene and Tropical Medicine
(University of London)



Keppel Street, London WC1E 7HT
Tel: 071-636 8636 · Tel Direct: 071-9271460 · Fax: 071-436 3611

Department of Public Health and Policy
Health Services Research Unit

The Pharmacist,
Principal Clinical Pharmacist,
The Pharmacy,
The Hospital,
Hospital Address
Postcode.

Date

Dear Pharmacist,

About six weeks ago I sent you a questionnaire about clinical pharmacy services in your hospital. I do not appear to have received a reply from you as yet so I hope you do not mind me contacting you again.

In case you did not receive the questionnaire, I have enclosed another copy.

If you have already posted the questionnaire to me, please disregard this reminder and accept my apologies for adding to your post tray!

If you have received the questionnaire but have not yet had time to fill it in, I hope you can find the half hour or so which it takes to do this in the near future. We need a high response rate to make the results relevant and generalisable across the United Kingdom.

Your colleagues at district level have already answered a questionnaire on clinical pharmacy services to the primary health care sector. So far, 88% of these questionnaires have been returned; I am delighted with their support and enthusiasm. We now need your contribution to complete the picture at both local and national level.

I recognise that this is a busy time for you but the results of this study will be of fundamental importance to hospital pharmacists in these changing times. The information gathered will influence future policy decisions and provide valuable data on our profession's present contribution to patient care.

If you have any questions about the survey or the project as a whole, or if I can help clarify anything with regard to the survey, please do not hesitate to contact me.

Yours sincerely,

Siobhan M Cotter MRPharmS
Clinical Research Pharmacist.

APPENDIX VI

CODING FRAME FOR QUESTIONNAIRE 1

QUESTION NUMBER	FIELD NAME	CODES TO USE FOR ANSWERS					
0	District	Insert the questionnaire number-top right corner of questionnaire					
Q NO	FIELD NAME	CODES TO USE FOR ANSWERS					
		NONE	VERY LITTLE	MODERATE AMOUNT	LOTS	THAT PART OF THE QUESTION LEFT BLANK	WHOLE QUESTION LEFT BLANK
1	GPA	1	2	3	4	0	enter
	GPB	1	2	3	4	0	enter
	GPC	1	2	3	4	0	enter
	GPD	1	2	3	4	0	enter
	GPE	1	2	3	4	0	enter
2	NURSEA	1	2	3	4	0	enter
	NURSEB	1	2	3	4	0	enter
	NURSEC	1	2	3	4	0	enter
	NURSED	1	2	3	4	0	enter
	NURSEE	1	2	3	4	0	enter
3	PATIENTA	1	2	3	4	0	enter
	PATIENTB	1	2	3	4	0	enter
	PATIENTC	1	2	3	4	0	enter
4	CPA	1	2	3	4	0	enter
	CPB	1	2	3	4	0	enter
	CPC	1	2	3	4	0	enter
	CPD	1	2	3	4	0	enter
	CPE	1	2	3	4	0	enter
	CPF	1	2	3	4	0	enter
5	PHCPA	1	2	3	4	0	enter
	PHCPB	1	2	3	4	0	enter
	PHCPC	1	2	3	4	0	enter
6	PHCIA	1	2	3	4	0	enter
	PHCIB	1	2	3	4	0	enter
	PHCIC	1	2	3	4	0	enter
	PHCID	1	2	3	4	0	enter
	PHCIE	1	2	3	4	0	enter
	PHCIF	1	2	3	4	0	enter

Q NO	FIELD NAME	CODES TO USE FOR ANSWERS			
		YES	NO	NOT ANSWERED	
7	HCRES	1	2	enter	
	NUFF	1	2	enter	
8	TRUSTA	1	2	3	enter
		NOT APPLICABLE	YES APPLICABLE BUT NO CHANGE	YES APPLICABLE AND YES CHANGE	NOT ANSWERED

Code Book for Questionnaire II

0. SEE TOP OF FORM

- Q1(a). HOSMANAG NHS Trust (1)
 Directly-managed Unit (2)
 Part Trust, part Directly-managed (3)
 Becoming Trust 4/92 (4)
 Not answered (0)
- Q1(b) HOSTEACH Non-teaching (1)
 Medical School Teaching (2)
 Postgrad teaching (3)
 Speciality teaching (4)
 Not answered (0)

Q2.

WARD TYPE	TOTAL NO. OF WARDS	TOTAL NO. OF BEDS	WARD TYPE	TOTAL NO. OF WARDS	TOTAL NO. OF BEDS
ITU/CCU	(NO)	(NO)	Long-stay Psychiatric & Mental handicap wards	(NO)	(NO)
Day-care & 5 day/week wards	(NO)	(NO)	Other Long-stay wards	(NO)	(NO)
Acute wards	(NO)	(NO)	Other wards	(NO)	(NO)

Bed & Ward blanks (0)
 Bed or Ward blank ward = 99 bed = 9999
 Whole question unanswered (0)

- Q3(a). OFFSITE No (1)
 Yes (2)
 Whole question (a) unanswered (0)
- Q3(b). OTHRHOSP No (1)
 Yes (2)
 Whole question (b) unanswered (0)

Q4. Monday - Friday inclusive HRSWK (hrs)
 Saturday HRSSAT (hrs)
 Bank & official holidays HRSHOL(hrs) (excluding stat days)
 Sunday HRSSUN (hrs)
 Any blanks (0)
 Whole question unanswered (99.99)

Q5(a) PHARMNO (NUMBER) persons
 PHARMWTE (NUMBER) WTE's
 Any blanks (99)

Q5(b) PhD (NO)
 MPhil (NO)
 MSc (NO)
 Post-graduate Diploma (NO)
 Any blanks (0)
 Whole question 5(b) unanswered (99)

Q5(c) PHARMSPN (NUMBER)
 Any blanks (0)
 Whole question 5 unanswered (99 for 5(c))

Q6.	OUTOFHRS	No	(1)
		Yes, by pharmacists on-call from home	(2)
		Yes, a Residency service	(3)
		Yes, by District-wide on call from home	(4)
		Yes, by District-wide Residency service	(5)
		Whole question unanswered	(0)
Q7.	Member of the hospital board	(1 = Blank; 2 = Tick)	
	Clinical director	(1 = Blank; 2 = Tick)	
	A service manager	(1 = Blank; 2 = Tick)	
	Unit General Manager	(1 = Blank; 2 = Tick)	
	Another - Codes (ENTERED IN ANY OF MAMAGOT1 & 2):		
	CAPO/DPhO/DPS	= (1)	
	Principal pharm at other hospital	= (2)	
	Dir. of operations	= (3)	
	Trust Dir. of services	= (4)	
	Chief Executive	= (5)	
	Director of Standards	= (6)	
	Chief Pharmacist at acute unit	= (7)	
	Principal Pharm. Community Services	= (8)	
	Medical director	= (9)	
	Dir. Pharmacy Services	= (10)	
	Business Manager	= (11)	
	Speciality management team	= (12)	
	Acute unit General Manager	= (13)	
	Hospital Manager	= (14)	
	Unit Pharmacy Manager	= (15)	
	Chair of clinical directorates	= (16)	
	"Other" blank	= (0)	
Q8.	The head of the pharmacy department	DRUGPHAR	(1 = Blank; 2 = Tick)
	The Unit General Manager	DRUGUGM	(1 = Blank; 2 = Tick)
	Held at Clinical Directorate level	DRUGCD	(1 = Blank; 2 = Tick)
	Another (CODES CAN BE ENTERED IN ANY OF DRUGOT1 & 2):		
	CAPO/DPhO/DPS	= (1)	
	Principal pharm. at other hospital	= (2)	
	Individual consultants	= (3)	
	Drug & Therapeutics Committee	= (4)	
	Trust Board	= (5)	
	Ward Nurse Manager	= (6)	
	Medical Director	= (7)	
	Dir. of Pharmacy Services	= (8)	
	Departmental Manager	= (9)	
	Unit Pharmacy Manager	= (10)	
	Clinical Co-ordinator	= (11)	
	Acute Services Manager	= (12)	
	Medical Executive Committee	= (13)	
	Chair Pharmaceutical Sub-committee	= (14)	
	"Other" blank	= (0)	
Q9.	WDPHARMN	(NUMBER) persons	
	WDPHARMW	(NUMBER) WTE's	
	Any blanks	(99/99.99)	
	Whole question unanswered	(99 + 99.99)	
Q10(a)	INPTCHTM	No	(1)
		Yes	(2)
		Yes by technicians	(3)
		Some	(5)
		Any blanks	(0)

5 Code Book for Questionnaire II continued.

Q10(b)(i)	If yes, LOCMONIT	On the ward	(1)
		In the pharmacy	(2)
		Both	(3)
		Some wards, on ward	(4)
10b(i)	unanswered when answer to 10 (a) was YES		(0)
10b(i)	unanswered when answer to 10 (a) was NO		(9)
10b(i)	unanswered as well as 10(a)		(0)
10b(i)	answered when 10(a) = NO		(8)
10b(i)	answered when 10(a) = UNANSWERED		(7)
10b(i)	WARD when answer to Question 9 was ZERO		(11)
Q10(b)(ii)	FREQMTWK	Twice daily	(2)
		Daily	(1)
		Not done	(0)
Other codes:	Once/ Twice per week		= (3)
	Alternate days		= (4)
	3 times per week		= (5)
	Weekly		= (6)
	Prn when sent to pharmacy		= (7)
	Monthly on ward, daily in pharmacy		= (8)
	Not applicable		= (40)
	2-3 times per week		= (10)
	2 times per week		= (11)
	Use two codes separated by a decimal point if > 1 type of service frequency		
10b(ii)	unanswered when answer to 10(a) was NO		(9)
10b(ii)	unanswered as well as 10(a) and/or 10b(i)		(99.99)
10(bii)	unanswered when 10b(i) answered		(99.99)
10b(ii)	answered when 10(a) = NO		(18)
10b(ii)	answered when 10(a) = UNANSWERED		(17)
Q10(b)(ii)	FREQMTWE	Twice daily	(2)
		Daily	(1)
		Not done	(0)
Other codes:	Daily-on take/emergency wards only		= (3)
	Daily-key wards		= (4)
	Monthly on ward		= (5)
	Daily Saturday only		= (6)
	Prn when sent to pharmacy		= (7)
	Use two codes separated by a decimal point if > 1 type of service frequency		
10b(ii)	unanswered when answer to 10(a) was NO		(9)
10b(ii)	unanswered as well as 10(a) and/or 10b(i)		(99.99)
10(bii)	unanswered when 10b(i) answered		(99.99)
10b(ii)	answered when 10(a) = NO		(18)
10b(ii)	answered when 10(a) = UNANSWERED		(17)
Q11. WDRound	No, never		(1)
	Yes, but only specialist pharmacists		(2)
	Yes, many of our pharmacists do this		(3)
	Yes, all our pharmacists do this		(4)
	Yes, many of our more experienced		(5)
	Yes, Diploma/MSc students do this		(6)
	Yes, Diploma/MSc students & specialists		(7)
	Whole question unanswered		(0)
	11 answered YES but 9 = ZERO		(11)
Q12. LSCHTMNT	No		(1)
	Yes, for the majority weekly or more frequently		(2)
	Yes, for the majority less frequently than weekly		(3)
	Whole question unanswered		(0)
	Question not applicable (see Q2) and answered NO		(4.1)
	Question not applicable (see Q2) and answered Yes		(4.2 or 4.3)
	Question not applicable (see Q2) and unanswered		(4.0)

Q13(a)	DRUGINFO	No	(1) but if 13(c) >0 change to (8)
		Yes	(2)
		Unanswered but 13(c) >0	(7)
		Unanswered & 13(b)/(c) also	(0)
Q13(b)	NODILOC1	Local hospital	(1)
		Region	(2)
		Both	(3)
	NODILOC2	Other-codes:	
		Joint service-2 Districts-at other hospital	= (4)
		District service	= (5)
		Use Industry-own hospital handle query	= (6)
		Use within dept. sources and handle query	= (7)
		Use the service from another district	= (8)
		Regional DI in the district	= (10)
		13(b) Unanswered but 13(a) answered NO	(0)
		13(b) Unanswered but 13(a) answered YES	(9)
		13(b) Unanswered but 13(a) unanswered	(0)
		13(b) answered but 13(a) unanswered (prefix 7 on 13(b) codes)	
		13(b) answered but 13(a) = YES (prefix 8 on 13(b) codes)	
		13(b) NODILOC1 OR 2 blank	(0)
Q13(c)	PHARMDIN		(NUMBER) persons
			(NUMBER) WTR's
		13(c) Unanswered but 13(a) YES	(99/99.99)
		13(c) Unanswered but 13(a) NO	(0)
		13(c) Unanswered but 13(a) unanswered	(99/99.99)
		All 3 parts unanswered	(99/99.99 for part 13(c))
Q14.			
		Compilation of clinical information on drug use	Blank =(1) Tick=(2)
		Compilation of financial information on drug use	Blank =(1) Tick=(2)
		Clinical information for formulation of prescribing policies	Blank =(1) Tick=(2)
		Clinical information for formulary decisions	Blank =(1) Tick=(2)
		Clinical information for evaluation of new products	Blank =(1) Tick=(2)
		Information for production of educational bulletins used by hospital staff	Blank =(1) Tick=(2)
		Information for the production of educational bulletins for health professionals outside hospital	Blank =(1) Tick=(2)
		Information for the production of material used in patient education	Blank =(1) Tick=(2)
		Other codes in DIOTRI-5	
		Info to public on travel medications	= (1)
		info for use in hospital staff education	= (2)
		info for use in outside presentations	= (3)
		info to risk management team	= (4)
		info to other hospitals re own specialty	= (5)
		Info for specialty palliative care team	= (6)
		Info on benzodiazepine withdrawal	= (7)
		Info for medical audit meetings	= (8)
		Info on kinetics	= (10)
		"Other" codes blank	= (0)
		Whole question unanswered	= (0)
Q15(a)	Professional education	No	(1)
		Yes	(2)
		Question unanswered	(0)

Q15(b).	If yes, formal qualification?	No	Blank = (1)	Tick = (2)	
		Yes, a Diploma	Blank = (1)	Tick = (2)	
		Yes, an MSc.	Blank = (1)	Tick = (2)	
	Other codes—enter in QUALOT1-2	MPhil		= (1)	
		N Management Cert		= (2)	
		BTec		= (3)	
		DMI		= (4)	
		MBA		= (5)	
		MPharm		= (6)	
		CMS		= (7)	
		PharmD		= (8)	
	"Other" codes blank			= (0)	
	15(b) unanswered when answer to 15(a) was Yes			(0)	
	15(b) unanswered when 15(a) unanswered			(0)	
	15(b) unanswered when answer to 15(a) was No			(9)	
	15(b) answered when answer to 15(a) was No		(prefix 8 on 15(b) codes)		
	15(b) answered when 15(a) unanswered		(prefix 7 on 15(b) codes)		
Q15(c).	<u>way</u> it is provided and <u>how much</u> done.	<u>NONE</u>	<u>VERY</u>	<u>MODERATE</u>	<u>LOTS</u>
			<u>LITTLE</u>	<u>AMOUNT</u>	
	Group teaching on the clinical use of drugs	1	2	3	4
	Clinical skills training	1	2	3	4
	In-house clinical training course	1	2	3	4
	Use of peer review eg. ward pharmacy meetings	1	2	3	4
	Group learning where peer review is not used eg. journal clubs	1	2	3	4
	By routine dissemination of printed or other	1	2	3	4
	Any of the codes under other can be entered in PHMEDOT1-5				
	Enter code of education type plus how much done eg 10.3				
	Other 1 -Clinical Pharmacy appraisal on wards 1:1	1	2	3	4
	Other 2 -Drug Company videos & other drug Co. stuff	1	2	3	4
	Other 3 -Individual tutorials	1	2	3	4
	Other 4 -Quizzes	1	2	3	4
	Other 5 -Case studies/presentations	1	2	3	4
	Other 6 -Consultant talks	1	2	3	4
	Other 9 -Grand round attendance	1	2	3	4
	Other 10-Training to meet needs	1	2	3	4
	Other 11-Tutoring for clinical projects	1	2	3	4
	Other 12-Evening clinical pharmacy meetings	1	2	3	4
	Other 13-Peer review using data on quality	1	2	3	4
	Other 14-Technician training	1	2	3	4
	Other 15-University modules for Diploma/MSc	1	2	3	4
	Other 16-District organised courses	1	2	3	4
	Other 17-Video meetings	1	2	3	4
	Other 18-Block release on secondment	1	2	3	4
	Other 19-Regional cascade training	1	2	3	4
	Other 20-Management training	1	2	3	4
	Other 21-tutorials	1	2	3	4
	Other 22-Practice meetings	1	2	3	4
	Other 23-Ward rounds with a pharmacist	1	2	3	4
	Other 24-Project presentations	1	2	3	4
	Other 25-Regional clinical pharmacy course	1	2	3	4
	Other 26-Consultant ward rounds	1	2	3	4
	Other 27-Pre-reg seminars	1	2	3	4
	"Other" codes blank				(0)
	All 15(c) unanswered when answer to 15(a) was Yes				(0)
	Some 15(c) unanswered when answer to 15(a) was Yes				(0)
	All 15(c) unanswered when 15(a) unanswered				(0)
	Some 15(c) unanswered when 15(a) unanswered				(0)
	15(c) unanswered when answer to 15(a) was No				(9)
	15(c) answered when answer to 15(a) was No			(Use prefix 8)	
	15(c) answered when 15(a) unanswered			(Use prefix 7)	

Q16. Education for health care professionals in the hospital				
	<u>NONE</u>	<u>VERY LITTLE</u>	<u>MODERATE AMOUNT</u>	<u>LOTS</u>
Group teaching for nursing staff (including students)	1	2	3	4
Group teaching for medical staff	1	2	3	4
Group teaching for medical students	1	2	3	4
Group teaching for other health care professionals	1	2	3	4
Any of the codes under other can be entered in HCPEDOT1-5				
Enter as code of activity plus how much done eg. 10.3				
Other 1 -Diploma in Nursing P2000 teaching	1	2	3	4
Other 2 -Education at grand rounds & audit	1	2	3	4
Other 3 -Pharmacy undergrad. teaching in clin. pharmacy	1	2	3	4
Other 4 -Clin Pharmacy Dip at university	1	2	3	4
Other 5 Physiotherapists	1	2	3	4
Other 6 OTs	1	2	3	4
Other 7 Community MH team	1	2	3	4
Other 8 Community midwives	1	2	3	4
Other 9 Opticians	1	2	3	4
Other 10 Practice nurses	1	2	3	4
Other 11 Care staff	1	2	3	4
Other 12 GPs	1	2	3	4
Other 13 Radiographers	1	2	3	4
Other 14 Residential/Nursing home staff	1	2	3	4
Other 15 Social workers	1	2	3	4
Other 16 Mother & baby teachers	1	2	3	4
Other 17 Paramedics	1	2	3	4
Other 18 District nurses	1	2	3	4
Other 19 School nurses	1	2	3	4
Other 20 Health visitors	1	2	3	4
Other 21 Psychologists	1	2	3	4
Other 22 Community pharmacists	1	2	3	4
Other 23 Clinical resource groups	1	2	3	4
Other 24 Chiroprodists	1	2	3	4
Other 25 ODAs	1	2	3	4
Other 26 Porters - medical gas	1	2	3	4
Other 27 Drug counsellors	1	2	3	4
Other 28 Dental assistants	1	2	3	4
Other 29 MLS	1	2	3	4
Other 30 Medical secretaries	1	2	3	4
Other 31 ECG techs	1	2	3	4
Other 32 Managers	1	2	3	4
Other 33 Radiotherapy students	1	2	3	4
Other 34 Ambulance staff	1	2	3	4
Other 35 Speech therapists	1	2	3	4
Other 36 Dieticians	1	2	3	4
Other 37 Public -resuscitation training	1	2	3	4
Other 38 Vaccination clinic staff	1	2	3	4
"Other" codes blank				(0)
All of 16 unanswered				(0)
Q17(a). Drug & Therapeutics committee				
	No			(1)
	Yes			(2)
	District D&T			(3)
17(a) Unanswered but 17(b) answered more than ZERO				(7)
17(a) answered NO but 17(b) answered more than ZERO				(8)
17(a) and 17(b) unanswered				(0)
Q17(b). PHARMDTN (NUMBER)				
17b >0 but 17a answer is NO				(17a answer becomes 8)
17b >0 but 17a unanswered				(17a answer becomes 7)
17b unanswered but 17a is NO				(0)
17b unanswered but 17a is unanswered too				(99/99.99)
17b unanswered but 17a answered YES				(99/99.99)

Q18(a). FORMULARY	No	(1)	
	Yes	(2)	
	Antibiotics only	(3)	
	Question unanswered	(0)	
Q18(b). NONFORML	0% (1)	25% (2)	50% (3) 75% (4) 100% (5)
	18b answered but 18a answer is NO		(Prefix 8 on answers to 18(b))
	18b answered but 18a unanswered		(Prefix 7 on answers to 18(b))
	18b unanswered but 18a is NO		(9)
	18b unanswered but 18a is unanswered/YES		(0)
Q18(c).	No one	Blank = (1)	Tick = (2)
	Ward pharmacist	Blank = (1)	Tick = (2)
	Consultant/senior doctor	Blank = (1)	Tick = (2)
	Prescriber	Blank = (1)	Tick = (2)
	A senior pharmacist	Blank = (1)	Tick = (2)
	Ward sister/senior nurse	Blank = (1)	Tick = (2)
	The Drug & Therapeutics committee	Blank = (1)	Tick = (2)
Other codes—enter in CONSOT1-3	Formulary group/pharmacist		= (1)
	Patient		= (2)
	Consultant microbiologist		= (3)
	DPho/CAPO/DPS		= (4)
	CPU		= (5)
	Clinical Director		= (6)
	UGM		= (7)
	Chair of D&T Committee		= (8)
	Pharmacy Stores		= (10)
	"Other" codes blank		= (0)
	18c answered but 18a answer is No		(Prefix 8 on 18c codes)
	18c answered but 18a unanswered		(Prefix 7 on 18c codes)
	18c unanswered but 18a is NO or 18(b) is 100%		(9)
	18c unanswered but 18a/b is unanswered/YES		(0)
	Whole question unanswered		(0)
Q19(a).	CDIRECT	No	(1)
		Yes	(2)
		19a Unanswered	(0)
Q19(b).	ADVCECD	No	(1)
		Yes	(2)
	19b Unanswered when 19a was unanswered too		(0)
	19b Unanswered when 19a was YES		(0)
	19b Unanswered when 19a was NO		(9)
	19b answered when 19a was NO		(Prefix 8 on 19b codes)
	19b answered when 19a was Unanswered		(Prefix 7 on 19b codes)
Q19(c)(i)	WHOADVCL		
	One pharmacist only		(1)
	Specific ph. for individual/combinations of directorates/care groups		(2)
	Both		(3)
	"Other" codes (enter in WHOADVCL—two codes split by a decimal point)		
	All Ward Pharmacists = (4)	DIC = (5)	
	DPho/CAPO/DPS = (6)	Formulary Pharmacist = (7)	
	Chief Pharmacist = (8)	Technician = (10)	
	No specific pharmacist = (11)	Clinical services manager = (12)	
	Drug economy pharmacist = (13)	Snr. ph tech services = (14)	
	D&T committee = (15)	DIC & ward Pharmacist = (16)	
	DPho, DIC & Formulary Ph = (17)	Chief & Purchasing Ph = (18)	
	Clin Srv Mgr & Drug economy Ph = (19)		
	Clin Ph & Pcy Mgr = (20)	DTC & Specific Ph = (21)	
	Chief & Clin Ph = (22)	Clin Formulary & DI Ph = (23)	
	Clin & Purchasing Ph = (24)	Two pharmacists = (25)	
	Dir Ph & Clin economist = (26)	DUR Ph at other hospital = (27)	
	"Other" codes blank = (0)		

19c(i) Unanswered when 19a/b was unanswered too (0)
 19c(i) Unanswered when 19a/b was NO (9)
 19c(i) Unanswered when 19a/b was YES (0)
 19c(i) answered when 19a/b was NO (Prefix 8 on 19c(i) codes)
 19c(i) answered when 19a/b was Unanswered (Prefix 7 on 19c(i) codes)

Q19c(ii) HOWADVCD A Clinical Director Blank = (1) Tick = (2)
 HOWADVBM A Business Manager Blank = (1) Tick = (2)

Other-codes enter in HOWADOT1-2
 Committee for each care group = (1)
 Prn. meetings with ? = (2)
 Ward managers = (3)
 Directorate managers = (4)
 Medical staff/consultants in directorate = (5)
 Send information only = (6)
 All consultants = (7)
 At medical audit meeting = (8)
 Send written information regularly = (10)
 Meeting with chair of D&T committee = (11)
 Drug policies group meeting = (12)
 Director of pharmaceutical services = (13)
 Management accountant = (14)
 At audit meeting = (15)
 Team = (16)
 Nurse manager & Clinical Director = (17)
 Finance manager = (18)
 Clinical care manager = (19)
 Via clinical meetings = (20)
 "Other" codes blank = (0)

19c(ii) Unanswered when 19a/b was unanswered too (0)
 19c(ii) Unanswered when 19a/b was NO (9)
 19c(ii) Unanswered when 19a/b was YES (0)
 19c(ii) answered when 19a was NO (Prefix 8 on 19c(ii) codes)
 19c(ii) answered when 19a was Unanswered (Prefix 7 on 19c(ii) codes)

Q20(a) SERVICE	NO SERVICE PROVIDED	SUPPLY SERVICE ONLY	ADVICE ON REQUEST	PART OF A TEAM
TPN/Nutrition 1	(1)	(2)	(3)	(4)
Cytotoxics 1	(1)	(2)	(3)	(4)
Central Intravenous Additives 1	(1)	(2)	(3)	(4)
Patient Controlled Analgesia 1	(1)	(2)	(3)	(4)
Box 2 & 3 ticked - code				(5)
Box 2 & 4 ticked - code				(7)
Box 3 & 4 ticked - code				(6)
Box 2, 3 & 4 ticked - code				(10)
Any sub-section unanswered				(0)
Any question where both box 1 & another ticked in a section				(8)
Whole question unanswered				(0)

Q20(b) SERVICE	NONE	HELP/ADVICE ONLY ON REQUEST	ROUTINE SERVICE AVAILABLE	SPECIAL SERVICE AVAILABLE
TDM	(1)	(2)	(3)	(3)
Pain control	(1)	(2)	(3)	(3)
Infection control	(1)	(2)	(3)	(3)
Anticoagulation control	(1)	(2)	(3)	(3)
Wound care	(1)	(2)	(3)	(3)
Box 2 & 3 ticked - code				(4)
Any sub-section unanswered				(0)
Any question where both box 1 & another ticked in a section				(8)
Whole question unanswered				(0)

11 Code Book for Questionnaire II continued.

Q20c(1)	HSTRYA	No	(1)
		Yes	(2)
		Unanswered	(0)
In-patients	Blank = (1)	Tick = (2)	
Day-patients	Blank = (1)	Tick = (2)	
Out-patients	Blank = (1)	Tick = (2)	
This part unanswered when the first part unanswered/YES			(0)
This part unanswered when the third part answered			(0)
This part unanswered when the first part answered NO			(9)
This part answered when the first part unanswered			(Prefix 7 on these answers)
This part answered when the first part answered NO			(Prefix 8 on these answers)
Patient type-HSTRYPT1-5 Radiology/oncology "hostel" patients			=(1)
ophthalmology			=(2)
short stay surgical			=(3)
urology			=(4)
Anticoagulated patients			=(5)
Haematology			=(6)
on request-problem psychiatric patients			=(7)
all patients			=(8)
Rheumatology			=(10)
Neurology			=(11)
All elderly			=(12)
Specific elderly patients			=(13)
Cardiac			=(14)
Rehabilitation			=(15)
Psychiatric			=(16)
Renal			=(17)
Specific/difficult patients			=(18)
Respiratory			=(19)
Acute patients			=(20)
Long-stay/ Mental Handicap			=(21)
Terminal Care			=(22)
Surgical O/A			=(23)
Cystitis			=(24)
Self-medicating			=(25)
Pain clinic			=(26)
Obstetric			=(27)
All this part unanswered when first part unanswered/YES or second part answered			(0)
Some this part unanswered when first part unanswered/YES or second part answered			(0)
This part unanswered when the first part answered NO (9) answered			(Prefix 8 on these)
This part answered when the first /second part unanswered			(Prefix 7 on these)
All three parts unanswered			(0)

Q20c(2)	SLFMDA	No	(1)
		Yes	(2)
		Unanswered	(0)
In-patients	Blank = (1)	Tick = (2)	
Day-patients	Blank = (1)	Tick = (2)	
Out-patients	Blank = (1)	Tick = (2)	
This part unanswered when the first part unanswered/YES			(0)
This part unanswered when the third part answered			(0)
This part unanswered when the first part answered NO			(9)
This part answered when the first part unanswered			(Prefix 7 on these answers)
This part answered when the first part answered NO			(Prefix 8 on these answers)
Patient type-SLFMDPT1-5 Geriatric			=(1)
Psychiatric			=(2)
Inhaler technique			=(3)
Rheumatology			=(4)
Rehabilitation			=(5)
Medical patients			=(6)
Haematology/transplant			=(7)
Assisted ventilation patients			=(8)
Cardiac patients			=(10)
Compliance aids prn			=(11)
Short stay surgical			=(12)
Respiratory			=(13)
Acute patients			=(14)
Orthopaedic patients			=(15)
Paediatric			=(16)
Elective surgery			=(17)
Specific problem patients			=(18)
Specific long-stay patients			=(19)
Neurology			=(20)
Oncology			=(21)
Post-operative patients			=(22)
Maternity			=(23)
Some medical patients			=(24)
All patients			=(25)
Some surgical patients			=(26)
TURP patients			=(27)
Palliative care patients			=(28)
GP patients			=(29)
Pain clinic			=(30)
Long-stay mentally handicapped			=(31)
Long stay patients			=(32)
Ophthalmology			=(33)
Dermatological			=(34)
Renal			=(35)
Young disabled			=(36)
Respite care			=(37)
Geriatric rehab			=(38)
Urology			=(39)
Heart transplant			=(40)
Cystitis			=(41)
All this part unanswered when first part unanswered/YES or second part answered			(0)
Some this part unanswered when first part unanswered/YES or second part answered			(0)
This part unanswered when the first part answered NO (9) answered			(Prefix 8 on these)
This part answered when the first /second part unanswered			(Prefix 7 on these)
All three parts unanswered			(0)

Q20c(3) PTCSLA No (1)
 Yes (2)
 Unanswered (0)

In-patients Blank = (1) Tick = (2)
 Day-patients Blank = (1) Tick = (2)
 Out-patients Blank = (1) Tick = (2)

This part unanswered when the first part unanswered/YES (0)
 This part unanswered when the third part answered (0)
 This part unanswered when the first part answered NO (9)
 This part answered when the first part unanswered (Prefix 7 on these answers)
 This part answered when the first part answered NO (Prefix 8 on these answers)

Patient type-PTCSLPT1-5 Anticoagulated patients = (1)
 Rheumatology patients = (2)
 All patients = (3)
 Geriatric patients = (4)
 Pre-discharge, on request = (5)
 Cardiology patients = (6)
 Inhaler technique = (7)
 Self-medication scheme patients = (8)
 Obstetric patients = (10)
 HIV = (11)
 Selected problem patients = (12)
 Parents of neonates = (13)
 Respiratory patients = (14)
 Medical patients = (15)
 Psychiatric patients = (16)
 TPN patients = (17)
 Surgical patients = (18)
 On request = (19)
 Patients on poly drug therapy = (20)
 ENT patients = (21)
 Ophthalmology patients = (22)
 PCA patients = (23)
 Inhaler technique, on request = (24)
 Diabetics = (25)
 Renal patients = (26)
 Haematology patients = (27)
 Rehabilitation patients = (28)
 All out patients = (29)
 All discharged patients = (30)
 Oncology patients = (31)
 Palliative care patients = (32)
 BP unit = (33)
 Dermatology = (34)
 Infertility = (35)
 Acute discharges = (36)
 Nebuliser therapy = (37)
 Post MI = (38)
 Neurology = (39)
 Gynae = (40)
 Orthopaedics = (41)
 On new medicines = (42)
 Asthmatics = (43)
 Asthma clinic = (44)
 Cystic fibrosis = (45)

All this part unanswered when first part unanswered/YES or second part answered (0)
 Some this part unanswered when first part unanswered/YES or second part answered (0)
 This part unanswered when the first part answered NO (9) answered (Prefix 8 on these)
 This part answered when the first /second part unanswered (Prefix 7 on these)
 All three parts unanswered (0)

Q20c(4) PTEDA No (1)
 Yes (2)
 Unanswered (0)

In-patients Blank = (1) Tick = (2)
 Day-patients Blank = (1) Tick = (2)
 Out-patients Blank = (1) Tick = (2)

This part unanswered when the first part unanswered/YES (0)
 This part unanswered when the third part answered (0)
 This part unanswered when the first part answered NO (9)
 This part answered when the first part unanswered (Prefix 7 on these answers)
 This part answered when the first part answered NO (Prefix 8 on these answers)

Patient type-PTEDPT1-5 Respiratory patients =(1)
 Rheumatology patients =(2)
 Post MI patients (in rehabilitation) =(3)
 Geriatric patients =(4)
 Cardiology patients =(5)
 Psychiatric patients =(6)
 Oncology patients =(7)
 Stroke patients =(8)
 Cystic fibrosis patients =(10)
 Breast cancer patients =(12)
 Cardiac surgery patients =(13)
 Patients on nebuliser therapy =(14)
 Neurology patients =(15)
 Diabetics =(16)
 Psychiatric =(17)
 Renal =(18)
 Transplant =(19)

All this part unanswered when first part unanswered/YES or second part answered (0)
 Some this part unanswered when first part unanswered/YES or second part answered (0)
 This part unanswered when the first part answered NO (9) answered (Prefix 8 on these)
 This part answered when the first /second part unanswered (Prefix 7 on these)
 All three parts unanswered (0)

Q20c(5) CSMA No (1)
 Yes (2)
 Unanswered (0)

In-patients Blank = (1) Tick = (2)
 Day-patients Blank = (1) Tick = (2)
 Out-patients Blank = (1) Tick = (2)

This part unanswered when the first part unanswered/YES (0)
 This part unanswered when the third part answered (0)
 This part unanswered when the first part answered NO (9)
 This part answered when the first part unanswered (Prefix 7 on these answers)
 This part answered when the first part answered NO (Prefix 8 on these answers)

CSMDR Blank = (1) Tick = (2)
 CSMPIL Blank = (1) Tick = (2)

This part unanswered when the first part unanswered/YES (0)
 This part unanswered when the first part answered NO (9)
 This part unanswered when third part answered (0)
 This part answered when first part unanswered (Prefix 7 on answers to this part)
 This part answered when first part answered NO (Prefix 8 on answers to this part)

Q20c(6)	ADRA	No	(1)
		Yes	(2)
		Unanswered	(0)
In-patients	Blank = (1)	Tick = (2)	
Day-patients	Blank = (1)	Tick = (2)	
Out-patients	Blank = (1)	Tick = (2)	
This part unanswered when the first part unanswered/YES			(0)
This part unanswered when the third part answered			(0)
This part unanswered when the first part answered NO			(9)
This part answered when the first part unanswered			(Prefix 7 on these answers)
This part answered when the first part answered NO			(Prefix 8 on these answers)
Patient type-ADRPT1-5	All patients		=(1)
	Geriatric patients		=(2)
	Medical patients		=(3)
	Surgical patients		=(4)
	Psychiatric patients		=(5)
	Ophthalmology patients		=(6)
	Haematology		=(7)
	ADR to desferrioxamine		=(8)
	HIV		=(10)
	Oncology		=(11)
All this part unanswered when first part unanswered/YES or second part answered			(0)
Some this part unanswered when first part unanswered/YES or second part answered			(0)
This part unanswered when the first part answered NO (9) answered			(Prefix 8 on these)
This part answered when the first /second part unanswered			(Prefix 7 on these)
All three parts unanswered			(0)
Q20(d). OTRCSIN1-5	Section unanswered		= (0)
	Counselling prn		=(1)
	Patient information leaflets as part of shared care		=(2)
	Individualised patient information leaflets		=(3)
	Abnormal U&E's picked out by daily computer search		=(4)
	Compliance cards on discharge		=(5)
	Home nebuliser advice		=(6)
	Inhaler counselling		=(7)
	Radiopharmaceutical supply		=(8)
	Extemporaneous dispensing		=(9)
	Wound care advice		=(10)
	Education for diabetics		=(11)
	Counselling for those receiving cytos -Expected ADEs etc prior to admin.		=(12)
	Discharge counselling		=(13)
	CIVA service for problem drugs		=(14)
	Education for AIDS patients		=(15)
	Audit of prescribing on request		=(16)
	Prescribing in past assessed for impact for some patients		=(17)
	Patient medication profiles		=(18)
	Lithium therapy monitoring & TDM		=(19)
	Special packaging of drugs for some patients		=(20)
	Antiemetic control		=(21)
	Mother & baby education		=(22)
	Advice on drug withdrawal		=(23)
	Advice on IV fluid therapy		=(24)
	Counselling & education for cystic fibrosis patients		=(25)
	Attend multidisciplinary meetings		=(26)
	Palliative care		=(27)
	Revision of prescription prior to review by doctor		=(28)
	Relatives group discussions, on request		=(29)
	DIC		=(30)
	Antibiotic monitoring		=(31)
	Discharge counselling - on request		=(32)
	Camouflage service (skin)		=(33)
	Satellite service to specific units		=(34)
	Advice on choice of dressings, disposable & their use		=(35)
	Home nebuliser counselling & training		=(36)
	Standardised heparin and IV insulin services		=(37)

- Q20(e). OTRCOUT1-5 Whole question (e) unanswered = (0)
- Patient information leaflets as part of shared care = (1)
 - TDM reports for GP = (2)
 - MTX syringe pre-packs for GP's = (3)
 - Aseptically prepared products for outpatients = (4)
 - Outpatient inhaler counselling clinic = (5)
 - Informal counselling = (6)
 - Patient information leaflets = (7)
 - Teaching cystic fibrosis patients how to prepare & use IV antibiotics = (8)
 - Education for diabetics = (9)
 - Answer DI phone queries = (10)
 - Dispensing at specific intervals for certain patients = (11)
 - Counselling for specific out patients = (12)
 - All out patients counselled = (13)
 - Talks to relatives support groups = (14)
 - Talks to national interest groups = (15)
 - Home dialysis = (16)
 - Education for mother & baby = (17)
 - Drug withdrawal = (18)
 - Counselling for dermatology patients = (19)
 - Counselling and education for cystic fibrosis patients = (20)
 - Medication histories = (21)
 - Formal participation in asthma clinics = (22)
 - Warfarin clinic = (23)
 - Telephone hotline for rheumatology patients = (24)
 - Service to needle exchange = (25)
 - Fertility clinic = (26)
 - Cytotoxic Infusion pumps = (27)
 - Education for relatives/carers = (28)
 - Lipid clinic team member = (29)
 - Advice to community patients = (30)
 - Home TPN = (31)

Q21(a) CLINTRL No (1)
 Yes (2)
 Unanswered (0)

Q21(b)
 Blank = (1) Tick = (2)
 No ticks in all column A/B but not both & 21(a) Unanswered (code 1 for blanks)
 No ticks in all of column A/B and 21(a) answered YES = (0)
 No ticks in all of column A/B but 21(a) answered NO = (9)
 Ticks in column A/B but 21(a) unanswered = (prefix 7 on answers to 21b)
 Ticks in column A/B but 21(a) answered NO = (prefix 8 on answers to 21b)

COLUMN A	
ROLE (IN-HOUSE TRIALS)	✓
INTRL1	
IHTRL2	
IHTRL3	
IHTRL4	
IHTRL5	
IHTRL6	
IHTRL7	
IHTRL8	
IHTRL9	
IHTRL10	
IHTRL11	

COLUMN B	
ROLE (DRUG COMPANY TRIALS)	✓
DCTRL1	
DCTRL2	
DCTRL3	
DCTRL4	
DCTRL5	
DCTRL6	
DCTRL7	
DCTRL8	
DCTRL9	
DCTRL10	
DCTRL11	

IHTRLOT1-5	Ethics assessment	=(1)
	Representative of pharmacy on ethics committee	=(2)
	Assist with blood level monitoring	=(3)
	Provide specific counselling	=(4)
	Assess feasibility in practice	=(5)
	"Other" section blank but at least one box ticked in column A	=(0)
DCTRLLOT1-5	Representative of pharmacy on ethics committee	=(1)
	Assistance with blood level monitoring	=(2)
	Specific counselling for patients	=(3)
	Assess feasibility in practice	=(4)
	"Other" section blank but at least one box ticked in column A	=(0)
Q22(a) PRRES	No	(1)
	Yes	(2)
	Both	(3)
	22a NO but 22b/c answered	(8 for 22a)
	22a Unanswered but 22b/c answered	(7 for 22a)
	All 22 Unanswered	(0)
Q22(b)	PhD (NO)	MPhil (NO)
	MSc (NO)	Post-graduate Diploma (NO)
	Tick taken as ONE unless reason to believe otherwise	
	Any blanks	(0)
	22b Unanswered when 22a was unanswered too	(99)
	22b Unanswered when 22a was NO	(0)
	22b Unanswered when 22a was YES	(99)
	22b answered when 22a was NO	(8 as answer to 22a)
	22b answered when 22a was Unanswered	(7 as answer to 22a)
Q22(c)	NPROJECT (NUMBER OF PROJECTS)	
	22c Unanswered when 22a/b unanswered too	(99)
	22c Unanswered when 22a was NO	(0)
	22c Unanswered when 22a was YES	(99)
	22c answered when 22a was NO	(8 as answer to 22a)
	22c answered when 22a was Unanswered	(7 as answer to 22a)

Q23(a)	PHARMMA	No	(1)		
		Yes	(2)		
		Both 23a & 23b Unanswered	(0)		
		Both 23a & 23b ticked	(8)		
		23b answered when 23a was NO	(8 as answer to 23a)		
		23b answered, 23a Unanswered	(7 as answer to 23a)		
Q23(b)			<u>NONE</u>	<u>VERY</u>	<u>MODERATE</u>
				<u>LITTLE</u>	<u>AMOUNT</u>
		Provision of financial information on drug use	(1)	(2)	(3)
		Provision of information on problems encountered in the drug use process eg. prescribing errors	(1)	(2)	(3)
		Provision of information and assistance in setting prescribing policies	(1)	(2)	(3)
		Provision of feedback on adherence to the agreed prescribing policies	(1)	(2)	(3)
					(4)
					(4)
					(4)
					(4)
OTHRMA 1-5	Use prefix of "other" type , decimal point and how much done eg. 10.3				
	DUR				=(1)
	Audit of prescribing				=(2)
	Prescription writing audited				=(3)
	Grand round presentations				=(4)
	Audit of discharge prescriptions				=(5)
	Assessment of medical audit undertaken by the doctors				=(6)
	Evaluation of antibiotic prescribing				=(7)
	Evaluation of antiemetic				=(8)
	Presentations at consultant audit meetings				=(10)
	Joint research projects on audit				=(11)
	Review of discharge letters				=(12)
	Review of anticoagulant charts				=(13)
	Chose audit topic				=(14)
	Part of working party on prescribing process				=(15)
	TPN				=(16)
	Suggest audit topics				=(17)
	Data gathering for specific projects				=(18)
	Evaluation of impact of new therapies				=(19)
	Prediction of future needs				=(20)
	Formulary				=(21)
	Prn medicines				=(22)
	Intervention monitoring fed back into				=(23)
	Agreeing topics				=(24)
	Prescribing of depot neuroleptics				=(25)
	Therapy for dangerous/acute psychosis				=(26)
	Of care group equipment				=(28)
	To develop specialist formulary				=(30)
	"Other" blank but at least one box ticked in question 23(b)				(0)
	23b Unanswered when 23a unanswered too				(0)
	23b unanswered when 23a NO				(9)
	23b unanswered when 23a YES				(0)
	23b answered when 23a NO				(8 as answer to 23a)
	23b answered when 23a Unanswered				(7 for 23a)
Q24(a)	PHARMCAA	No	(1)		
		Yes	(2)		
		Both	(8)		
		24b answered when 24a was NO	(8 as answer to 24a)		
		24b answered when 24a was Unanswered	(7 as answer to 24a)		
		Both 24a & 24b Unanswered	(0)		

24(b) NOCAA1-10	
Clinical pharmacy interventions in patients	=(1)
Time involvement/clinical pharmacist/specialty	=(2)
DI queries / user group	=(3)
Time on DI queries / user group	=(4)
Number & % Dispensing errors	=(5)
Number items dispensed/time period	=(6)
Mistakes	=(7)
Time spent trouble shooting	=(8)
Workload figures	=(10)
Dispensary	=(11)
QC	=(12)
TPN service	=(13)
Cytotoxics service	=(14)
Preparation & Packaging of medicines	=(15)
OPD waiting time	=(16)
Occasionally, ward pharmacy	=(17)
Dispensary interventions study	=(18)
Mentions RPhO's standards, Pts. charter or local contract but no specifics	=(19)
All parts of pharmacy audited against standards	=(20)
Peer review of interventions	=(21)
peer review of interventions against standards	=(22)
Costings	=(23)
DI audit	=(24)
Pain management	=(25)
TTA waiting time	=(26)
Response time in dispensing chemotherapy	=(27)
Response time in dispensary	=(28)
Customer satisfaction/care satisfaction surveys	=(29)
Short audits in specific areas, examples given	=(30)
Residency	=(31)
Short audits in specific areas, no examples given	=(32)
Clinical/ward pharmacy	=(33)
Medication errors	=(34)
Stock checks	=(35)
Via collaborative care plans	=(36)
Specific audits by region	=(37)
Regionally/district organised meeting every month to discuss audits	=(38)
Regularity of ward pharmacy visits	=(39)
Quantifying interventions	=(40)
Information flow in pharmacy department	=(41)
Prescription errors	=(42)
TDM service	=(43)
Formulary management	=(44)
Protocol-setting	=(45)
Activity-outcome monitoring	=(46)
QARx	=(47)
CIVAs	=(48)
Tech top up	=(49)
1-2/year clinical pharmacy surveys	=(50)
Audit of all pharmacy activities	=(51)
Request for information	=(52)
Re-use of patients medicines on discharge	=(53)
Warfarin clinic	=(54)
Annual audit of each pharmacy department by District QA pharmacist	=(55)
Safety policy	=(56)
Legal requirements for registration	=(57)
Aseptic dispensing unit	=(58)
TQM	=(59)
Time response	=(60)
24b Unanswered when 24a unanswered too	(0)
24b Unanswered when 24a was NO	(9)
24b Unanswered when 24a was YES	(0)
24b answered when 24a was NO	(8 as answer to 24a)
24b answered when 24a was Unanswered	(7 as answer to 24a)

Q25(a) PHARMCAB	No	(1)
	Yes	(2)
	Both	(8)
	25b answered when 25a was NO	(8 as answer to 25a)
	25b answered when 25a was Unanswered	(7 as answer to 25a)
	Both 25a & 25b Unanswered	(0)
Q25(b) NOCAB1-10		
	Audit of surgical department	=(1)
	Audit of other departments using RPho's Standards	=(2)
	Audit of laxative policy	=(3)
	Pathology	=(4)
	Antibiotic audit	=(5)
	Dietetics	=(6)
	Physiotherapy	=(7)
	Occupational therapy	=(8)
	Chiropody	=(10)
	Obstetric & Gynaecology	=(11)
	Paediatrics	=(12)
	Use of on-call service/supply service	=(13)
	Patient outcomes at EMI day hospital	=(14)
	Haematology unit-Use of Hickman lines	=(15)
	Use of EPO in renal patients	=(16)
	CCU activity audit	=(17)
	Medical chart audit	=(18)
	Resuscitation	=(19)
	Medicines in elderly	=(20)
	Audits of other hospitals with reports to CAPO on pharmaceutical supplies	=(21)
	Audits of other hospitals with reports to Nurse Manager on supply	=(22)
	Each pharmacist involved in audits in their own specialty	=(23)
	General medicine	=(24)
	Geriatrics	=(25)
	SCBU	=(26)
	Dermatology	=(27)
	Anaesthetics	=(28)
	General surgery	=(29)
	Multidisciplinary quality audit	=(30)
	Nurse telephone requests quality monitoring	=(31)
	ITU	=(32)
	Inhaler technique	=(33)
	Use of heparin	=(34)
	Use of antacids	=(35)
	Of wards in units	=(36)
	Of hospitals supplied by us	=(37)
	Preparation of IVs on the ward	=(38)
	Antibiotic prophylaxis for surgery	=(39)
	Aminoglycoside therapy in bacteraemia	=(40)
	DUR of antidepressants in continuing care	=(41)
	Unit transplant audit	=(42)
	Unit orthopaedic audit	=(43)
	25b Unanswered when 25a unanswered too	(0)
	25b Unanswered when 25a was NO	(9)
	25b Unanswered when 25a was YES	(0)
	25b answered when 25a was NO	(8 as answer to 25a)
	25b answered when 25a was Unanswered	(7 as answer to 25a)
Q26(a) THEWAYF	No	(1)
	Yes	(2)
	Unanswered	(0)
	Not applicable as answer	(3)
	Don't know	(4)
Q26(b) NUFFIELD	No	(1)
	Yes	(2)
	Unanswered	(0)
	Not applicable as answer	(3)
	Don't know	(4)

APPENDIX VII

The Clinical Role of the Hospital Pharmacist - Interview Survey

District pharmacist (or equivalent)

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post (District pharmacist)

No. years at hospital

Time of interview (day/month/time)

B. Topics:

- 1. Views on pharmacy services Contribution to health care, hospital, patient care, your professional development, pharmacy's professional development, resources.**

- 2. Views on the future of hospital clinical pharmacy in general - Challenges, opportunities, action required, facilitating factors, barriers.**

- 3. What are our greatest strengths and weaknesses as a profession.**

The Clinical Role of the Hospital Pharmacist - Interview Survey

Clinical Services Pharmacist

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post (Clinical services pharmacist)

No. years at hospital

Time of interview (day/month/time)

B. Topics:

- 1. Views on pharmacy services - Generally, new services (stimulus for), discontinued services (reasons), contribution (to directorate, hospital, patient care, your professional development, pharmacy's professional development, resources).**
- 2. Professional relationships & conflicts - Social, professional, status, conflicts (cause, action to reduce them).**
- 3. Services contribution to patient care - Process vs outcome, present, future, gap.**
- 4. Views on hospital pharmacy in general - Challenges, opportunities, action required, facilitating factors, barriers.**
- 5. Future developments - which valued, not wanted, are opinions sought, new NHS, clinical directorate structure.**

The Clinical Role of the Hospital Pharmacist - Interview Survey

Community Services Pharmacist

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post (Community services pharmacist)

No. years at hospital

Time of interview (day/month/time)

B. Topics:

- 1. Views on pharmacy services to PHC - Generally, new services (stimulus for), discontinued services (reasons), contribution (to directorate, hospital, patient care, your professional development, pharmacy's professional development, resources).**
- 2. Professional relationships & conflicts - Social, professional, status, conflicts (cause, action to reduce them).**
- 3. Services contribution to patient care - Process vs outcome, present, future, gap.**
- 4. Views on hospital pharmacy in general - Challenges, opportunities, action required, facilitating factors, barriers.**
- 5. Future developments - which valued, not wanted, are opinions sought, effect of NHS reforms.**

The Clinical Role of the Hospital Pharmacist - Interview Survey

Directorate Pharmacist

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post (Directorate pharmacist)

No. years at hospital

Time of interview (day/month/time)

B. Topics:

- 1. Views on pharmacy services in directorate structure - Stimulus for development, contribution (to directorate, hospital, patient care, your professional development, pharmacy's professional development, resources).**
- 2. Professional relationships & conflicts - Social, professional, part of directorate team or pharmacy, conflicts (cause, action to reduce them).**
- 3. Your contribution to patient care - Process vs outcome, present, future, gap.**
- 4. Views on hospital pharmacy in general - Challenges, opportunities, action required, facilitating factors, barriers.**
- 5. Future developments - which valued, not wanted, are opinions sought, new NHS, clinical directorate structure.**

The Clinical Role of the Hospital Pharmacist - Interview Survey

Ward or other pharmacist

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post

No. years at hospital

Time of interview (day/month/time)

B. Topics:

- 1. Views on pharmacy services - Usefulness, professional satisfaction, contribution to patient care, contribution to your (and pharmacy's) professional development.**
- 2. Professional relationships & conflicts - Social, professional, conflicts (cause, action to reduce them).**
- 3. Your contribution to patient care - Process vs outcome, present, future, gap.**
- 4. Views on hospital pharmacy in general - Challenges, opportunities, action required, facilitating factors, barriers.**
- 5. Future developments - which valued, not wanted, are opinions sought, new NHS.**

The Clinical Role of the Hospital Pharmacist - Interview Survey

Consultant/Clinical Director or Pharmacologist

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post

No. years at hospital

Time of interview (day/month/time)

B. Topics:

- 1. Relationship with pharmacy - Interaction with, contribution to and conflicts with medical management.**
- 2. Views on pharmacy services - Present services (usefulness etc.) clinical directorates, policies, necessary changes.**
- 3. Services contribution to patient care - Present, future, gap.**
- 4. Professional relations - conflicts/co-operation, team membership, future.**
- 5. Needs in pharmacy - Challenges, opportunities, action required, facilitating factors, barriers.**
- 6. Future developments - which valued, not wanted, are opinions sought, new NHS, (clinical directorate structure).**

The Clinical Role of the Hospital Pharmacist - Interview Survey

Non-Consultant Doctor

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post

No. years at hospital

Time of interview (day/month/time)

B. Topics:

- 1. Relationship with pharmacy - Interaction with, contribution to and conflicts with medical management.**
- 2. Views on pharmacy services - Present services (usefulness etc.) clinical directorates, policies, necessary changes.**
- 3. Views on pharmacist you meet most often - contribution, interaction (conflicts/co-operation).**
- 4. Services contribution to patient care - Present, future, gap.**
- 5. Needs in pharmacy - Challenges, opportunities, action required, facilitating factors, barriers.**
- 6. Future developments - which valued, not wanted, are opinions sought.**

The Clinical Role of the Hospital Pharmacist - Interview Survey

Nurse

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post

No. years at hospital

Time of interview (day/month/time)

B. Topics:

- 1. Relationship with pharmacy - Interaction with, contribution to and conflicts with nursing management.**
- 2. Views on pharmacy services - Present services (usefulness etc.) clinical directorates, policies, necessary changes.**
- 3. Views on pharmacist you meet most often - Understanding of key issues in patient care, contribution, interaction (conflicts/co-operation).**
- 4. Services contribution to patient care - Present, future, gap.**
- 5. Needs in pharmacy - Challenges, opportunities, action required, facilitating factors, barriers.**
- 6. Future developments - which valued, not wanted, are opinions sought, new NHS.**

The Clinical Role of the Hospital Pharmacist - Interview Survey

Manager

A. General information about the hospital and interviewee

Hospital

Interviewee's name

Professional group/post

No. years at hospital

Time of interview (day/month/time)


B. Topics:

- 1. Relationship with pharmacy - Interaction with, contribution to and conflicts with management.**
- 2. Views on pharmacy services - Developments, new NHS, clinical directorates, PHC, Patients' Charter.**
- 3. Services contribution to patient care - Present, future, gap.**
- 4. Needs in pharmacy - Challenges, opportunities, action required, facilitating factors, barriers.**
- 5. Future developments.**

APPENDIX VIII

The following are examples of letters sent to interview sites (requesting participation, informing interviewees of the study, arranging interviews and thanking participants). All were personally signed.

1. **Introductory letter sent to the Chief Pharmacist at interview sites.**

<hr/>	
London School of Hygiene and Tropical Medicine (University of London)	
Keppel Street, London WC1E 7HT Tel 071 636 8636 Tel Direct 071 9272460 Fax 071 436 3611	
<hr/>	
	Department of Public Health and Policy Health Services Research Unit
The Chief Pharmacist, The Pharmacy, The Hospital, Hospital Address, Postcode.	Date
Re: Visit by Siobhan Cotter to [The Hospital].	
Dear Chief Pharmacist,	
Thank you for agreeing to assist in this study and have me visit your hospital on the [Date]. This letter is just to confirm what we discussed in our recent telephone conversation and to give you a better idea of what the study involves.	
I am visiting a selected number of hospital pharmacies throughout the United Kingdom to study innovative clinical pharmacy services. This is part of a larger three year study on the clinical role of the hospital pharmacist in the UK. In earlier parts of this research I have conducted a questionnaire survey of clinical pharmacy service provision in UK NHS hospitals. I now want to look towards the future and consider the prospective role of hospital clinical pharmacy and its potential contribution to health care.	
Just a bit of background about myself - I was a hospital clinical pharmacist but now am a PhD student in the Health Services Research Unit at the London School of Hygiene & Tropical Medicine. Although I am funded by N.W. Thames Regional Health Authority and the Enterprise Scheme (Department of Health), this is independent work. I am supervised by Dr Martin McKee, a public health physician based at the School of Hygiene, and advised by Professor Nick Barber from the School of Pharmacy, Brunswick Square.	
As I mentioned on the telephone, the study involves a 2 - 3 day visit to your hospital, during which I hope to speak with pharmacy and non-pharmacy staff. I would like to obtain an interview with yourself and with the [Name - District Pharmaceutical Officer or equivalent] since both of you have the most influence on pharmacy service development in [Hospital]. These interviews are likely to take about an hour and I would appreciate you setting this time aside, at a time convenient to you, during the visit. (I will contact [The District Pharmacist or equivalent] to arrange a suitable interview time.)	
As you can see, this visit will involve a number of pre-arranged interviews with some time for more informal contact with staff. I would very much appreciate your help in selecting the pharmacists, doctors, nurses and managers that I should interview. You will have a much better idea of which consultants, non-consultant doctors and senior nurses frequently interact with pharmacy and know of the benefits of your clinical services. I hope that you can give me the names of a few that I should contact. Whilst I am happy to arrange the interviews myself, I would welcome your help if you feel that it would be advantageous. I also need to speak with a few clinical directors, the non-pharmacy manager with whom you have most contact, the pharmacist responsible for clinical pharmacy services and the pharmacist with most links with primary care. Once again I am hoping for some names so that I can go on to organise the interview times.	

2. Introductory letter sent to the Chief Pharmacist at interview sites continued.

Needless to say, complete confidentiality will be maintained throughout. The source of the information collected will never be identifiable and information will not be linked to [Name of Hospital]. This study will, however, help me create a statement about the future role of the clinical pharmacist in the UK and will, I hope, prove valuable to the profession in these changing times.

I hope that you can help me identify those to whom I should speak during my visit so that I can begin to arrange the interview times as soon as possible. If you need to speak with me or to obtain further details, I can be contacted at 071-927 2460 and at the address above.

I look forward to hearing from you and thank you for your agreement to participate in the study.

Yours sincerely,



Siobhan Cotter.
Research Fellow.

3. Confirmatory letter sent to interviewees.

London School of Hygiene and Tropical Medicine
(University of London)



Keppel Street, London WC1E 7HT
Tel: 071-636 8636 Tel Direct: 071-927 2440 Fax: 071-436 3611

Department of Public Health and Policy
Health Services Research Unit

Dr Physician,
Consultant Physician,
Department,
Hospital,
Hospital Address,
Postcode.

Date.

Re: Arranged interview with Siobhan Cotter on [Date] at [Time] in [Place].

Dear Dr Physician,

Thank you for agreeing to be interviewed on [Date] as part of this study into the future role of hospital pharmacy in the United Kingdom. I appreciate you setting aside the time for this in what must be a very busy schedule. This letter confirms what we discussed in our recent telephone conversation and will give you a better idea of what the study involves.

The attached letter provides more detailed information about this study. At [Hospital], I will be interviewing a variety of pharmacy and non-pharmacy staff over a period of three days to consider the present and prospective role of hospital pharmacy in the provision of health care. As I mentioned on the telephone, the interviews will take 30-45 minutes and will consist of broad-based questions to obtain your views on pharmacy services. Needless to say, complete confidentiality will be maintained throughout. The source of the information collected will never be identifiable and information will not be linked to your hospital.

Once again, thank you for agreeing to assist in this study. I look forward to meeting with you on [Date]. In the meantime, if you need to speak with me or to obtain further details, I can be contacted at 071-927 2460 and at the address above.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Siobhan Cotter'.

Siobhan Cotter,
Research Fellow.

4. Letter of information sent to sites and medically-qualified interviewees.

London School of Hygiene and Tropical Medicine
(University of London)



Keppel Street, London WC1E 7HT
Tel: 071-636 8636 · Tel Direct: 071-9272460 · Fax: 071-436 3611

Department of Public Health and Policy
Health Services Research Unit

17th May 1993.

To whom it may concern,

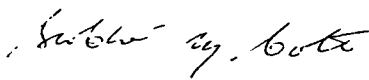
Siobhan Cotter is a PhD student in the Health Services Research Unit at the London School of Hygiene and Tropical Medicine. She is carrying out research into hospital pharmacy and is funded by N.W. Thames Regional Health Authority and the Enterprise Scheme (Department of Health). She is visiting a selected number of hospital pharmacies throughout the United Kingdom to study innovative clinical pharmacy services as part of her PhD. In earlier parts of this research she has carried out a questionnaire survey of clinical pharmacy service provision in UK NHS hospitals. She now wants to consider issues surrounding hospital pharmacy clinical services development.

The study involves a 2 - 3 day visit, during which she will speak with a number of pharmacy and non-pharmacy staff for about 30 - 45 minutes. With the help of the pharmacy staff, we hope to identify hospital staff who can make useful contributions to the research.

Needless to say, complete confidentiality will be maintained throughout. The provider of any information will not be identifiable and information will not be linked to your hospital. This study will, however, help in the creation of a statement about the future role of the hospital pharmacist in the UK and will, we hope, prove valuable to pharmacists and others who work in the hospital sector.

Yours sincerely,


Dr Martin McKee M.D. M.R.C.P. (Supervisor)
Senior Lecturer in Public Health Medicine


Siobhan Cotter
Research Fellow

5. Letter of information sent to sites and non-medically-qualified interviewees.

London School of Hygiene and Tropical Medicine
(University of London)



Keppel Street, London WC1E 7HT
Tel: 071-636 8636 · Tel Direct: 071-9272460 · Fax: 071-436 3611

Department of Public Health and Policy
Health Services Research Unit

17th May 1993.


To whom it may concern,


Siobhan Cotter is a PhD student in the Health Services Research Unit at the London School of Hygiene and Tropical Medicine. She is carrying out research into hospital pharmacy and is funded by N.W. Thames Regional Health Authority and the Enterprise Scheme (Department of Health). She is visiting a selected number of hospital pharmacies throughout the United Kingdom to study innovative clinical pharmacy services as part of her PhD. In earlier parts of this research she has carried out a questionnaire survey of clinical pharmacy service provision in UK NHS hospitals. She now wants to consider issues surrounding hospital pharmacy clinical services development.

The study involves a 2 - 3 day visit, during which she will speak with a number of pharmacy and non-pharmacy staff for about 30 - 45 minutes. With the help of the pharmacy staff, we hope to identify hospital staff who can make useful contributions to the research.

Needless to say, complete confidentiality will be maintained throughout. The provider of any information will not be identifiable and information will not be linked to your hospital. This study will, however, help in the creation of a statement about the future role of the hospital pharmacist in the UK and will, we hope, prove valuable to pharmacists and others who work in the hospital sector.

Yours sincerely,


Dr Martin McKee (Supervisor)
Senior Lecturer in Public Health Medicine


Siobhan Cotter
Research Fellow

6. Letter of thanks sent to interviewees.

London School of Hygiene and Tropical Medicine
(University of London)

Keppel Street, London WC1E 7HT
Tel: 071-636 8636 Tel Direct 071-9272460 Fax 071-436 3611



Department of Public Health and Policy
Health Services Research Unit

The interviewee,
The Hospital,
Hospital Address,
Postcode

Date.

Dear Interviewee,

Just a note to say 'thank you' for participating in my interview study of providers and recipients of hospital pharmacy services. The information that you provided has given me a much clearer idea of how hospital pharmacy presently contributes to patient care and how it might continue to do so in the future. I am grateful for the time that you spent on the interview and for your valuable contribution.

As I mentioned before, complete confidentiality will be maintained and providers of information will never be identifiable.

Thank you once again for your time and your thoughts on hospital pharmacy.

Yours sincerely,

Siobhan Cotter.
Research Fellow.

APPENDIX IX

Table 1. Response rate to a questionnaire inquiring about the provision of clinical pharmacy services by hospital pharmacies in each District¹ in the UK NHS² to primary care recipients³.

Part of United Kingdom	Response⁴ - Returned/Sent (%)
England	165/177 (93.2)
Northern Ireland	3/4 (75.0)
Scotland	12/14 (85.7)
Wales	8/9 (88.9)
Special Health Authorities	5/7 (71.4)
All UK NHS	193/211 (91.5)

Notes to Table 1:

1. District Health Authorities (England), Health Boards (Scotland & Northern Ireland) and Health Authorities (Wales & Special Health Authorities);
2. United Kingdom National Health Service;
3. General practitioners, primary care nurses, community pharmacists, patients and persons in the community, primary care health professionals (other than doctors, nurses and community pharmacists) and primary care institutions;
4. The respondents were District Pharmaceutical Officers (England) and their equivalents in the rest of the UK NHS.

Table 2. Provision of clinical pharmacy services by hospital pharmacies in each District¹ in the United Kingdom National Health Service to General Practitioners.

Service	Numbers (%) Districts ¹ providing each service in -					
	All UK (n = 192)	England (n = 164)	N. Ireland (n = 3)	Scotland (n = 12)	Wales (n = 8)	SHAs ² (n = 5)
Advice on prescribing or on prescribing policies	69 (35.9)	57 (34.8)	2 (66.7)	8 (66.7)	2 (25.0)	0 (0)
Advice on financial aspects of drug use	37 (19.3)	29 (17.7)	2 (66.7)	6 (50.0)	0 (0)	0 (0)
Information on general drug-related matters	78 (40.6)	66 (40.2)	2 (66.7)	8 (66.7)	2 (25.0)	0 (0)
Drug information provided by DICs ³	99 (51.6)	86 (52.4)	1 (33.3)	4 (33.3)	8 (100)	0 (0)
Educational services	23 (12.0)	19 (11.6)	0 (0)	3 (25.0)	1 (12.5)	0 (0)

Notes to Table 2:

1. District Health Authorities (England), Health Boards (Scotland & Northern Ireland) and Health Authorities (Wales & Special Health Authorities);
2. Special Health Authorities;
3. Drug Information Centres.

Table 3. Provision of clinical pharmacy services by hospital pharmacies in each District¹ in the United Kingdom National Health Service to Primary Care Nurses.

Service	Numbers (%) Districts ¹ providing each service in -					SHAs ² (n=5)
	All UK (n=193)	England (n=165)	N. Ireland (n=3)	Scotland (n=12)	Wales (n=8)	
Advice on wound care	102 (52.8)	87 (52.7)	1 (33.3)	8 (66.7)	6 (75.0)	0 (0)
Advice on analgesia/equipment used in PCA ³	66 (34.4)	60 (36.4)	0 (0)	3 (25.0)	3 (37.5)	0 (0)
Information on general drug-related matters	120 (62.2)	102 (61.8)	2 (66.7)	8 (66.7)	7 (87.5)	1 (20.0)
Drug information from DICs ⁴	96 (49.7)	81 (49.1)	0 (0)	6 (50.0)	8 (100)	1 (20.0)
Educational services	102 (52.8)	89 (53.9)	2 (66.7)	5 (41.7)	5 (62.5)	1 (20.0)

Notes to Table 3:

1. District Health Authorities (England), Health Boards (Scotland & Northern Ireland) and Health Authorities (Wales & Special Health Authorities);
2. Special Health Authorities;
3. Patient Controlled Analgesia;
4. Drug Information Centres.

Table 4. Provision of clinical pharmacy services by hospital pharmacies in each District¹ in the United Kingdom National Health Service to Patients and Persons in the Community, and other Primary Care Health Professionals².

Service	Numbers (%) Districts ¹ providing each service in -					
	All UK (n=192)	England (n=164)	N. Ireland (n=3)	Scotland (n=12)	Wales (n=8)	SHAs ³ (n=5)
Individual counselling for patients with specific drug-related needs	47 (24.5)	35 (21.3)	1 (33.3)	6 (50.0)	4 (50.0)	1 (20.0)
Group education for patients	24 (12.5)	23 (14.0)	0 (0)	1 (8.3)	0 (0)	0 (0)
Group education for persons in the community	28 (14.6)	28 (17.1)	0 (0)	0 (0)	0 (0)	0 (0)
Information on general drug-related matters to primary care health professionals ²	70 (36.5)	61 (37.2)	1 (33.3)	4 (33.3)	4 (50.0)	0 (0)
Drug information from DICs ⁴ to primary care health professionals ²	64 (33.3)	54 (32.9)	1 (33.3)	4 (33.3)	5 (62.5)	0 (0)
Educational services for primary care health professionals ²	33 (17.2)	28 (17.1)	1 (33.3)	2 (16.7)	2 (25.0)	0 (0)

Notes to Table 4:

1. District Health Authorities (England), Health Boards (Scotland & Northern Ireland) and Health Authorities (Wales & Special Health Authorities);
2. Not including general practitioners, primary care nurses or community pharmacists;
3. Special Health Authorities;
4. Drug Information Centres.

Table 5. Provision of clinical pharmacy services by hospital pharmacies in each District¹ in the United Kingdom National Health Service to Community Pharmacists.

Service	Numbers (%) Districts ¹ providing each service in -					
	All UK (n=193)	England (n=165)	N. Ireland (n=3)	Scotland (n=12)	Wales (n=8)	SHAs ² (n=5)
Advice on analgesia/equipment used in PCA ³	7 (3.6)	5 (3.0)	0 (0)	0 (0)	2 (25.0)	0 (0)
Advice on parenteral nutrition/ equipment used in TPN ⁴	4 (2.1)	4 (2.4)	0 (0)	0 (0)	0 (0)	0 (0)
Advice on discharge of patients with specific drug needs	42 (21.8)	32 (19.4)	1 (33.3)	3 (25.0)	4 (50.0)	2 (40.0)
Drug information from DICs ⁵	80 (41.5)	63 (38.2)	1 (33.3)	7 (58.3)	8 (100)	1 (20.0)
Educational services	30 (15.5)	23 (13.9)	1 (33.3)	4 (33.3)	1 (12.5)	1 (20.0)

Notes to Table 5:

1. District Health Authorities (England), Health Boards (Scotland & Northern Ireland) and Health Authorities (Wales & Special Health Authorities);
2. Special Health Authorities;
3. Patient Controlled Analgesia;
4. Total Parenteral Nutrition;
5. Drug Information Centres.

Table 6. Provision of clinical pharmacy services by hospital pharmacies in each District¹ in the United Kingdom National Health Service to Primary Care Institutions².

Service	Numbers (%) Districts ¹ providing each service in -					SHAs ³ (n=5)
	All UK (n=193)	England (n=165)	N. Ireland (n=3)	Scotland (n=12)	Wales (n=8)	
Advice on wound care	58 (30.1)	48 (29.1)	0 (0)	5 (41.7)	5 (62.5)	0 (0)
Advice on sedation policies	29 (15.0)	26 (15.8)	0 (0)	2 (16.7)	1 (12.5)	0 (0)
Advice on analgesia/equipment used in PCA ⁴	35 (18.1)	32 (19.4)	0 (0)	1 (8.3)	2 (25.0)	0 (0)
Information on general drug-related matters	92 (47.7)	80 (48.5)	2 (66.7)	5 (41.7)	5 (62.5)	0 (0)
Drug information from DICs ⁵	52 (26.9)	43 (26.1)	0 (0)	4 (33.3)	5 (62.5)	0 (0)
Educational services	61 (31.6)	52 (31.5)	2 (66.7)	3 (25.0)	4 (50.0)	0 (0)

Notes to Table 6:

1. District Health Authorities (England), Health Boards (Scotland & Northern Ireland) and Health Authorities (Wales & Special Health Authorities);
2. Including Residential Homes, Hospices and Nursing Homes;
3. Special Health Authorities;
4. Patient Controlled Analgesia;
5. Drug Information Centres.

Table 7. Perceptions of changes in pharmacy resources within United Kingdom National Health Service Districts¹ as a result of HC(88)54²; The Nuffield Report³ and attainment of Trust Status⁴ by one or more hospitals.

Factor and part of the United Kingdom (number of respondents)	Number (%) of Districts ¹ where resources had altered
HC(88)54²	
All United Kingdom (n=192)	94 (49.0)
England (n=165)	74 (44.8)
N. Ireland (n=3)	2 (66.7)
Scotland (n=11)	9 (81.8)
Wales (n=8)	6 (75.0)
Special Health Authorities (n=5)	3 (60.0)
The Nuffield Report³	
All United Kingdom (n=185)	30 (16.2)
England (n=159)	25 (15.7)
N. Ireland (n=3)	0
Scotland (n=11)	1 (9.1)
Wales (n=7)	4 (57.1)
Special Health Authorities (n=5)	0
Trust Status⁴ (proportion of districts)	
All United Kingdom (106/183)	22/106 (20.8)
England (100/158)	21/100 (21.0)
N. Ireland (1/2)	0
Scotland (2/10)	1/2 (50.0)
Wales (3/8)	0
Special Health Authorities (0)	N/A

Notes to Table 7:

1. District Health Authorities (England), Health Boards (Scotland & Northern Ireland) and Health Authorities (Wales & Special Health Authorities); Department of Health, Health Services Management. The way forward for hospital pharmaceutical services. HC(88)54. London: HMSO, 1988 (and equivalent documents in Scotland and Northern Ireland);
2. Pharmacy. The Report of a Committee of Inquiry appointed by the Nuffield Foundation (Chair: Sir K Clucas). London: The Nuffield Foundation 1986;
3. The 1989 National Health Service (NHS) reforms enabled hospitals to become NHS trusts with greater autonomy over service provision and development within government health policy.

APPENDIX X

Table 1. Proportion of responding and non-responding United Kingdom National Health Service hospital pharmacies¹ located in teaching hospitals².

Part of the United Kingdom	Responders		Non-responders	
	Number (%)	Number (%) in teaching hospitals ²	Number (%)	Number (%) in teaching hospitals ²
England	325/357 (91.0)	68/303 (22.4)	32/357 (9.0)	7/32 (21.9)
N. Ireland	14/23 (60.9)	7/14 (50.0)	9/23 (39.1)	3/9 (33.3)
Scotland	45/49 (91.8)	19/41 (46.3)	4/49 (8.2)	0/4
Wales	23/24 (95.8%)	3/22 (13.6)	1/24 (4.2)	0/1
SHAs ³	9/10 (90.0)	8/9 (88.9)	1/10 (10.0)	1/1 (100)
All United Kingdom	416/463 (89.8)	105/389 (27.0)	47/463 (10.2)	11/47 (23.4)

Notes to Table 1:

1. United Kingdom National Health Service hospital pharmacies that provided comprehensive pharmacy service, that is where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided;
2. Location in medical school teaching hospitals;
3. Special Health Authorities.

Table 2. Characteristics of United Kingdom National Health Service hospital pharmacies¹.

Characteristic	Part of the United Kingdom					
	All UK	England	N. Ireland	Scotland	Wales	SHAs ²
Number (%) self-governing trusts	118/402 (29.4)	115/316 (36.4)	0/14 (0)	3/41 (7.3)	0/23 (0)	0/8 (0)
Beds served:						
Number of respondents	409	319	13	45	23	9
Median (1st & 3rd quartiles)	545 (320, 842)	528 (325, 806)	380 (272, 595)	818 (435, 1200)	595 (382, 1002)	174 (151, 301)
Number of pharmacists:						
Number of responders	389	302	14	44	20	9
Median (1st & 3rd quartiles)	7 (3, 12)	7 (3, 12)	4 (3, 11)	8 (3, 13)	11 (6, 12)	8 (5, 10)
WTE ³ pharmacists employed:						
Number of respondents	375	296	10	41	21	7
Median (1st & 3rd quartiles)	7 (3, 11.5)	6.5 (3, 11.4)	4 (3, 10.5)	7 (3, 12)	10 (6, 11.5)	6 (5, 10)
Pharmacists with higher qualifications ⁴ :						
Number (%) pharmacies employing them	305/410 (74.4)	238/320 (74.4)	11/14 (78.6)	32/44 (72.7)	16/23 (69.6)	8/9 (88.9)
Median (1st & 3rd quartiles) employed	2 (1, 4)	2 (1, 4)	1 (1, 4)	3 (2, 5)	2 (1, 3)	1 (1, 3)
Specialist Clinical Pharmacists ⁵ :						
Number (%) pharmacies employing them	185/410 (45.1)	143/320 (44.7)	5/14 (35.7)	20/44 (45.5)	13/23 (56.5)	4/9 (44.4)
Median (1st & 3rd quartiles) employed	2 (1, 3)	2 (1, 3)	3 (2, 4)	2 (2, 5)	3 (1, 4)	1 (1, 2)
Number (%) of sites where the chief pharmacist was managed by the UGM ⁶	198/408 (48.5)	137/318 (43.1)	10/14 (71.4)	30/44 (68.2)	15/23 (65.2)	6/9 (66.7)
Number (%) of sites where pharmacy held the drug budget	245/408 (60.0)	178/317 (56.2)	13/14 (92.9)	32/45 (71.1)	18/23 (78.3)	4/9 (44.4)
Number (%) of sites providing services to off-site units	276/409 (67.5)	217/319 (68.0)	10/14 (71.4)	30/44 (68.2)	17/23 (73.9)	2/9 (22.2)
Number (%) of sites providing services to other NHS ⁷ hospitals	220/408 (53.9)	165/318 (51.9)	8/14 (57.1)	31/44 (70.4)	14/23 (60.9)	2/9 (22.2)
Number (%) of sites where resources moved towards clinical pharmacy due to HC(88) ⁵⁴	174/406 (42.9)	130/316 (41.1)	4/14 (28.6)	24/45 (53.3)	11/22 (50.0)	5/9 (55.6)
Number (%) of sites where resources moved towards clinical pharmacy due to the Nuffield Report ⁹	77/391 (19.7)	55/308 (17.9)	2/14 (14.3)	12/40 (30.0)	5/21 (23.8)	3/8 (37.5)

See page 451 for footnotes to this table.

Notes to Table 2:

1. Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
2. Special Health Authorities;
3. Whole Time Equivalents;
4. Diplomas, Masters of Science (MScs), Masters of Philosophy (MPhils) and Doctorates of Philosophy (PhDs);
5. Devote 50% or more of their time to a clinical specialty;
6. Unit General Manager;
7. National Health Service;
8. Department of Health. Health Services Management. The way forward for hospital pharmaceutical services. HC(88)54. London: HMSO, 1988 (and equivalent documents in Scotland and Northern Ireland);
9. Pharmacy. The Report of a Committee of Inquiry appointed by the Nuffield Foundation (Chair: Sir K Lucas). London: The Nuffield Foundation 1986.

Table 3. Employment of pharmacists with higher qualifications in United Kingdom National Health Service hospitals¹.

Qualification	Part of the United Kingdom					SHAs ²
	All UK	England	N. Ireland	Scotland	Wales	
Diploma						
Number (%) of employer pharmacies	184/410 (44.9)	152/320 (47.5)	3/14 (21.4)	11/44 (25.0)	14/23 (60.9)	4 9 (44.4)
Numbers employed by each pharmacy:						
Median (1st & 3rd quartiles)	1 (1, 2)	1 (1, 2)	1 ⁴	2 (1, 3)	1 (1, 2)	1 (1, 2)
MSc³						
Number (%) of employer pharmacies	217/410 (52.9)	170/320 (53.1)	6/14 (42.9)	29/44 (65.9)	7/23 (30.4)	5 9 (55.6)
Numbers employed by each pharmacy:						
Median (1st & 3rd quartiles)	2 (1, 3)	1 (1, 2)	1 (1, 4)	2 (2, 5)	1 (1, 2)	1 (1, 2)
MPhil³						
Number (%) of employer pharmacies	26/410 (6.3)	23/320 (7.2)	0/14	1/44 (2.3)	2/23 (8.7)	0 9
Numbers employed by each pharmacy:						
Median (1st & 3rd quartiles)	1 ⁴	1 ⁴	-	1 ⁴	1 ⁴	-
PhD³						
Number (%) of employer pharmacies	60/410 (14.6)	40/320 (12.5)	4/14 (28.6)	8/44 (18.2)	6/23 (26.1)	2 9 (22.2)
Numbers employed by each pharmacy:						
Median (1st & 3rd quartiles)	1 ⁴	1 ⁴	1 ⁴	1 ⁴	1 ⁴	1 ⁴

Notes to Table 3:

1. Hospital pharmacies providing comprehensive pharmaceutical services, that is where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
2. Special Health Authorities;
3. Qualifications - Master of Science (MSc), Master of Philosophy (MPhil), Doctorate of Philosophy (PhD);
4. Interquartile range = 0.

Table 4. Availability of full pharmacy services in United Kingdom National Health Service hospital pharmacies¹.

Time period	Part of the United Kingdom					SHAs ²
	All UK	England	N. Ireland	Scotland	Wales	
Monday to Friday						
Number (%) pharmacies open	413 (100)	323 (100)	14 (100)	44 (100)	23 (100)	9 (100)
Median (1st & 3rd quartiles) number of hours open (per day)	8.5 (8.3, 8.8)	8.5 (8.3, 8.8)	8.5 (8.5, 9)	8.5 (8.3, 8.8)	8.5 (8.3, 8.5)	8.5 (8.5, 9)
Saturdays						
Number (%) pharmacies open	305/414 (73.7)	241/323 (74.6)	7/14 (50.0)	31/45 (69.9)	19/23 (82.6)	7/9 (77.8)
Median (1st & 3rd quartiles) number of hours open (per day)	3 (3, 3.5)	3 (3, 3.5)	3 (2.5, 4)	3 (3, 3.5)	3.5 (3, 3.8)	3 (2.5, 4)
Sundays						
Number (%) pharmacies open	40/414 (9.7)	35/323 (10.8)	0/14	3/45 (6.7)	1/23 (4.3)	1/9 (11.1)
Median (1st & 3rd quartiles) number of hours open (per day)	3 (2, 4)	3 (2, 4)	-	4 (2, 4)	7 ³	2 ³
Bank & Official Holidays						
Number (%) pharmacies open	305/414 (73.7)	233/323 (72.1)	12/14 (85.7)	39/45 (86.7)	18/23 (78.3)	3/9 (33.3)
Median (1st & 3rd quartiles) number of hours open (per day)	3 (3, 4)	3 (3, 3.5)	4.5 (4, 8)	8.3 (5.8-8.5)	3 (3-4)	3.5 (3-7)
Out of hours service⁴						
Pharmacists on call from home	363/412 (88.1)	284/323 (87.9)	11/14 (78.6)	37/43 (86.0)	23/23 (100)	8/9 (88.9)
Residency	39/412 (9.5)	33/323 (10.2)	2/14 (14.3)	4/43 (9.3)	0	0

Notes to Table 4:

- Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
- Special Health Authorities;
- Interquartile range = 0;
- Pharmacists on-call-from home provide advice and are available to arrange drug supply. Residents usually work alone providing on-site emergency supply and advisory services but may be supported and advised by pharmacy staff at home.

Table 5. Provision of drug therapy monitoring in United Kingdom National Health Service hospital pharmacies¹.

In-patient drug therapy monitoring	Number (%) ² hospital pharmacies providing medication chart monitoring according to different parts of the United Kingdom					SHAs ³
	All UK	England	N. Ireland	Scotland	Wales	
Provision for:	394/409 (96.3)	310/318 (97.5)	12/14 (85.7)	42/45 (93.3)	21/23 (91.3)	9/9 (100)
Location at which monitoring of acute in-patients drug therapy took place:	313/335 (93.4)	253/264 (95.8)	10/14 (71.4)	29/35 (82.9)	19/20 (95.0)	2 2 (100)
On the ward	367/393 (93.4)	286/309 (92.6)	11/12 (91.7)	42/42 (100)	20/21 (95.2)	8 9 (88.9)
On the pharmacy	8/393 (2)	7/309 (2.3)	1/12 (8.3)	0/42	0/21	0 9
On the ward and in the pharmacy	18/393 (4.6)	16/309 (5.2)	0/12	0/42	1/21 (4.8)	1 9 (11.1)
Frequency of monitoring of acute in-patients' drug therapy on weekdays:						
Daily	351/392 (89.5)	278/308 (90.3)	8/12 (66.7)	37/42 (88.1)	19/21 (90.4)	9 9 (100)
Less than daily but more than weekly	23/392 (5.9)	14/308 (4.5)	4/12 (33.3)	4/42 (9.5)	1/21 (4.8)	0 9
Weekly or less frequently	18/392 (4.6)	16/308 (5.2)	0/12	1/42 (2.4)	1/21 (4.8)	0 9
Frequency of monitoring of acute in-patients' drug therapy on weekends/holidays:						
Daily	20/393 (5.1)	13/309 (4.2)	0/12	6/42 (14.3)	1/21 (4.8)	0 9
On Saturdays only	2/393 (0.5)	2/309 (0.6)	0/12	0/42	0/21	0 9
When required only	29/393 (7.4)	23/309 (7.4)	1/12 (8.3)	2/42 (4.8)	3/21 (14.3)	0 9
Frequency of monitoring of long-stay in-patients' drug therapy:						
Weekly or more frequently	245/335 (73.1)	201/264 (76.1)	8/14 (57.1)	20/35 (57.1)	14/20 (70)	2 2 (100)
Less frequently than weekly	68/335 (20.3)	52/264 (19.7)	2/14 (14.3)	9/35 (25.7)	5/20 (25)	-
Number of ward pharmacists employed:						
Number of responding pharmacies	388	301	13	44	21	9
Median (1st & 3rd quartiles)	6 (3-10)	6 (3-10)	3 (2-5)	5 (2-9)	8 (6-10)	5 (3-7)

Notes to Table 5:

- Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
- Percentages vary slightly due to missing data;
- Special Health Authorities;
- Not all hospitals had long-stay patients.

Table 6. Participation by United Kingdom National Health Service hospital pharmacies¹ in hospital drug policy creation, implementation and assessment.

Activity	Number (%) ² hospital pharmacies participating in each activity according to different parts of the United Kingdom					SHAs ³
	All UK	England	N. Ireland	Scotland	Wales	
Pharmacist participation in ward rounds						
Some pharmacists	288/414 (69.6)	227/324 (70.1)	6/14 (42.9)	33/44 (75.0)	18/23 (78.3)	4 9 (44.4)
All pharmacists	33/414 (8)	26/324 (8.0)	3/14 (21.4)	3/44 (6.8)	1/23 (4.3)	0 9
Pharmacist participation in DTC ⁴ meetings	329/341 (96.5)	258/267 (96.6)	10/10 (100)	33/36 (91.7)	21/21 (100)	7 7 (100)
Application of a formulary system ⁵	295/333 (88.6)	246/266 (92.5)	6/11 (54.5)	23/33 (69.7)	19/20 (95.0)	1 3 (33.3)
Provision of advice to clinical directorates ⁶	181/279 (64.9)	153/235 (65.1)	4/6 (66.7)	7/14 (50.0)	11/17 (64.7)	6 7 (85.7)
Provision of financial information on drug use to hospital staff	360/397 (90.7)	280/309 (90.6)	12/13 (92.3)	42/44 (95.5)	18/22 (81.8)	8 9 (88.9)
Provision of information used in creating prescribing policies	296/397 (74.6)	233/309 (75.4)	9/13 (69.2)	32/44 (72.7)	15/22 (68.2)	7 9 (77.8)
Provision of information used in making formulary decisions	288/397 (72.5)	220/309 (71.2)	11/13 (84.6)	35/44 (79.5)	18/22 (81.8)	4 9 (44.4)
Provision of information used in new product evaluations	237/397 (59.7)	185/309 (59.9)	9/13 (69.2)	25/44 (56.8)	14/22 (63.6)	4 9 (44.4)
Participation in infection control services ⁷	24/391 (6.1)	16/309 (5.2)	1/14 (7.1)	6/39 (15.4)	0/20	1 9 (11.1)

Notes to Table 6:

- Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
- Percentages vary slightly due to missing data;
- Special Health Authorities;
- Drug and Therapeutic Committees - only 361/414 (87.2%) of hospitals had such committees;
- 342 415 (82.4%) of hospitals had a formulary. Application of the formulary meant that fewer than 100% of non-formulary requests were acceded to by pharmacy;
- Clinical directorates are the resource management units within UK NHS hospitals. Only 279/414 (67.4%) of hospitals had clinical directorates;
- Included assistance with the creation of, and provision of advice on, various infection control policies.

Table 7. Provision of information and education for hospital staff in United Kingdom National Health Service hospital pharmacies¹.

Service/Facility	Number (%) ² hospital pharmacies providing each service/facility according to different parts of the United Kingdom					SHAs ³
	All UK	England	N. Ireland	Scotland	Wales	
On-site drug information centre (DIC)	245/411 (59.6)	190/321 (59.2)	8/14 (57.1)	28/44 (63.6)	10/23 (43.5)	9/9 (100)
Presence of dedicated DIC pharmacist(s)	236/245 (96.3)	184/190 (96.8)	8/8 (100)	25/28 (89.3)	10/10 (100)	9/9 (100)
Types of information provided:						
Clinical information on drug use	312/397 (78.6)	239/309 (77.3)	11/13 (84.6)	36/44 (81.8)	18/22 (81.8)	8/9 (88.9)
Educational material for hospital staff	179/397 (45.1)	142/309 (46.0)	3/13 (23.1)	21/44 (47.7)	11/22 (50.0)	2/9 (22.2)
Educational material for non-hospital professionals	91/397 (22.9)	75/309 (24.3)	1/13 (7.7)	11/44 (25.0)	3/22 (13.6)	1/9 (11.1)
Educational material for patients	167/397 (42.1)	137/309 (44.3)	5/13 (38.5)	14/44 (31.8)	8/22 (36.4)	3/9 (33.3)
Provision of education for pharmacy staff	281/413 (68.0)	225/322 (69.9)	7/14 (50.0)	27/45 (60.0)	17/23 (73.9)	5/9 (55.6)
Provision of education leading to a Diploma	216/281 (76.9)	175/225 (77.8)	5/7 (71.4)	15/27 (55.6)	16/17 (94.1)	5/5 (100)
Provision of education leading to a MSc ⁴	86/281 (30.6)	65/225 (28.9)	3/7 (42.9)	18/27 (66.7)	0/17	0/5
Types of education provided for pharmacy staff:						
Group teaching on clinical use of drugs	152/281 (54.1)	125/225 (55.6)	3/7 (42.9)	11/27 (40.7)	8/17 (47.1)	5/5 (100)
Clinical skills training	173/281 (61.6)	139/225 (61.8)	2/7 (28.6)	15/27 (55.6)	12/17 (70.6)	5/5 (100)
In-house clinical pharmacy course	157/281 (55.9)	130/225 (57.8)	4/7 (57.1)	12/27 (44.4)	7/17 (41.2)	4/5 (80.0)
Teaching using peer review	137/281 (48.8)	110/225 (48.9)	4/7 (57.1)	10/27 (37.0)	10/17 (58.8)	3/5 (60.0)
Group education without peer review ⁵	116/281 (41.3)	90/225 (40.0)	2/7 (28.6)	13/27 (48.1)	8/17 (47.1)	3/5 (60.0)
Dissemination of printed material	116/281 (41.3)	93/225 (41.3)	5/7 (71.4)	7/27 (25.9)	7/17 (41.2)	4/5 (80.0)
Provision of education for nurses (and student nurses)	267/416 (64.2)	213/325 (65.5)	4/14 (28.6)	28/45 (62.2)	14/23 (60.9)	8/9 (88.9)
Provision of education for doctors	27/416 (6.5)	20/325 (6.2)	1/14 (7.1)	4/45 (8.9)	1/23 (4.3)	1/9 (11.1)
Provision of education for medical students	17/416 (4.1)	14/325 (4.3)	0/14	3/45 (6.7)	0/23	0/9
Provision of education for other hospital health care professionals ⁶	64/416 (15.4)	51/325 (15.7)	2/14 (14.3)	3/45 (6.7)	6/23 (26.1)	2/9 (22.2)

Notes to Table 7:

- Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
- Percentages vary slightly due to missing data;
- Special Health Authorities;
- Masters of Science;
- For example, Journal Clubs;
- Health professionals other than pharmacists, doctors and nurses.

Table 8. Involvement of United Kingdom National Health Service hospital pharmacies¹ in Research, Audit, Clinical Trials, Multidisciplinary teams and other clinical pharmacy services.

Service/Activity	Number (%) ² hospital pharmacies providing each service/activity according to different parts of the United Kingdom					
	All UK	England	N. Ireland	Scotland	Wales	SHAs ³
Conduct of practice research	170/412 (41.3)	127/322 (39.4)	5/14 (35.7)	21/45 (46.7)	12/22 (54.5)	5/9 (55.6)
Contribution to medical audit ⁴	204/410 (49.8)	165/321 (51.4)	5/14 (35.7)	21/44 (47.7)	8/22 (36.4)	5/9 (55.6)
Types of contribution to medical audit ⁴ :						
Financial information on drug use	169/197 (85.8)	136/159 (85.5)	5/5 (100)	15/20 (75.0)	8/8 (100)	5/5 (100)
Help with creation of prescribing policies	134/188 (71.3)	106/152 (69.7)	5/5 (100)	13/19 (68.4)	6/8 (75.0)	4/4 (100)
Information on adherence to prescribing policies	115/186 (61.8)	90/150 (60.0)	4/5 (80.0)	12/19 (63.2)	5/8 (62.5)	4/4 (100)
Information on problems in prescribing process	86/180 (47.8)	69/147 (46.9)	3/5 (60.0)	8/17 (47.1)	6/8 (75.0)	0/3
Performance of pharmacy audit ⁴	108/404 (26.7)	89/317 (28.1)	4/14 (28.6)	10/43 (23.3)	3/22 (13.6)	2/8 (25.0)
Participation in clinical audit ⁴	29/404 (7.2)	22/317 (6.9)	1/14 (7.1)	4/43 (9.3)	2/22 (9.1)	0/8
Provision of support for clinical trials	380/413 (92)	298/323 (92.3)	11/13 (84.6)	40/45 (88.9)	22/23 (95.7)	9/9 (100)
Participation in TPN ⁵ teams	147/401 (36.6)	109/316 (34.5)	3/12 (25.0)	24/42 (57.1)	10/23 (43.5)	1/8 (12.5)
Participation in cytotoxic chemotherapy teams	92/399 (23.1)	64/315 (20.3)	3/12 (25.0)	17/40 (42.5)	7/23 (30.4)	1/9 (11.1)
Participation in PCA ⁶ teams	60/388 (15.5)	42/307 (13.7)	1/12 (8.3)	8/39 (20.5)	9/22 (40.9)	0/8
Provision of therapeutic drug monitoring	83/394 (21.1)	65/312 (20.8)	3/11 (27.3)	11/42 (26.2)	4/20 (20.0)	0/9
Provision of anticoagulation control	18/377 (4.8)	13/297 (4.4)	0/12	4/38 (10.5)	1/21 (4.8)	0/9
Provision of advice on wound care	66/404 (16.3)	48/318 (15.1)	4/14 (28.6)	8/42 (19.0)	5/21 (23.8)	1/9 (11.1)
Provision of advice on pain control	33/396 (8.3)	23/312 (7.4)	1/13 (7.7)	8/41 (19.5)	1/21 (4.8)	0/9
Provision of CIVAS ⁷	139/381 (36.5)	103/302 (34.1)	2/9 (22.2)	22/39 (56.4)	9/22 (40.9)	3/9 (33.3)

Notes to Table 8:

- Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
- Percentages vary slightly due to missing data;
- Special Health Authorities;
- Audit is a quality assurance activity. It may be led by, and predominantly involve, doctors (medical audit) or pharmacists (pharmacy audit) or it may be multidisciplinary (clinical audit);
- Total Parenteral Nutrition;
- Patient Controlled Analgesia;
- Central Intravenous Additive service.

Table 9. Types of support provided for in-house¹ and drug company sponsored² clinical trials by United Kingdom National Health Service hospital pharmacies³.

Service	Number (%) hospital pharmacies providing each service in different parts of the United Kingdom					
	All UK (n=378)	England (n=297)	N. Ireland (n=11)	Scotland (n=40)	Wales (n=21)	SHAs ⁴ (n=9)
In-house trials¹:						
Assessment/planning of trial design	121 (32.0)	92 (31.0)	3 (27.3)	15 (37.5)	5 (23.8)	6 (66.7)
Assessment of drug safety and efficacy	89 (23.5)	70 (23.6)	3 (27.3)	9 (22.5)	2 (9.5)	5 (55.6)
Formulation of drug	82 (21.7)	61 (20.5)	2 (18.2)	12 (30.0)	4 (19.0)	3 (33.3)
Protocol design	125 (33.1)	94 (31.6)	4 (36.4)	13 (32.5)	9 (42.9)	5 (55.6)
Randomisation of patients	153 (40.5)	111 (37.4)	7 (63.6)	17 (42.5)	9 (42.9)	9 (100)
Packaging of drug	160 (42.3)	118 (39.7)	4 (36.4)	21 (52.5)	9 (42.9)	8 (88.9)
Supplying drug to clinics	71 (18.8)	46 (15.5)	3 (27.3)	11 (27.5)	7 (33.3)	4 (44.4)
Dispensing drug	239 (63.2)	180 (60.6)	8 (72.7)	28 (70.0)	14 (66.7)	9 (100)
Record-keeping	222 (58.7)	171 (57.6)	6 (54.5)	25 (62.5)	11 (52.4)	9 (100)
Randomisation codes held & broken if necessary	212 (56.1)	162 (54.5)	6 (54.5)	24 (60.0)	11 (52.4)	9 (100)
Compliance monitoring	159 (42.1)	117 (39.4)	4 (36.4)	19 (47.5)	11 (52.4)	8 (88.9)
Drug company sponsored trials²:						
Assessment of trial design	129 (34.1)	102 (34.3)	2 (18.2)	13 (32.5)	7 (33.3)	5 (55.6)
Assessment of trial safety	111 (29.4)	91 (30.6)	1 (9.1)	9 (22.5)	5 (23.8)	5 (55.6)
Assessment of ethical issues	151 (39.9)	123 (41.4)	4 (36.4)	10 (25.0)	9 (42.9)	5 (55.6)
Active role on ethics committee	124 (32.8)	105 (35.4)	0	8 (20.0)	10 (47.6)	1 (11.1)
Packaging of drug	82 (21.7)	63 (21.2)	1 (9.1)	10 (25.0)	2 (9.5)	6 (66.7)
Supplying drug to clinics	108 (28.6)	77 (25.9)	4 (36.4)	17 (42.5)	6 (28.6)	4 (44.4)
Dispensing drug	371 (98.1)	293 (98.7)	9 (81.8)	39 (97.5)	21 (100)	9 (100)
Record-keeping	363 (96.0)	289 (97.3)	8 (72.7)	39 (97.5)	19 (90.5)	8 (88.9)
Liaising with drug company	350 (92.6)	277 (93.3)	9 (81.8)	37 (92.5)	18 (85.7)	9 (100)
Randomisation codes held & broken if necessary	338 (89.4)	265 (89.2)	8 (72.7)	37 (92.5)	20 (95.2)	8 (88.9)
Compliance monitoring	277 (73.3)	216 (72.7)	7 (63.6)	30 (75.0)	17 (81.0)	7 (77.8)

Notes to Table 9

1. Trials organised by hospital personnel and conducted in the hospital;
2. Trials, frequently multicentre, conducted by hospital personnel on behalf of pharmaceutical companies;
3. Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
4. Special Health Authorities.

Table 10. Patient-orientated services provided by United Kingdom National Health Service hospital pharmacies¹.

Service	Number (%) ² hospital pharmacies providing each service in different parts of the United Kingdom					SHAs ³
	All UK	England	N. Ireland	Scotland	Wales	
Patient medication history-taking:						
Provision to:						
In-patients ⁴	67/409 (16.4)	46/320 (14.4)	2/13 (15.4)	16/45 (35.6)	3/22 (13.6)	0 9
Day-patients ⁴	56/66 (84.8)	38/45 (84.4)	2/2 (100)	14/16 (87.5)	2/3 (66.7)	-
Out-patients ⁴	8/66 (12.1)	6/45 (13.3)	0/2	2/16 (12.5)	0/3	-
Self-medication schemes ³						
Provision to:						
In-patients ⁴	12/66 (18.2)	7/45 (15.6)	0/2	4/16 (25.0)	1/3 (33.3)	3 9 (33.3)
Day-patients ⁴	204/407 (50.1)	165/319 (51.7)	4/13 (30.8)	23/44 (52.3)	9/22 (40.9)	1 1 (100)
Out-patients ⁴	187/200 (93.5)	157/164 (95.7)	3/4 (75.0)	19/22 (86.4)	7/9 (77.8)	0 1
Patient medication counselling						
Provision to:						
In-patients ⁴	40/200 (20.0)	27/164 (16.5)	1/4 (25.0)	9/22 (40.9)	3/9 (33.3)	1 1 (100)
Day-patients ⁴	15/200 (7.5)	12/164 (7.3)	0/4	2/22 (9.1)	0/9	3 9 (33.3)
Out-patients ⁴	245/406 (60.3)	188/319 (58.9)	6/13 (46.2)	32/43 (74.4)	16/22 (72.7)	0 3
Patient education						
Provision to:						
In-patients ⁴	167/238 (70.2)	126/184 (68.5)	4/6 (66.7)	26/30 (86.7)	11/15 (73.3)	0 3
Day-patients ⁴	39/238 (16.4)	25/184 (13.6)	2/6 (33.3)	6/30 (20.0)	6/15 (40.0)	3 3 (100)
Out-patients ⁴	151/238 (63.4)	120/184 (65.2)	2/6 (33.3)	16/30 (53.3)	10/15 (66.7)	2 9 (22.2)
Operation of the Committee of Safety of Medicines (CSM)						
Adverse Drug Reaction (ADR) monitoring scheme						
Provision to:						
In-patients ⁴	102/401 (25.4)	85/314 (27.1)	1/13 (7.7)	11/43 (25.6)	3/22 (13.6)	1 1 (100)
Day-patients ⁴	30/98 (30.6)	24/82 (29.3)	1/1 (100)	4/11 (36.4)	0/3	0 1
Out-patients ⁴	19/98 (19.4)	15/82 (18.3)	0/1	4/11 (36.4)	0/3	0 1
Service ensures						
Yellow card ⁶ given to doctor	59/98 (60.2)	51/82 (62.2)	0/1	5/11 (45.5)	3/3 (100)	3 8 (37.5)
Yellow card ⁶ completed	187/407 (45.9)	146/318 (45.9)	3/14 (21.4)	18/44 (40.9)	17/23 (73.9)	3 3 (100)
Operation of an ADR monitoring scheme in addition to the CSM scheme						
Provision to:						
In-patients ⁴	160/161 (99.4)	126/127 (99.2)	2/2 (100)	12/12 (100)	17/17 (100)	1 3 (33.3)
Day-patients ⁴	74/161 (46.0)	63/127 (49.6)	1/2 (50.0)	3/12 (25.0)	6/17 (35.3)	2 3 (66.7)
Out-patients ⁴	79/161 (49.1)	69/127 (54.3)	1/2 (50.0)	2/12 (16.7)	5/17 (29.4)	2 3 (66.7)
CSM scheme						
Provision to:						
In-patients ⁴	128/172 (74.4)	97/135 (71.9)	3/3 (100)	10/14 (71.4)	16/17 (94.1)	2 3 (66.7)
Day-patients ⁴	95/172 (55.2)	74/135 (54.8)	0/3	8/14 (57.1)	11/17 (64.7)	2 3 (66.7)
Out-patients ⁴	46/367 (12.5)	31/288 (10.8)	0/12	3/38 (7.9)	12/22 (54.5)	0 7
Footnotes:						
1	44/44 (100)	30/30 (100)	-	3/3 (100)	11/11 (100)	-
2	17/44 (38.6)	12/30 (40.0)	-	2/3 (66.7)	3/11 (27.3)	-
3	20/44 (45.5)	15/30 (50.0)	-	2/3 (66.7)	3/11 (27.3)	-

See page 460 for footnotes to this table.

Notes to Table 10:

1. Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. 89.9% response rate;
2. Percentages vary slightly due to missing data. Percentages for service provision to different patient categories are of the number of sites providing the service that responded to the specific sub-section of the question;
3. Special Health Authorities;
4. In-patients have been admitted to hospital. Day patients attend for a procedure/treatment but are not normally admitted. Outpatients attend for non-invasive diagnosis/review of treatment;
5. Also known as self-administration schemes;
6. Adverse drug reaction reporting form.

Table 11. Services used in calculating the Total Service Score¹.

Provision of drug therapy monitoring for acute patients
Provision of drug therapy monitoring for long-stay patients ²
Residency ³
Participation by some pharmacists in medical ward rounds
Participation in Drug and Therapeutic Committee meetings ⁴
Application of a formulary system ⁵
Provision of advice to clinical directorates ⁶
Participation in infection control services ⁷
On-site drug information centre
Provision of education for pharmacy staff
Provision of education for nurses (and student nurses)
Provision of education for doctors
Provision of education for other hospital staff ⁸
Conduct of practice research
Contribution to medical audit ⁹
Performance of pharmacy audit ⁹
Participation in clinical audit ⁹
Provision of support for clinical trials
Pharmacist involvement in total parenteral nutrition teams
Pharmacist involvement in cytotoxic chemotherapy teams
Pharmacist involvement in patient controlled analgesia teams
Provision of therapeutic drug monitoring
Provision of anticoagulation control
Provision of advice on wound care
Provision of advice on pain control
Provision of a central intravenous additive service
Patient medication history-taking (all patients)
Provision of self-medication schemes ¹⁰
Provision of patient medication counselling
Provision of patient education
Operation of the CSM ADR ¹¹ monitoring scheme
Operation of an additional ADR monitoring scheme ¹¹

Notes to Table 11:

1. Each service was allocated a score of 1 if provided and 0 if not;
2. Not all hospitals had long-stay patients;
3. Resident pharmacists usually provide an on-site emergency pharmacy supply and advisory service. They work alone but may be supported and advised by pharmacy staff at home;
4. 361/414 (87.2%) of hospitals had a Drug & Therapeutics Committee;
5. 342/415 (82.4%) of hospitals had a formulary. Application of the formulary meant that fewer than 100% of requests for non-formulary products were acceded to by pharmacy;
6. Clinical directorates are the resource management units within UK NHS hospitals. 279/414 (67.4%) of hospitals had clinical directorates;
7. Included assistance with the creation of, and provision of advice on, various infection control policies;
8. Other than pharmacists, doctors and nurses;
9. Audit is a quality assurance activity. It may be led by, and predominantly involve, doctors (medical audit) or pharmacists (pharmacy audit) or it may be multidisciplinary (clinical audit);
10. Also known as self-administration schemes;
11. Committee of Safety of Medicines (CSM) adverse drug reaction (ADR) monitoring scheme and adverse drug reaction monitoring schemes in addition to the CSM scheme.

Table 12. Results of a Rasch analysis¹ for 33 Clinical Pharmacy Services in United Kingdom National Health Service Hospitals².

Service	Raw scores ¹	Rasch scores ¹	Standard error ¹
Provision of drug therapy monitoring for acute patients	329	-4.572	0.300
Provision of support for clinical trials	319	-3.853	0.228
Participation in Drug and Therapeutic Committee meetings	282	-2.574	0.155
Participation by some pharmacists in medical ward rounds	268	-2.261	0.144
Application of a formulary system ³	256	-2.024	0.138
Provision of drug therapy monitoring for long-stay patients ⁴	255	-2.006	0.137
Provision of education for pharmacy staff	244	-1.807	0.133
Provision of education for nurses (and student nurses)	225	-1.492	0.127
On-site drug information centre	222	-1.445	0.127
Patient medication counselling	211	-1.276	0.125
Contribution to medical audit ⁵	181	-0.835	0.122
Provision of self-medication schemes ⁶	170	-0.678	0.121
Operation of the CSM ADR ⁷ monitoring scheme	158	-0.507	0.122
Provision of advice to clinical directorates ⁸	152	-0.421	0.122
Conduct of practice research	147	-0.348	0.122
Pharmacist involvement in total parenteral nutrition teams	126	-0.038	0.125
Provision of a central intravenous additive service	117	0.100	0.127
Performance of pharmacy audit ⁵	96	0.442	0.133
Provision of patient education	95	0.459	0.133
Pharmacist involvement in cytotoxic chemotherapy teams	83	0.674	0.138
Provision of therapeutic drug monitoring	75	0.828	0.142
Provision of patient medication history-taking	56	1.244	0.157
Pharmacist involvement in patient controlled analgesia teams	55	1.268	0.158
Provision of education for other hospital health professionals ⁹	52	1.344	0.161
Provision of advice on wound care	52	1.344	0.161
Operation of an additional ADR monitoring scheme ⁷	41	1.654	0.176
Residency service ¹⁰	37	1.784	0.183
Provision of advice on pain control	31	2.002	0.197
Participation in clinical audit ⁵	25	2.258	0.215
Provision of education for doctors	22	2.407	0.226
Participation in infection control services ¹¹	19	2.575	0.241
Provision of an anticoagulation control service	15	2.840	0.267
Provision of education for medical students	14	2.916	0.275

Notes to Table 12:

1. Rasch analysis is described in the methods (Chapter III);
2. Hospital pharmacies where a pharmacist was present during normal working hours and services, in addition to drug supply, were provided. The response rate was 89.9%;
3. 342/415 (82.4%) of hospitals had a formulary. Application of the formulary meant that fewer than 100% of requests for non-formulary products were acceded to by pharmacy;
4. Not all hospitals had long-stay patients;
5. Audit is a quality assurance activity. It may be led by, and predominantly involve, doctors (medical audit) or pharmacists (pharmacy audit) or it may be multidisciplinary (clinical audit);
6. Also known as self-administration schemes;
7. Committee of Safety of Medicines (CSM) adverse drug reaction (ADR) monitoring scheme and ADR monitoring schemes in addition to the CSM scheme;
8. Resource management units in some (279/414, 67.4%) UK NHS hospitals;
9. Health professionals other than pharmacists, doctors and nurses;
10. Resident pharmacists usually provide an on-site emergency pharmacy supply and advisory service. They work alone but may be supported and advised by pharmacy staff at home;
11. Understood by respondents to include assistance with the creation of, and provision of advice on, various infection control policies.

APPENDIX XI

This appendix contains an annotated bibliography of the evaluative literature on UK NHS hospital clinical pharmacy services. The numbering of the references is consistent with that used in the References section of the thesis. This has resulted in the appearance of artificial gaps in the following bibliography.

19. Vere DW. Errors of Complex Prescribing. *Lancet* 1965;i:370-3.
Descriptive study:
This paper outlined the incidence of errors in drug administration at a London hospital. It was probably the first needs assessment for prescription monitoring in hospital.
22. Hill PA and Wigmore HM. Measurement and control of drug-administration incidents. *Lancet* 1967;i:671-4.
Descriptive report:
This paper described the changes in error rates following the introduction of the new prescription charts at the London Hospital. Use of a ward pharmacist and a new style drug chart reduced error rates. It was suggested that a pharmacist should be sent to the wards to initiate drug supply. The authors asserted that a pharmaceutical service would "provide a consultancy service at the point of prescribing".
24. Sykes CH and Oakes AEM. Drug administration at the London hospital. *Pharm J* 1968;200:117-8.
Descriptive report:
This paper described a new drug prescription chart brought into use at the London hospital following multidisciplinary committee activity to reduce drug administration error. Pharmacists went on the wards and spent 83% of their time monitoring prescriptions and 14% in consultation and discussion with medical and nursing staff.
46. Brown AW, Barrett CW and Herxheimer A. Hospital Pharmacy Committees in England: Their structure, function and development. *Br Med J* 1975;270:323-5.
Descriptive study:
A survey of 150 (80% response rate) chief and group chief pharmacists in England found that 70 worked in hospitals with a committee that dealt with drugs and related matters. 72% of teaching hospitals, as opposed to 30% of others, had such committees. The first committee was set up in 1948. The numbers increased steadily until 1968 and then more rapidly. Only one committee did not include a pharmacist and all were multidisciplinary.
47. George CF and Hands DE. Drug and Therapeutic Committees and information pharmacy services: the United Kingdom. *World Development* 1983;11:229-36.
Descriptive study:
This paper described the origins of multidisciplinary drug and therapeutic committees (DTCs) and the drug information service in the United Kingdom (UK). A census survey of district health authorities and boards in the UK revealed that 198 had DTCs. These were usually comprised of doctors, nurses and pharmacists. The average number of members was 9 (range 2-23). Data from the 150 respondents that provided DTC membership details showed that a total of 629 consultants, 277 hospital pharmacists, 108 nurses, 91 administration personnel, 54 junior doctors and 41 general practitioners sat on committees. Their terms of reference varied

widely. One hundred and thirty one respondents provided details on DTC terms of reference. These were to develop drug policy (106), achieve economy (86) and promote safety of drug use (65), to provide information on drug costs and efficacy (31), to monitor the use of and expenditure on drugs (30) and to provide information on new drugs (27). The savings achieved by formularies at two sites were quoted. Formularies were also considered to be educational tools. The development of the Wessex drug information centre (DIC) in 1976 was described. It handled 2600 queries in 1981. Queries were received from consultants (9.3%), junior doctors (24.7%), general practitioners (5.7%), hospital pharmacists (37%), community pharmacists (3%), hospital nurses (11%) and community nurses (1%). The commonest topics on which inquiries were received were drug administration (15.8%), indication/choice (15.8%), adverse effects (14.5%), identification (11.8%) and availability/supply (10.4%). The sources of information that were used by the DIC and its other activities in producing bulletins were described as was the national network of pharmacy information services in Britain.

48. Middlebrook MJ. The use of hospital formularies in the UK. *Br J Pharmaceutical Practice* 1979;1(8):12-3,16-7, 20-25.

Descriptive study:

A survey of 42 hospitals in the UK found that many had developed (12) or were in the process of developing (8) drug formularies, prescribing guidelines or policies for the introduction of new drugs. Some had started this work as early as 1970. Hospitals stated that the purpose of the formulary was cost reduction (10), education of prescribers (10), facilitation of rational prescribing (10) and drug selection. Formularies were updated as frequently as every 3 months but, more commonly, over longer periods. Of the 13 hospitals that provided information on compliance with formulary recommendations, 9 said that this was in excess of 60%.

49. Ridley H. *Drugs of choice: a report on drug formularies used in NHS hospitals*. London: Social Audit, 1986.

Descriptive study:

This publication provided details of the results of a telephone survey of district health authorities (DHA) in 1985. The response rate was 83%. Seventy five (36%) had formularies that extended to all hospitals in the DHA and covered all or most drug categories. The DHA placed some restrictions on prescribing in 48 (23%) cases and 32 DHAs (15%) had no formulary.

50. Calder G, Davies JS, McNulty H and Smith JC. Drug information network in the United Kingdom National Health Service. *Am J Hosp Pharm* 1981;38:663-6.

Descriptive report:

The national drug information network was described in this paper. Various government reports that supported the provision of drug information were outlined. Specialist centres were named and the many activities supported by the national network were described, such as the production of bulletins, literature abstracting, the transfer of information, the education and training of staff, and the setting up of an annual conference to exchange ideas. The sources of information queries at the various centres were enumerated. There was a rise in the use of the centres by doctors over the years 1976-9 and a fall in their use by hospital, but not community, pharmacists. The variation in the types and distribution of queries between centres was described.

51. Foster JHS. Postgraduate education for clinical pharmacy. *Proceedings of the Guild* 1977;3:1-29.

Report:

This report was a comprehensive review of the training needs in clinical pharmacy and an effort to predict future needs based on current practice developments. The author described the development of training programmes in the United States (USA) and in the UK and made general recommendations for the UK, where the practice of clinical pharmacy had not developed to the same extent as in the USA. He enumerated the available courses in the UK which comprised nine MSc courses in hospital or clinical pharmacy. These were mainly university based and an interview study of recent graduates indicated general satisfaction with the courses. Participants suggested that greater clinical involvement was needed, such as could be provided by a clinical residency period. He concluded by stating that, at the time, the courses that were available were inadequate to fulfil training needs. He felt that new developments should include the use of clinical pharmacists, currently in practice, to teach skills to participants and become role models for them. A residency programme, such as was common in the USA, would be desirable.

52. Goldberg LA and Cullen AMS. Continuing postgraduate education/training in hospital pharmacy. *Br J Pharmaceutical Practice* 1979;1(8):9-10.

Descriptive study:

This paper described the results of a questionnaire survey of Area Health Authorities and their equivalents in the United Kingdom to ascertain attitudes towards the provision of education for hospital pharmacists. Of the 87 questionnaires sent, 47 were returned (54%). All respondents thought that the provision of education was essential. In total, 35 Areas provided education in clinical pharmacy, 31 in support services and 28 in management. In 22 Areas, education was organised at regional level and in 10 it was on an ad hoc basis. The types of education provided included films and taped lectures in addition to more conventional methods. Some (27) sites had links with a university and 35 had teacher practitioners jointly employed with a university. There was general dissatisfaction with the educational services provided to hospital pharmacists because too few pharmacists were available to teach, it was difficult to get pharmacists on appropriate management courses, there was a lack of courses for support services and there was a general shortage of staff. This last factor hindered the secondment of pharmacists to attend educational courses.

53. Davies G, Dodds L, Fleet E, Horne R and Joshua A. Pharmacy practice research in the hospitals of South East Thames regional health authority, England. *Int J Pharm Pract* 1993;2:184-8.

Descriptive study:

This paper reported the results of a survey conducted within one regional health authority in England on ongoing practice research and perceived barriers to the conduct of practice research. Survey were sent to 22 units; 21 were returned. This represented answers provided by 18/19 clinical trainers. As well as completing the questionnaire, the clinical trainers had been asked to interview senior pharmacy managers at their unit. Seventeen interviews were conducted. Although 15 units had a pharmacist who had successfully completed/supervised a project in the past, only 11 had individuals with a research commitment. Managers were seeking to fund a research pharmacist in 6 units. Details were obtained on 199 projects, 110 of

which had been completed and 28 of which were being planned. Most projects were concerned with drug usage (55%) and a smaller proportion with service development (33%). Research was often undertaken to support service development (37%) or as part of the pre-registration requirements (23%). The majority of managers did not afford practice research a high priority and the main barriers to its performance were lack of money (14/17 managers and 10/18 trainers) and time (16/17 managers and all trainers). Perceived solutions to the problem were the availability of external supervisors (10/17 managers and 11/18 trainers) and assistance with funding (9/17 managers and 12/18 trainers). The authors envisaged a change in attitude to research consequent on the NHS changes. They also commented on the failure of researchers to report the results of research projects and the negative consequences for further funding applications.

54. Talbot JCC and Veitch GBA. Adverse drug reactions. Results of a national survey to discover the extent and limitations of the hospital pharmacist's involvement. *Br J Pharmaceutical Practice* 1980;2(9):6-11.

Descriptive study:

This paper described the results of a postal questionnaire survey of 82 Area Pharmaceutical Officers in England and Wales and 12 Chief Administrative Pharmaceutical Officers in Scotland. There were 84 replies (89% response rate). The number of replies was 119 due to officers sending the questionnaire to districts and large hospitals. Most pharmacy departments kept CSM cards (95), some distributed them to the wards (64) but few ward pharmacists carried them (41). Pharmacists frequently, or sometimes, recommended the making of a report to the CSM in 88 sites, were told when the CSM reports had been sent in 68 and completed the report in 17. Forty two sites had attempted to channel CSM reports through the drug information service but 12 said that no reports were reaching the CSM in this way and a further 14 made comments about the lack of success in this area. Thirty sites were involved in encouraging adverse drug reaction reporting and 17 sites were involved in monitoring patients for ADRs. Eighty four (71%) sites would like to be more involved in ADR reporting to the CSM and 69 (58%) in additional ADR schemes. A number of sites had plans to be more involved but resource constraints, inadequate training, and resistance from medical staff and from the CSM were hindering developments.

55. Sharott P. The hospital pharmaceutical service - is there a need for extended hours of service? *Proceedings of the Guild* 1978;4:33-62.

Descriptive study:

The author described a survey of 16 hospital providing extended opening hours; 8 had residency services and 6 provided a service staffed by a pharmacist on call from home. Twenty percent of calls to pharmacists were for drug information and advice but most concerned drug supply issues. The advantages and disadvantages of a residency service were discussed.

63. Parekh R and Ghee C. Evaluation of a pharmacist controlled anticoagulant clinic. *Br J Pharmaceutical Practice* 1987;9:370-81.

Objective:

To assess any change in the control of patients since active pharmacy participation was undertaken in out-patient anticoagulation clinics at a single hospital.

Methods:

This was a prospective 6 week controlled study measuring maintenance of international normalised ratio (INR) in the recommended range, patient recall rate and the degree of fluctuation in INR between visits in patients allocated to two groups, one managed by a doctor the other by a pharmacist. Some patients acted as their own controls and others were matched for drug indication, age and sex. Patients had to be treated exclusively, or for at least nine months, by a pharmacist to qualify for inclusion in the test group although this was not adhered to in practice.

Results:

Seventy three patients were treated by doctors and 73 by pharmacists. The only differences found between groups were that pharmacists carried out more INR tests and recalled patients at more frequent intervals. This indicated that the pharmacist-run service may have been more expensive although the costs were not measured. The proportion of patients' levels that were in the therapeutic range were similar for both services. The discussion described the benefits to the patient, such as counselling, continuity of care, and inferred that the patient benefited more from a pharmacist-run clinic.

Assessment of study: (strength, size of effect, generalisability)

This was a small study since the 146 patients were split among several sub-groups. The researchers assessed output and process only, and not outcome or costs, hence this was a partial evaluation. Benefit was defined in a very limited sense (equivalent outcome). All benefits not taken into account and claims of some benefits (such as continuity of care) were not proven in the article. There was potential for confounding (patient allocation) and bias (pharmacists-gathered data) and it was difficult to assess the implications of these results. The results are not generalisable.

65. Gould TH, Crosby DL, Harmer M, Lloyd SM, Lunn JN, Rees GAD, Roberts DE and Webster JA. Policy for controlling pain after surgery; effect of sequential changes in management. *Br Med J* 1992;305:1187-93.

Objective:

To observe the effects of introducing an acute pain service to the general surgical wards of a general hospital.

Methods:

This was a seven stage study using audit of pain control practices before and after the gradual introduction of an acute pain team. Several pain relief strategies were assessed, including patient controlled analgesia and regional blocks. The usefulness of patient information leaflets was assessed also. The main outcome measures were changes in the median pain (visual analogue) scores 24 hours after surgery, on deep inspiration and on movement.

Results:

A total of 2035 patients were involved in this 9 month study. The introduction of the service was associated with gradually decreasing pain scores.

Assessment of study: (strength, size of effect, generalisability)

This was not an evaluation of a pharmacy service. A pharmacist was, however, involved in the routine supervision of the acute pain team.

70. Daly MJ and Jones S. Preliminary assessment of a computerised counselling program for asthmatic children. *Pharm J* 1991;247:206-8.

Descriptive study:

This paper described the creation and assessment of a self-operated computerised program to counsel children about asthma and its therapy. Asthmatic children (n=22) and adults (n=26), plus interested adults (n=16), assessed the program via a questionnaire. They were asked also to rate the modules in order of potential effectiveness in asthma counselling. Responses were generally positive, more so amongst children than adults. Most thought it was a good idea (81%), easy to use (78%), was attractive and non-threatening (63%), appropriate for children (79%) and adults (55%), and will improve inhaler technique (60%) and knowledge of asthma (70%). Most rated the "some facts about asthma", "using a metered dose inhaler", "what is asthma" and "quiz" as potentially being the most useful modules.

92. McKay AB, Hepler CD and Knapp DA. How To Evaluate Progressive Pharmaceutical Services. Bethesda: ASHP Research and Education Foundation, 1987.
Book:
This book described methods for the evaluation of pharmaceutical services.
119. Crooks J, Weir RD, Coull DC, McNab JW, Calder G, Barnett JW and Caie HB. Evaluation of a method of prescribing drugs in hospital and a new method of recording their administration. *Lancet* 1967;i:668-71.
Descriptive report:
This paper described a new drug prescription chart brought into use following multidisciplinary committee activity at Aberdeen.
120. Calder G and Barnett JW. The pharmacist in the ward. *Pharm J* 1967;198:584-7.
Descriptive report:
This paper described ward pharmacists' activities at Aberdeen and their potential benefits.
121. Baker JA. Recent developments in the pharmaceutical service at Westminster Hospital. *J Hospital Pharmacy* 1967;24:400-6.
Descriptive report:
This paper described ward pharmacy activity and benefits at the Westminster Hospital, London. It outlined the potential sources of error in drug use on the wards, the new prescription sheet introduced at the hospital, the findings of a study on ward drug requirements and the various changes made as a result of this study. The ward pharmacists' responsibilities included the checking of all new treatments, the checking of drug availability, control of stock drug availability, regular inventory checks and the provision of information. The simplification of ordering systems allowed the nursing staff to devote more attention to drug administration. The pharmacy also proposed becoming more involved in the education of junior doctors.
122. Wall HM, Stephens MJ and Jepson MH. The clinical pharmacist's role in geriatric units. *Pharm J* 1987;239:R12.
Descriptive study:
This paper described perceptions of the need for ward pharmacist visits to geriatric unit wards. Need was judged on the number of prescription changes in the 3 geriatric wards studied (which received a weekly ward pharmacist visit) in comparison with the rate on an acute medical ward (which received a daily visit). Mean weekly prescribing activity on the geriatric unit was at least 50% of that on the acute medical ward over a 10 week period. The authors claimed that

this indicated a need for more frequent ward pharmacy visits.

123. Pawluczyk MB. Trends in psychiatry Part 2: Monitoring patient medication in a psychiatric hospital. *Br J Pharmaceutical Practice* 1988;10:434-8.
Descriptive study:
This described the problems that a ward pharmacist may encounter in prescription monitoring in a large psychiatric hospital (prescription type, drug interactions, doses in psychiatric therapy, other drugs, side effects).
124. Thomas RE. Discharge prescription monitoring. A role for the pharmacist. *Hospital Pharmacy Practice* 1991;1:333-7.
Descriptive study:
This paper described a three week retrospective survey carried out on 5 wards at a single hospital. When a pharmacist compared discharge prescriptions with the ward drug chart, 38 (51.4%) of the 74 prescriptions assessed needed the intervention of a clinical pharmacist. Forty nine interventions would have been necessary on these prescriptions, mainly on the frequency of dosing (29%), enteric coating (12%), drug added (10%) or drug omitted (8%).
125. Wightman ER. Medicine interactions observed in a year of ward pharmacy. *J Clin Hosp Pharm* 1978;3:183-8.
Descriptive study:
The author reported on the nature and number of drug interactions observed at a general^a hospital over the course of a year by ward pharmacists. They described the types of interactions in detail, the information supplied to the prescriber and the actions of the prescribers' that resulted from the pharmacists' interventions.
126. Jenkins D, Cairns C and Barber N. The quality of written in patient prescriptions. *Int J Pharm Pract* 1993;2:176-9.
Descriptive study:
Four hundred and thirty four prescription charts (4536 items) from a stratified sample of inpatients discharged in one year at two hospitals were examined for errors using pre-set criteria. The proportion of errors made and their type depended on the type of the prescription. Hence between 12-32% failed to use the approved name of the drug (depending on the prescription type), 4-10% were illegible or ambiguous (depending on the prescription type) and 11-26% failed to specify the dose correctly (depending on the prescription type).
127. Lannigan NA. Screening for pharmaceutical care issues on a general surgical ward. *Pharm J* 1994;252:134-5.
Descriptive study:
This paper described a systematic method of identifying pharmaceutical care issues on a general surgical unit in a single hospital. Forty six percent (197) of all pharmaceutical care issues on patients admitted to the unit over 4 months could be identified from prescription data and 53% (226) after consideration of other sources of patient data such as case notes. The main
- a Throughout this appendix 'general' describes a hospital that treats general types of patients rather than a 'District General Hospital'.

issues identified from the prescriptions were incorrect dose or frequency (9%), illegal or ambiguous prescriptions (13%) and inappropriate therapy (16%); those from consideration of other data were difficulties in administration (8%), potential administration, distribution, metabolism or excretion problems requiring possible dose adjustment (7%), problems with concurrent therapy for other conditions (16%) and failure of appropriate therapy (14%).

128. Batty R and Barber N. Prescription monitoring for ward pharmacists. *Pharm J* 1991;247:242-4.

This paper described a prescription monitoring method.

129. Jenkins D, Cairns C and Barber N. How do ward pharmacists spend their time? An activity sampling study. *Int J Pharm Pract* 1992;1:148-51.

Descriptive study:

Twenty eight ward pharmacists were observed at two hospitals and their activities recorded using work sampling. Multiple (n=1985) observations were made. Prescription monitoring and clinical monitoring accounted for 31% and 7%, respectively, of the time spent by ward pharmacists, travel for 21% and stock control for 12%. Data were similar at the two sites.

130. Beech EF and Barber ND. The development of a self-reporting multidimensional work sampling measure to study ward pharmacy services in the United Kingdom. *J Soc Admin Pharm* 1993;10:157-62.

Descriptive study:

This paper described the use of hand-held credit card sized bar coding technology to record prescription monitoring activities performed by 6 pharmacists at a general hospital. Ward pharmacists spent about 50% of their time on clinical pharmacy activities (prescription monitoring, information gathering, prescription annotation, changes in drug therapy, patient monitoring, and the provision of advice).

131. Ellis S. Constraints and opportunities in ward pharmacy. *Br J Pharmaceutical Practice* 1982;4(4):8-20.

Descriptive study:

The author described the results of a survey of activities undertaken by 10 ward pharmacists, each servicing one ward in a different hospital in East Anglian Region. In stage one, a four week period, the time spent on the ward, changes in prescriptions, work arising from the changes, discussions held and with whom, information supplied and ward activities were recorded. In stage 2 (4 weeks, six months from stage 1) individual defined pharmaceutical activities on the wards were timed. These activities included the reading of every prescription sheet and noting of any required action, the annotation of new prescriptions according to hospital policy and the checking of prescriptions for possible dose or dose form adjustments. Detailed work activity results were presented in the article and these were used to construct a schematic visiting commitment for a 450 bed general hospital. Although this was not an evaluation some results were of interest to the evaluation in this thesis. During 164 visits in stage 1 and 169 during stage 2, 60 and 43 problems, respectively, were raised by pharmacists. There were 29 and 17 changes in prescriptions, respectively, as a result. The numbers of beds on each ward, and their occupancy, varied but most had 20 or more beds. On average, visits took 28 minutes in stage 1 and 45 in stage 2 but the number of contacts with patients doctors

and nurses actually decreased from 293 to 186. The number of queries answered increased from 80 to 89 and the number of items of unsolicited information decreased from 34 to 27. Most contact was with nurses; house officers were the most frequent medical contact. On average, discussions on prescriptions took 3.11 minutes to resolve and conveying information or answering questions took 2.81 minutes. The study did not discern any significant factors that affected the quality of ward pharmacy services or their value in improving patient care.

132. Ashley MJ and Barber A. Bar codes - an aid to prescription monitoring in hospital clinical pharmacy. *Pharm J* 1990;246:HS6-8.

Descriptive study:

This paper described the use of hand-held bar coding technology to record prescription monitoring activities in a general hospital.

133. Cousins D and Hatoum H. The development of a computerised quality assurance system for clinical pharmacy. *Int J Pharm Pract* 1991;1:86-9.

Descriptive study:

This paper described the installation and operation of a system where interventions made by clinical pharmacists were recorded on a computerised database (QUARx - American Society of Hospital Pharmacists) to permit analysis of their effects on the quality of care and costs. The system was thought to have benefits for audit, management of pharmacy services and patient care. It built on an older system at the hospital which used paper forms to record details of the interventions in the pharmacy. Copies of these forms used to be placed in the patients' notes. The new system has simplified and facilitated the recording of interventions. In the new system, interventions were scored by the pharmacists that entered the data based on their perceptions of the effects on costs and patient care. Four hundred and ninety one interventions were recorded over 4 months. Pharmacists' advice was accepted in 93% of cases. Twenty five percent of interventions were scored by a single pharmacist as having changed subtherapeutic dosing (56), prevented serious toxicity (60) or were potentially life saving (5). One hundred and six interventions reduced drug costs, 7 saved resources on monitoring, 82 had savings attributable to complications of drug therapy and 110 reduced length of stay.

134. Kennedy K and Wind K. The development of a monitoring package for pharmacy interventions. *Hospital Pharmacy Practice* 1992;2:93-100.

Descriptive study:

This paper described the use of QUARx in a general hospital. QUARx is a computerised system that allows pharmacists to record their interventions, the outcomes of interventions and their contribution to care.

135. Hamilton MC and Hudson SA. Patient monitoring in clinical pharmacy; A study of initial assessment in general medical in-patients (abstract). *Proceedings of the UKCPA residential symposium. Bournemouth, 1990:11-13.*

Descriptive study:

This study compared three methods of identifying patients at risk of drug related problems. These methods were patient interview, prescription assessment or both methods used together. It was found that none were very specific methods when sensitivity to problem detection was in excess of 90%.

136. Nicholls J, Batty R and Jacklin A. Junior doctor's satisfaction with the ward pharmacy service in the Hammersmith and Queen Charlotte's special health authority. *Int J Pharm Pract* 1993;3:156-9.

Descriptive study:

The views of a random (stratified by grade) sample of 43 of a total of 135 junior doctors on ward pharmacy were sought in a face to face 10 minute taped interview. Twenty six were interviewed. The interviewer was unknown to the doctors and did not volunteer that she was a pharmacist. Most (85%) thought that the service was better than average and were satisfied because of different facets of the service. Seven were satisfied because of prescription monitoring, 9 because of the advice provided and 23 thought the service was friendly; one doctor rated the service as worse than in other hospitals. Suggestions for improvement included increased liaison with ward pharmacists either via ward rounds (n=10), general liaison (n=3) or by pharmacists introducing themselves to doctors (n=3). The study results may be biased if doctors with negative views on the service formed the 60% that responded.

137. Baignet B. Evaluation of clinical pharmacy in a mental health unit. *Pharm J* 1993;250:150-2.

Descriptive study:

This was a postal survey of junior doctors' attitudes to clinical pharmacy in a mental health unit. The survey aimed to assess the acceptability of a number of clinical pharmacy services, to determine if the quality of communication between medical and pharmacy staff was adequate, to identify areas of potential service development and to identify potential weaknesses in pharmacy's clinical or advisory services. Thirty five responses were received (65% response rate) to a self-completed questionnaire. The respondents thought that pharmacists should be available for consultation with medical staff (100%), advise on modifications to patients' therapy (94%), participate in ward rounds (83%) and visit the wards weekly (75%) or daily (25%). Pharmacists should monitor prescriptions for the correct drug name, dose and route (91%), frequency and duration (88%), interactions (97%) and adverse reactions (94%). Pharmacists should ensure cost effective prescribing (86%), that medical staff adhere to the formulary (77%) and provide information on the cost of alternative therapies (97%). On therapeutic drug monitoring, pharmacists should help select the drugs to be monitored (89%), when to take serum levels (83%) and how to interpret results (77%). Pharmacists should counsel patients on discharge (66%) and train other staff to do so (83%), provide drug histories (94%), give written reports to doctors (71%) and place these in the notes (69%). They should provide teaching seminars for student (97%) and trained (94%) nurses, and for medical staff (80%), bulletins on new drugs (86%) and information for patients (91%). Most (97%) thought that they should participate in practice research. Psychiatrists often contacted the pharmacy and most (87%) found the advice that was provided helpful. The results were similar to those of an unpublished survey of managers carried out at the hospital two years previously. Differences were that a lower proportion of ward managers wanted pharmacists on ward rounds (47%) and taking medication histories (64%).

138. Stevens E. Hospital doctors perceptions of the role of the hospital pharmacist (abstract). *UKCPA Theory into Practice Symposium Bournemouth, 1990:23.*

Descriptive study:

This self-completed anonymous questionnaire survey aimed to elicit hospital doctors' perceptions of the current and extended role of the hospital pharmacist at a single hospital.

Ninety nine questionnaires were issued to doctors of all grades; 42 were returned. Traditional roles, such as the provision of drug information and the monitoring of prescriptions for completeness, appropriateness and accuracy were well accepted. Clinical economy was also well-regarded, especially by senior doctors. Less well supported, particularly by senior doctors, were roles where there was greater patient contact such as adverse drug reaction monitoring, advising on dosage modifications in renal/hepatic insufficiency, medication history taking, and counselling on discharge. A role was envisaged in therapeutic drug monitoring but none felt that the pharmacist should be involved in medical teams.

139. Cavell GF, Bunn RJ and Hodges M. Consultants' views on the developing role of the hospital pharmacist. *Pharm J* 1987;239:100-2.

Descriptive study:

This paper reported the results of a self-completed questionnaire survey of 27 (72% response rate) consultants' opinions on which clinical pharmacy services should be provided at a single general hospital. All 6 consultants with a pharmacist attached to their firm responded and the authors wished to see if their opinions differed from those of their colleagues who did not have a pharmacist attached to their team. Sixty one percent thought that pharmacists should monitor therapy for drug interactions; 5/6 consultants with pharmacists on their team thought that pharmacists should definitely do this compared with 9/17 who did not have a pharmacist on their team. Sixty nine percent thought that pharmacists had a role in the control of drug expenditure. Only 10/23 thought that pharmacists should monitor patients drug therapy for side effects and 5 thought that they should monitor therapy for efficacy. More in the group with pharmacists on their teams considered these were roles for the pharmacist. Half of the consultants with pharmacists on their teams thought that pharmacists should take medication histories and counsel patients whereas 24% of those with no pharmacist on their teams thought so. About 25% thought that pharmacists should reconstitute intravenous products, 35% that they should attend ward rounds, 52% that they should provide seminars on drug therapy, 48% that they should provide therapeutic drug monitoring and 78% that they should take part in research. Responses to all these questions were more favourable from consultants with pharmacists on their teams.

140. Haslam R. An examination of the supply, prescribing, administration and recording of drugs in some Northern Regional Health Authority hospitals (MSc thesis). Newcastle upon Tyne: University of Newcastle upon Tyne, 1986.

Descriptive study:

This thesis reported the results of a study involving the observation of ward activity and the administration of questionnaires on 3 wards (selected by the hospital staff) in three hospitals over 5 consecutive days. Among the findings were that errors were frequently made in all aspects of drug use. Twenty (65%) nurses thought that it was the doctor's responsibility to ensure prescriptions were written correctly whereas all 15 pharmacists thought it was the pharmacists' responsibility. In practice, nurses said that they and senior nurses ensured that prescriptions were written correctly (97%). Patients were rarely asked about drug side effects by doctors (48%). Most doctors never asked about side effects despite some patients having experienced side effects (72%). Three quarters of nurses said that they used pharmacy often to check dose and drug availability and they felt that doctors should use the service more. Most doctors were happy with the pharmacy service (90%) and 42% were satisfied with the ward

pharmacy service.

141. Bentley A and Green R. Developing pharmaceutical services: the nursing view. *Br J Pharmaceutical Practice* 1981;3(3):4-9.

Descriptive study:

A self-completed questionnaire survey was carried out to assess the views of nursing staff at a single hospital on the clinical pharmacy services then provided. Questionnaires were sent to 32 wards and were completed anonymously. The response rate varied for individual questions. Nursing staff ranked the provision of drug information very highly but the provision of education for nurses less highly (response rate 44%) although they felt that the pharmacist could contribute usefully to nurse education in nursing school and on the wards. Of the 48% that responded to a question on patient counselling, most thought that the responsibility for discharge counselling rested with nursing staff (65%) rather than pharmacy staff (35%). In reply to a question on drug information (response rate 44%), nurses would readily contact pharmacy staff for information on names of drugs (54%), available strengths (79%), dose (89%), storage requirements (68%), physical incompatibilities (54%), intravenous fluids (68%), side effects (61%), contraindications (57%), drug identification (61%), interactions (75%) and causes of allergic reactions (79%). Most of the 45% that replied to a question on the benefits of having pharmacists on the wards ranked the ward pharmacy service as being important to them.

142. Stevens MJ. How nurses view the pharmacist's role. *Br J Pharmaceutical Practice* 1986;8:203-7.

Descriptive study:

This paper reported the results of 52 (57% response rate) self-completed questionnaires sent to student and qualified nursing staff on 8 wards in a single general hospital. Most thought that the supply of drug information (44/52), and costing data (30/52) was essential or important but few thought that the attendance on consultant ward rounds was important (7/52). Sixty one percent thought that ward pharmacy visits were important but nurses often did not seem to understand the reasons for these visits. Drug seminars were thought to be interesting and of value (42/52). Many nurses thought that pharmacy staff should be involved in reconstituting injections (10) or making intravenous additions (11); fewer though that they should counsel patients or identify adverse drug reactions (8) and none thought that they should take medication histories.

143. Leach RH, Feetam C and Butler D. An evaluation of a ward pharmacy service. *J Clin Hosp Pharm* 1981;6:173-82.

Objective:

To make an initial assessment of the value to patient care of a ward pharmacy service.

Method:

(i) This was a retrospective survey of a random sample of prescriptions from six wards in one general hospital for prescribing errors for 3 months before and the first 3 months after the introduction of a ward pharmacy service. Errors were defined as any of the following: incompleteness, incorrectness or ambiguity of a prescription item or its clinically significant incompatibility with another item. Annotations made by the ward pharmacist (in instances where errors had been detected) were excluded. The Chi-squared test was applied on the total

number of errors made in each phase.

(ii) A prospective survey was performed of the contribution made by three ward pharmacists. Personal records were made of the activities carried out by three ward pharmacists on 13 medical and 5 surgical wards over three months. Pharmacists noted any drug related problem that they detected, their action, the result and any questions asked by ward staff.

(iii) A questionnaire survey of medical and nursing staffs' opinions on the value of the service was carried out. One hundred and fifty self-completed questionnaires were sent, 6 to each of 25 wards. All registrars, house officers, sisters and staff nurses received them.

Results:

(i) Three hundred and fifteen drug charts (2000 prescriptions) were recalled in each time period. The mean error per patient fell from 2.04 to 1.10 (46.1% reduction) and the mean error per prescription fell from 0.3 to 0.7 (43.3% reduction). The reductions in 6 categories of error (name, route, frequency, signature, data, other) were significant ($p < 0.05$) but those on 3 (dose, controlled drug requirements and interactions) were not. Errors were judged by pharmacists to be dangerous rarely but would cause confusion for nurses. Ward pharmacists failed to detect 50% of errors.

(ii) Seventy five problems requiring pharmacist action were detected. Most prescriptions were altered on the pharmacists' request. Fifty eight questions were asked of pharmacists mainly by junior doctors, nurses and paramedical personnel. Most were on the following topics - clinical use, dose, "what is.." and interactions.

(iii) There was a 46% response rate to the questionnaires with a preponderance of replies from medical wards. According to staff nurses the most important functions of the ward pharmacist were: endorsing prescriptions with the approved name and supplying non-stock items, and checking that prescriptions were clear and unambiguous and that the dose was acceptable. According to ward sisters that most important functions of the ward pharmacist were promoting the most effective use of drugs, discussing problems of drug therapy, endorsing prescriptions with the approved name and supplying non-stock items. According to house officers the most important functions of the ward pharmacist were discussing problems of drug therapy, providing drug information, checking the dose was acceptable and promoting the safe use of drugs. According to registrars the most important functions of the ward pharmacist were providing drug information, detecting drug interactions, checking the dose was acceptable and promoting the safe use of drugs.

Assessment (strength, size of effect, generalisability):

The main problems with the study are related to potential bias (pharmacists self-recording and assessing their activities with no independent assessment, low survey response rate) and confounding (possible non-comparability of time periods). Process was assessed in phases I and II and perceptions in the third. Output and outcome were not addressed. The size of the effect was large (50% reduction in error) but study design problems and lack of generalisability (single site study using three pharmacists) limit its usefulness.

144. Gately J. An evaluation of a clinical/ward pharmacy service. Does the patient benefit? (abstract) UKCPA Residential Symposium. Bournemouth, 1988:9-10.

Descriptive study:

This described a survey of the interventions made by pharmacists in a single 715 bed hospital and a pharmacy assessment of these for the potential risks to patients if the intervention had not

been made. The duration of the study was unclear. Intervention rates ranged from 0.1-0.6 per patient per visit (37 wards). Eighty one percent were pharmacist initiated. Forty eight percent resulted in a prescription change. Fifteen percent concerned economic issues and 16% drug choice. The mean total risk factor (scale of 0 (none)-10 (high risk)) was 2.7.

145. Forbes DR. Can ward pharmacy be cost effective? *Br J Pharmaceutical Practice* 1981;3(5):29-33.

Objective:

To determine whether a visiting ward pharmacy service could be economically justified.

Methods:

This was a prospective before/after costing survey of prescriptions dispensed to 7 surgical wards at one general hospital. Costs included were pharmacists' time (dispensing and visiting wards) and nurses' time (travel to and from pharmacy collecting medicines).

Results:

The time taken to dispense items fell as did nursing time in visiting the pharmacy. Total pharmacy costs rose, from £129.72 in July to £235.15 in November, but dispensing costs fell, from £129.72 to £96.75. Nursing costs fell from £97.80 to £29.56 in this period. Patient throughput and length of stay data, and prescription numbers, were provided but were not used fully in the analysis.

Assessment of study: (strength, size of effect, generalisability)

This purported to be an economic analysis but inadequate data were provided on costing methods to enable assessment of their appropriateness or accuracy, and incremental and sensitivity analyses were absent. The study also failed to utilise workload data to enable the reader to judge if the service was economically viable. Judgements based on the crude figures presented may be flawed due to confounding. The researcher considered the figures in light of the number of prescriptions dispensed. This indicated that the total cost per item prescription rose from 41 to 63 pence. Bias due to pharmacists analysing their own service may be a problem.

146. Willson A. A new approach to prescription monitoring by ward pharmacists. *Pharm J* 1983;230:78-80.

Descriptive study:

This paper described the effect on prescription interventions of placing pharmacists on consultant ward rounds. For every 10 medical beds in a 20 week period the time spent by pharmacists on the ward round was 160 hours. This compared to 17 hours for ward pharmacists who did not attend ward rounds. The number of interventions on ward rounds was 320 (compared to 31 for ward pharmacists who did not attend ward rounds) and the number of information requests was 160 (compared to 43 for ward pharmacists who did not attend ward rounds).

147. Fahey M, Oakley PA and Sims K. Prescription monitoring and the oncology patient. *Pharm J* 1984;233:483-5.

Descriptive study:

This paper described the activities of a ward pharmacist on an oncology ward at one London hospital.

148. Gilles D. Prescribing review in a large mental illness hospital. *Pharm J* 1985;235:623-4.
Descriptive study:
 This paper described prescription anomalies detected by pharmacists on 41 wards in a large mental illness hospital over a 6 and an 18 month period. Anomalies were categorised as follows: clarification required, cancellation suggested, treatment review recommended, drug interaction noted and drug level monitoring indicated. Medical staff acted on pharmacists' advice in 65% of instances in the first 6 months increasing to over 95% in the 18 month period. The number of anomalies per 6 months increased despite a reduction in inmate population but no data were supplied to facilitate the making of comparisons over time periods.
149. Swallow RD, St C Remington H and Standing VF. Ward pharmacy: A positive contribution to cost control? *Pharm J* 1985;235:722-3.
Descriptive study:
 This paper described the effect on drug expenditure over 28 months and on doctors' compliance with the formulary in one year in a single general hospital. Drug expenditure was related to drug budget allocation. The authors suggested that the transformation of a £100,000 overspend into a £70,000 underspend (approximate) was due to creation of a hospital formulary which was implemented via the ward pharmacy system, training of ward pharmacists, evaluation of drug expenditure in specialties and the creation of a procedure for the introduction of new drugs. There was high (100%) compliance with the formulary in most drug groups. The authors provided no information on potential confounding factors.
150. Hawkey CJ, Hodgson S, Norman A, Daneshmend TK and Garner ST. Effect of reactive pharmacy intervention on quality of hospital prescribing. *Br Med J* 1990;300:986-90.
Objective:
 To evaluate the medical impact of reactive pharmacy intervention.
Methods:
 This was an analysis of the interventions made by 35 pharmacists at six hospitals over 28 days. Intervention data, collected prospectively from prescription monitoring activities, included characterisation of pharmacists' perceptions of prescription inadequacies, outcomes, time taken and grades of prescribers. These interventions were analyzed for their potential for preventing medical harm by one doctor. The hospitals represented 2530 mainly acute, 781 mental illness, and 633 mainly care of the elderly beds.
Results:
 Of the 781 interventions made (2.9% of all prescriptions), 60 were on prescriptions with major potential for medical harm. Wrong dose (280), dose not stated (50) and prescriptions of excess duration for antibiotics (48) were the commonest problems. The pharmacists interventions were accepted in 639 (86%) cases; in 571 the prescription was changed leading to an appreciable (246) or minor (231) improvement in care. Pharmacists interventions rarely saved money; 130 interventions resulted in a saving of less than 50 pence and 427 had no effect. Interventions occupied an average of 41 minutes/pharmacist /week.
Assessment of study: (strength, size of effect, generalisability)
 The size of the effect was relatively small although an assessment by a jury of one doctor, even though the level of the agreement was tested with another doctor, must be open to potential invalidity and bias. Bias due to the collection of data by pharmacists was also a possibility; no account was taken of the effect of not having pharmacists monitoring prescriptions (lack of

controls). Savings were calculated based on drug costs alone and other potential savings, such as the avoided costs of litigation or the nursing or pharmacy time saved because prescription problems were solved in advance, were ignored. The costs of pharmacists' time providing the service were not measured.

151. Batty R and Barber N. Ward pharmacy: a foundation for prescribing audit? *Quality in Health Care* 1991;1:5-9.

Descriptive study:

This survey was carried out in one English region (31 acute hospitals with 10337 beds) over seven days. Two hundred and ten pharmacists identified 2706 questionable prescriptions (83%). Other pharmacy staff identified 137 whilst nurses, doctors and other health care staff initiated a small number of inquires. The intervention rates varied depending on the hospital and on the nature of the ward. Pharmacists advised doctors regarding prescriptions on 2095 occasions and this advice was accepted in 96% of instances; in 77% of cases the prescription was altered. The resolution of inquires took approximately 5 minutes per prescription. This was the largest survey of this type ever carried out in the UK.

152. Hubbard CN and Alder G. Interventions during prescription checking on ward rounds. *Pharm J* 1992;248:162-3.

Descriptive study:

This paper described the number, nature and outcome of interventions made by 6 clinical pharmacists in a single general hospital over six weeks. Pharmacists recorded 351 interventions (3.3% intervention rate). A senior clinical pharmacist assessed 199 (57%) of these as being of major or moderate benefit to patients. Intervention rates varied depending on the pharmacist and the nature of the ward. Pharmacy advice was followed in 78% of cases.

153. Maguiness JA, MacFadyen E and Cooté JC. Routine discharge prescription monitoring by clinical pharmacists. *Pharm J* 1992;248:294-5.

Objective:

To determine the types of intervention that are necessary before a discharge prescription can be dispensed and to assess the impact that the clinical pharmacist can make through the routine monitoring of discharge prescriptions.

Methods:

This was a prospective survey comparing the number and types of interventions made by dispensary staff in a single hospital in two ten week periods before and after the institution of ward pharmacist monitoring of discharge prescriptions.

Results:

Monitoring of discharge prescriptions by ward pharmacists reduced the proportion of prescription queries made by dispensary staff from 21% (80/384) to 4.8% (19/394). Ward pharmacists intervened on 21.6% of prescriptions; 34% of these interventions would probably not have been made by dispensary staff hence the authors claimed that the use of ward pharmacists resulted in better care for patients. Ward pharmacist interventions differed from those made by dispensary staff and included discontinuation of unnecessary medications, re-institution of omitted medications and improved prescribing of antibiotics. Although savings on dispensary staff time and the expenditure in ward pharmacist time were measured crudely, the authors claimed that an overall reduction was seen in the time used querying prescriptions

(from 7 to 6.5 hours). Money saved on drug costs was similar in both phases (£61 versus £54).

Assessment of study: (strength, size of effect, generalisability)

The size of the effect on overall staff time was small. All costs and consequences were not measured and bias due to self-recording may be present. Workload was comparable in the two 10 week study periods. The results are not generalisable.

154. Barber PA. Intervention monitoring project at Nottingham City Hospital. *Hospital Pharmacy Practice* 1992;2:353-7.

Objective:

To demonstrate the effect of clinical pharmacy by reporting interventions made by pharmacists and technicians at a single general hospital over 5 months.

Methods:

Interventions made by pharmacists or technicians, or as a result of other staff asking questions, were self-recorded and subjectively scored as to their effect. The opinion of a consultant physician was sought on a random sample of these interventions.

Results:

Of the 1585 interventions that were recorded, 62.5% were made during ward pharmacy and 33.7% in the dispensary. Pharmacy staff initiated most interventions (87.1%). The majority of interventions were made on dose (19%) or duration (18%) of therapy. Eight one percent of interventions resulted in a prescription alteration (only 1.4% were rejected) although few were thought to be life saving (0.5%) or having prevented serious toxicity (3.7%); many optimised patient care (24.7%) or improved the standards of practice (32.8%).

Assessment of study: (strength, size of effect, generalisability)

The size of the effect was moderate. Study design problems included potential bias (pharmacists collected intervention data and scored most of their own interventions). The use of the doctors as assessors lent some credibility to the results but the lack of a control group prevented comparisons with the no-pharmacist scenario. The results are not generalisable.

155. Eadon H. Assessing the quality of ward pharmacists' interventions. *Int J Pharm Pract* 1992;1:145-7.

Objective:

To identify the quality of interventions made by pharmacists.

Methods:

This was a prospective survey and assessment of all interventions made by ward pharmacists at a single hospital over one year. Their impact on patient care was assessed by a senior clinical pharmacist using an American scoring system. Three physicians independently assessed a random sample of 25 interventions. Pharmacist and doctor scoring agreed well.

Results:

Of the 1315 interventions that were assessed, 695 (53%) were considered to have improved patient care and 28 (2%) were thought to have had a very significant effect on outcome.

Assessment of study: (strength, size of effect, generalisability)

The size of the effect was moderate. Data collection was open to bias despite the inclusion of all interventions (accepted and rejected). Close agreement between physician and pharmacist assessment of 25 interventions lends credibility to the data and strengthens the assertion that pharmacists contribute to patient care. The results are not generalisable.

156. Hall AD and Jackson M. Clinical pharmacy - can it be quantified. *Proceedings of the Guild* 1983;16:50-6.

Descriptive study:

The authors described the results of a pilot study carried out at a single hospital. The study compared the activities of a staff pharmacist providing a purely ward pharmacy service to three wards over 7 months with those of a similarly-experienced pharmacist providing a fuller service (clinical pharmacy) to six wards over the subsequent 4 months. The wards served were different in each phase. All interventions made by these pharmacists and the result of the interventions were self-recorded. One hundred and twenty three problems were identified by the ward pharmacy service out of 5674 prescriptions viewed. The intervention rate varied for the three wards from 1.5 to 3.5% (average 2%). Over the 118 days of service provision in the initial 7 month period, 120 hours were spent on ward pharmacy. Thirty seven percent of interventions were classified by the pharmacist as having a cost benefit, 20% as having a clinical benefit and 26% as having avoided an unnecessary hazard. Three hundred and fifteen problems were identified from 3136 prescriptions by the clinical pharmacy service. The intervention rate varied from 6.3 to 14.3% (average 10%) depending on the ward. Over the 64 days of service provision in the subsequent 4 month period, 300 hours were spent on clinical pharmacy. A similar proportion of interventions were classified by the pharmacist as having had a cost benefit (23-39% depending on the ward) in this phase but a higher proportion had a clinical benefit (42-56% depending on the ward) and avoided an unnecessary hazard (23-38% depending on the ward). Three quarters of interventions made during provision of clinical pharmacy services were acknowledged by medical staff and in 58% of cases it led to a change in prescription. The number of interventions per hour was similar for ward and clinical services and the authors claimed that the services were equally efficient.

157. Leach RH and Leach SJ. Drug and therapeutics committees in the United Kingdom in 1992. *Pharm J* 1994;253:61-3.

Descriptive study:

Senior pharmacy managers in the United Kingdom (District Pharmaceutical Officers or Chief Administrative Pharmaceutical Officers) were surveyed by mail questionnaire to elicit information on drug and therapeutic committee (DTC) activities, to establish benchmarks for effectiveness and to evaluate changes induced by the National Health Service reforms. Replies were received from 162 sites (which was thought to represent 81% of the estimated 200 DTCs in operation). The average DTC was multidisciplinary and had 12 members (range 4-26). Most (83%) DTCs had a GP representative and some had a Family Health Service Authority representative, usually a medical (34%) or pharmaceutical (28%) advisor. Respondents judged their DTC to be very effective or effective in 40% of cases. Most DTCs gave preference to hospital needs (63%) rather than to those of primary care (38%). The DTC produced a formulary in 156 cases. Many DTCs took an active role in formulary management by investigating the extent of compliance with the formulary and applying peer pressure where appropriate (n=83). In addition, those requesting the inclusion of drugs in the formulary were asked to submit a written application for new additions (n=80), attend DTC meetings to present their case for new additions (n=2), or both (n=12). Pharmacy sometimes (25 cases) helped inform the process of monitoring compliance by feeding back prescribing details to the prescribers. Although many (59%) thought that the DTC would have a role lasting for the next 10 years, some thought that several issues were now more appropriately addressed at the

director level. It was also thought that whilst hospital budgets remained cash-limited there would be few changes in the operation of DTCs to increase their involvement in primary care issues.

158. Joshi MP, Williams A and Petrie JC. Hospital formularies in 1993; Where, why and how? *Pharm J* 1994;253:63-6.

Descriptive study:

This study provided an overall perspective on the management of hospital formularies in the United Kingdom. Questionnaires were sent to all hospitals containing in excess of 500 beds. A response rate of 89% (66/74) was obtained. Sixty hospitals had a formulary and 57 implemented it. Only two were joint hospital-general practice formularies. Formulary content varied; 17 contained costs and 40 contained prescribing information. The formulary was overseen by a drug and therapeutics committee in most cases (42). At 33 hospitals, compliance was compulsory for junior doctors. At 26 compliance was compulsory, and at 17 voluntary, for junior and senior doctors. Fifty two hospitals allowed generic substitution and 15 allowed therapeutic substitution of drugs. In 32 cases, the formulary was revised yearly. Thirty one respondents indicated that prescribers' attitudes to the formulary were supportive and a further 24 said that prescribers were mildly supportive. Thirty two said that compliance was very good or excellent.

159. Turner P. Local formularies and good patient care (editorial). *Br Med J* 1984;288:348.

Editorial:

The author claimed, based on opinion and crude costings, that formularies contributed to economic and improved use of drugs and improved patient care.

160. Merton & Sutton Health Authority/CASPE Research. The effect on drug prescribing of introducing a formulary and information service to clinicians. *St Helier Hospital* 1980-3. London: CASPE research, King Edward's Hospital Fund, 1984.

Objectives:

To assess the effect of the introduction of a formulary on drug expenditure in a district (one hospital).

Method:

Stockholding, drug expenditure and compliance with the formulary were measured prospectively over three years. Pharmacists examined the effects of the formulary on 10% samples of prescriptions.

Results:

The number of items stocked fell by 23% and the value of stocks held fell by £24,864 (1984 prices). Formulary compliance was 96%. The formulary did not, however, decrease overall drug expenditure. In these calculations the authors had taken patient throughput, drug volume and price changes into account. The reasons given for the lack of discernable effect were the lack of implementation of, and pharmacy control over, the formulary. The formulary was simply a list of the drugs used in the hospital and it had been created by the doctors.

Assessment (size of effect, design, generalisability):

The size of the effect was small but this may be due to poor implementation and lack of pharmacy involvement. No data on case mix were provided hence there was potential for confounding. The results are not generalisable.

161. Crooks J. Drug epidemiology and clinical pharmacology: their contribution to patient care. *Br J Clin Pharmacol* 1983;16:351-7.
Descriptive study:
This paper described the experience of introducing a formulary in one hospital in Aberdeen. Drug expenditure fell by 15% on medical wards in the first year. The author suggested that the drug information service that supported the formulary would contribute to the continuing education of prescribers.
162. Collier J and Foster J. Management of a restricted drugs policy in hospital: The first five years' experience. *Lancet* 1985;i:331-3.
Descriptive study:
This paper described the activities of the Drug and Therapeutics Committee whilst introducing a formulary. The authors showed that, whilst national drug expenditure in UK hospitals increased by 12% per annum in 1982-4, it increased by 9, 4 and 0% in a health district with a prescribing list. These data did not account for changes in case mix but, because activity remained similar in the hospital, they suggested a positive effect on the control of expenditure.
163. Baker JA, Lant AF and Sutters CA. Seventeen years experience of a voluntarily based drug rationalisation program in hospital. *Br Med J* 1988;297:456-9.
Descriptive study:
This paper described the methods used in one English District, since 1970, to control rising expenditure on medicines. Their most successful system was a formulary with an educational component supported by educational bulletins plus facilitative consultation with prescribers. The facilitative consultations occurred on a one-to-one level for individual prescriptions and at a more formal level using a formulary group acting in collaboration with the Drug & Therapeutics Committee and a drugs committee. Compliance with the 700 item formulary, as assessed by audit, was in excess of 99% and drug expenditure fell by £0.8-1.0 million per annum following its introduction despite the number of prescribers and patients being treated remaining virtually static. In practice, this meant that expenditure had stabilised compared with rises of 10-15% per annum previous to that and an average yearly increase of 3% in other hospitals. This study suggested that drug expenditure in a group of hospitals was successfully controlled or decreased (after adjustment for inflation) as a result of implementation of this system. It failed, however, to provide information on possible confounders (such as changes in case mix).
164. Hampson J, Orme M, Bartzokas CA, Grimmer SFM and Smith J. Doctors, drugs and the DHSS (letter) *Br Med J* 1984;289:1692.
Descriptive study:
Use of an antibiotic and general prescribing policy at a single general hospital in Liverpool reduced expenditure by 2.6% in one year in contrast to normal increases of 10-15%. Subjectively, there had been no reduction in quality of care. Savings of £9,600 on metronidazole had financed the salary costs of a pharmacist to promote the formulary. Compliance, as assessed by a survey of prescriptions, was 78% in the first year rising to 80% in the next year. The policy-makers deliberately avoided choosing cheap drugs and applying the policy in a heavy-handed way.

165. Lewis AM and Rushworth P. The development of a drug formulary system in a non-teaching district linked with computerised drug use reporting. *Pharm J* 1989;243:HS32-4.
Descriptive study:
This paper described the development of a formulary and its effectiveness in reducing the cost per case of drugs in a district general hospital between the years 1983/4 and 1987/8. The formulary was revised extensively in 1987, made more user friendly and enforced more thoroughly by pharmacy staff. Compared with 1983/4, compliance increased from 64 to 83% and drug expenditure per case (adjusted for inflation) decreased from £37.75 to £35.44. No information was provided on case mix hence confounding remained an issue. The results, however, suggested that the formulary had exerted a positive effect on expenditure.
166. Kopelman PG, Wiggins HK and Littlejohns DW. Practical benefits achieved by a district diabetic prescribing policy. *J Royal Coll Physicians* 1989;23:248-50.
Descriptive study:
This paper described the institution of a district-wide prescribing policy for diabetics. It was created in co-operation with general practitioners and staff at two hospitals. The authors claimed that the policy was well-accepted. They claimed also that the care of diabetics was not compromised as evidenced by no admissions due to the loss of diabetic control caused by changes in therapy. No data were presented to support this statement, however. There was a reduction in expenditure on diabetic drugs. The number of bottles of insulin purchased fell from about 60,000 to 20,000 in each hospital and a change to a single brand reduced the price per bottle by 25%. Savings were also made on oral hypoglycaemics (about £3,500 per annum). The type of diagnostic reagent strips purchased changed to an increased use of blood test strips and there was a perception, amongst diabetic nurses, that patient education had improved.
167. Sutters CA. The management of a hospital formulary. *J Clin Pharm Ther* 1990;15:59-76.
Descriptive study:
This study described the key features of the successful management of hospital formularies. These included a strong, medically-led drug and therapeutics committee (DTC) with enough resources to operate interdisciplinary policies satisfactory. This DTC should have a good working relationship with the ethics committee and maintain an awareness of current trials. The paper also discussed the mode of operation of DTCs, the preparation, implementation and updating of a formulary, and its integration into pharmacy management systems. It provided data on compliance with the Riverside East formulary. The drug savings were similar to those presented by Baker et al (1988) for the same hospital.
168. Garvey G, Jappy B, Stewart D, Williams A, Duffus PRS, Maitland JM, Valentine MJ, Wedderburn S, Webster J and Petrie JC. Grampian Health Board's joint drug formulary. *Br Med J* 1990;301:851-2.
Descriptive study:
This paper reported on the feasibility of creating a joint hospital-general practice formulary for ulcer healing drugs in a Scottish health board. The opinions of general practitioners and hospital doctors on the drug that should be selected from a choice of 11 drugs coincided very well. Although the drugs selected varied widely in price between hospital and primary care, the authors believed that agreement on prescribing will improve care and facilitate the provision of seamless care.

169. Wolfson DJ. The contribution which can be made by a pharmacist in the formulation, acceptance, monitoring and success of an area-wide antibiotics policy. *Proceedings of the Guild* 1982;12:3-10.
- Descriptive study:**
This study described a reduction in expenditure on antibiotics, as a proportion of total drug expenditure, from 21.6% to 16.1% as a result of the introduction of an area-wide antibiotic policy. A survey of local doctors (44% response rate) showed that few referred to the policy daily (2.3%) or weekly (9.1%); many felt it was some (27.3%) or a significant (11.4%) infringement on their prescribing freedom. Only 25% felt it was helpful but 36.4% found it no hinderance (This study is also described in Wolfson DJ and Williamson PM, 1981).
170. Petrie JC and Scott AK. Drug formularies in hospitals (editorial). *Br Med J* 1987;294:919-20.
- Editorial:**
The authors described the usefulness of formularies in helping control drug expenditure, educating prescribers and improving the prescribing process. It referred to a survey carried out by another investigator (Ridley H, 1986).
171. Hey R, Wareham J and Goldberg LA. An investigation into the use of the local formulary in Stockport AHA. *Br J Pharmaceutical Practice* 1982;4(7):7-10.
- Descriptive study:**
The authors described the setting up and activities of a multidisciplinary drug and therapeutics committee, including the creation of a formulary. A review of prescribing 6 months after the formulary was introduced showed that over a three month period there were 256 instances of non-formulary prescribing for in-patients. In 56 instances formulary alternatives were used but for 203 a non-formulary drug was used, mainly because patients had been admitted on the drug (112, 55%) or a consultant authorised its use (49, 24%). A study of out-patient prescribing over a one week period showed that 23 (4.4%) of the 510 items that were prescribed were non-formulary. Only one item was altered to a formulary alternative. In 17.3% of instances there was no alternative in the formulary.
172. Hampson JP, Corkill JE, Murray A, Griffiths LR, Smith JC and Bartzokas CA. Potential financial benefits of a local antibiotics policy. *Pharm J* 1988;241:660-2.
- Descriptive study:**
This survey calculated, retrospectively, that the potential savings in a single hospital would have been £106,000 per annum if prescribers had adhered to the antibiotic policy. Five months data were used to calculate this figure. The actual savings that were made were lower.
173. Lacey RW. Hospital antibiotics policy in a health district. *Br Med J* 1979;1:1389.
- Descriptive study:**
The authors claimed that the use of an antibiotic prescribing policy reduced expenditure on antibiotics from £16,431 in 1974/5 to £10,448 (adjusted for inflation) in 1977/8. Spending on other drugs increased from £74,331 in 1974/5 to £84,926 (adjusted for inflation) in 1977/8. Antibiotic resistance patterns, examined in the second year, showed no problems.

174. Cooke J, Calvert RT and Lacey RW. Antibiotic prescribing (letter). *Pharm J* 1984;233:707-8.
Descriptive study:
The letter referred to an abstract published in the same journal volume (page 423) that described the development of an antibiotic prescribing policy in a single general hospital. Its purpose was to improve the cost-effective use of antimicrobials and to reduce the incidence of resistance. The policy was created in consultation with the drug and appliances committee, consultants and the microbiology department. In the letter, the authors claimed that the policy reduced expenditure on antibiotics by 15% over one year (£30,000).
175. Cooke J. Antibiotic policies. *Proceedings of the Guild* 1990;28:17-27.
Descriptive study:
This paper described a strategic approach to the use of antimicrobial in a single general hospital. Pharmacists consulted with prescribers to create a booklet with a list of preferred antimicrobial and information on their selection and use. Pharmacists also advised on the use of antimicrobials and encouraged selective reporting of sensitivities. Pharmacists educated those involved with antimicrobial use through workshops, seminars and updating sessions, and liaised with the purchasing pharmacist regarding actual usage of these agents. A retrospective audit revealed that the incidence of wound infections after gastro-biliary surgery decreased from 8.9 to 8.7% following the introduction of the formulary. The proportion of the drug budget spent on antimicrobial also fell from 19.8 to 13.3% with annual savings of around £120,000. Although the results suggested an effect, the quasi experimental nature of audit and the lack of information on possible confounders hampered the acquisition of proof of an effect.
176. Scholfield JK, Oberoi DK and Savage A. The development of a dermatology pharmacy counselling service and prescribing list. *Pharm J* 1990;245:364-6.
Descriptive study:
This study described how the pharmacy and dermatology departments aimed to improve patient compliance by developing a pharmacy counselling service. An list of dermatological products was created also to rationalise stocks and reduce costs. The list became part of the district formulary. There was a reduction in total drug expenditure on dermatological products for out-patients from £8250 to £5400 for the same three months period in consecutive years before and after the adoption of the list. This occurred despite an increase in the numbers of patients that were seen in the same time period from 1720 to 2057. Patient type remained largely comparable. Patients' satisfaction with the counselling was not assessed (Personal communication, Scholfield 1993) and the lack of data on patient and prescribing factors leaves the result open to potential confounding.
177. Riley MR and Cooke J. The planning, implementation and outcome of a change in intravenous nitrate prescribing strategy. *Int J Pharm Pract* 1991;1:30-3.
Objective:
To describe the methods used to effect a change in intravenous nitrate prescribing at a large general hospital.
Methods:
The costs of drugs and administration devices was measured before and after a change in nitrate prescribing policy. The study compared actual spending with projected figures had the policy not been implemented.

Results:

Compared with the expected spending on nitrates (isosorbide dinitrate), a change to glyceryl trinitrate (GTN) reduced expenditure by £24,000 in 1988/9 and £21,000 in 1989/90.

Assessment of study: (strength, size of effect, generalisability)

The projections were based on the use of drugs in previous years. The size of the effect was large. The authors assumed that prescribing would have remained unchanged without the policy and failed to measure accurately all the costs and consequences of the change in policy. No data were presented on issues that may have affected prescribing such as patient, physician or other factors. No sensitivity analyses were performed. As a cost minimisation type analysis, it was incomplete and the results are open to confounding. The results are not generalisable.

178. Goodyer LI, Fahey M and Tristram J. Audit of a laxative policy for elderly patients. *Int J Pharm Pract* 1992;1:238-9.

Objective:

The authors described the creation and subsequent audit of a laxative policy for elderly care patients at a single general hospital.

Methods:

This was a prospective audit of all prescription charts on care of the elderly wards was carried out on a single day two weeks before and 2,4 and 8 weeks after the introduction of a laxative prescribing policy. Differences in prescribing patterns were assessed.

Results:

Sixty four charts were reviewed in the before phase, 57 at 2 weeks, 59 at 4 weeks and 46 at eight weeks. There was a trend, over time, towards conformity with the prescribing policy; for some drugs this was statistically significant (lactulose, senna and co-danthrusate). Patients were broadly comparable and the change in prescribing persisted for up to one year (Personal communication: L Goodyer, 1993).

Assessment of study: (strength, size of effect, generalisability)

The size of the effect was large but the results are not generalisable. In addition, the lack of data on patient comparability leaves the results open to confounding. The lack of outcome data (financial or patient care) makes the study purely process orientated.

179. Patel K. A policy for rationalising laxative use and expenditure. *Pharm J* 1993;250:185-6.

Objective:

To report on the development of a policy to promote safe and effective prescribing of laxatives.

Methods:

This was a prospective, before after, survey that assessed the effects of a laxative policy, drawn up in consultation with doctors and nurses, on spending on laxatives in a single hospital.

Results:

Implementation of the laxatives policy produced savings of £11,000 in the first year. This reduced expenditure was maintained in the second year. No adverse effects were noted.

Assessment of study: (strength, size of effect, generalisability)

A large (50% reduction) effect was seen but lack of data on patient comparability and throughput, and contamination of the results (policy introduced in some wards in the before period), make it difficult to estimate the true effect. The results are not generalisable.

180. Morgan DJR, Sutters CA and Pugh S. Medical audit and formulary management; a policy for rational use for thrombolytic drugs. *Postgrad Med J* 1991;67:165-9.

Descriptive study:

This paper reported on the development, introduction and maintenance of a policy to promote the rational use of thrombolytic by doctors in two hospitals in a London district. A multidisciplinary task force suggested and implemented guidelines for the use of thrombolytics taking current practice, and the results of a literature and drug use review, into account. Implementation involved education of doctors and other staff via meetings and bulletins. A retrospective audit of drug use suggested that this method ensured 100% adherence with the policy. This 14 month study was not designed to be an evaluation but the data presented showed that the use of streptokinase more or less mirrored the number of patients with acute myocardial infarction and the amount of rt-PA used remained low during the study. The authors estimated that the policy resulted in £27,000 in drug expenditure that was avoided (if actual expenditure was compared to the use of the most expensive agent for all patients).

181. Upton DR, Taylor JK, Holmes GKT and Poston JW. Effects of withdrawal of co-danthromer on use of laxatives in a district general hospital. *Br Med J* 1988;297:1446-7.

Objective:

To assess the changes in the use of laxatives following the withdrawal of co-danthromer in 1987 and the issuing of recommendations, by the drug and therapeutics committee, for alternatives laxatives that should be used.

Methods:

This was a prospective before/after study of the amount of laxatives used in a district general hospital. Computer issues indicated the quantity of laxatives that were used. These were converted to defined daily doses (DDD) following consultation with colleagues. These DDDs were related to bed occupancy using the number of occupied bed days. Use of laxatives, expressed as the number of DDDs/100 bed days was compared for the same six months before and after the policy change.

Results:

A 7% increase in laxative use, from 29.3 to 31.3 DDD/100 bed days, was accompanied by a 65% increase in expenditure on laxatives, from £1986 to £3274, over the 6 months.

Recommendations on prescribing were not followed. The results suggested that formulary changes could actually increase expenditure (on laxatives) if reinforcing tactics were not used in addition to the provision of recommendations.

Assessment of study: (strength, size of effect, generalisability)

The study was conducted at a single site so the results are not generalisable. In addition, it suffers from potential confounding due to absence of data on case mix. Nevertheless, it is unlikely that changes in patient case mix would have accounted for all the changes in expenditure given that the DDDs/100 occupied beds was the measure of drug use that was employed. It is more likely that the cause was the use of some expensive liquid preparations in place of tablets or dietary fibre products.

182. Lewis C. Laxative prescribing before and after the implementation of treatment guidelines. *Hospital Pharmacy Practice* 1991;1:341-4.

Objective:

To assess the effects of a laxative policy created jointly with doctors and nurses on laxative

prescribing.

Methods:

A prospective before/after study of expenditure on, and prescribing of, laxatives in two hospitals in a single district health authority. Prescribing was measured for one month before and after implementation of the policy. Comparability and numbers of patients treated were assessed.

Results:

Thirty seven percent of patients were prescribed laxatives before and 35% after the introduction of the policy (65% and 58%, respectively, for geriatric patients) but the average number of laxatives per patient decreased from 1.41 to 1.25 (1.59 to 1.38, respectively, for geriatric patients). Prescribing practices changed in line with the policy recommendations and expenditure was reduced from £1300 to £200 per month. Comparable numbers and types of patients were treated before and after the study. Expenditure was decreasing before the guidelines were implemented possibly because those involved in the creation of the guidelines were aware of their content and altered their usage patterns as a result.

Assessment of study: (strength, size of effect, generalisability)

The effect was large but it is not known if it was sustained. Contamination was a problem as was potential bias. The absence of data on patient outcome is a drawback. As a result, is only possible to claim that pharmacy-initiated policies can reduce expenditure on laxatives. The results are probably generalisable.

183. Wolfson DJ. Financial implications of a set of antibiotic policies. *Pharm J* 1980;224:706-7.

Descriptive study:

The article described the creation and implementation of an antibiotic prescribing policy. It was created by pharmacy, doctors and the microbiology department, in an area containing four hospitals. The number of antibiotics in the formulary fell by 44 on its introduction and there was a fall of 0.4% in antibiotic expenditure in the year of its introduction compared to a rise of 41.3% in expenditure on other drugs. They estimated that this policy saved £36092 per annum which corresponded to a 42% reduction in expenditure. This was an uncontrolled study that made a number of assumptions in the calculations of financial savings.

184. Dobrzanski S, Lawley DI, McDermott I, Selby M and Ausobysky JR. The impact of guidelines on peri-operative antibiotic administration. *J Clin Hosp Pharm* 1991;16:19-24.

Objectives:

To observe current surgical antibiotic prophylaxis, create a policy in this area and evaluate its effect on the rationality of prescribing and the drug costs.

Method:

The use of peri-operative antibiotics was assessed, using pre-determined appropriateness criteria, in a single general hospital on patients under the care of two consultants before and after the introduction of guidelines. Patient outcome and cost factors were measured where possible.

Results:

The indications for surgery in the 73 patients in the before phase and the 102 in the after phase were similar. Before the guidelines, 17% of patients received appropriate therapy. The main problem was failure to administer the drug. After the guidelines were implemented, appropriateness increased to 60%. Cost/patient decreased from £38.13 to £16.93 due mainly to

a reduction in the use of questionable therapy. Patient outcomes were not assessed for the entire study.

Assessment (size of effect, design, generalisability):

The size of the effect was large but there are doubts regarding the methods used in assessing the appropriateness of the costs. There was a risk of confounding and bias. The results are not generalisable.

185. Upton DR. Antibiotic use review programmes - The duration of antibiotic therapy in a district general hospital (conference presentation). Proceedings of the Guild 1989;26:84-7.

Objective:

To investigate the duration of antibiotic therapy in a large general hospital and to assess the effectiveness of corrective measures.

Methods:

This was a prospective before/after study of antibiotic prescribing. The therapy of 200 consecutive patients (40 medical, 80 surgical and 80 orthopaedic) was examined in each phase. A drug utilisation review process was used to examine the records and institute the intervention to correct inappropriate prescribing. The intervention included a requirement for the prescriber to specify a stop date, usually 5 days from the day of prescribing. Longer periods of therapy could be specified. Where no date was specified, a pharmacist inserted a five day stop date but therapy was monitored and the prescriber contacted to remind them of the stop date at least 24 hours before it became effective.

Results:

Patients in both phases were similar in terms of duration of admission (means were 15.8 days in the before phase and 16.6 days in the after phase), number of antibiotic courses prescribed and the number of episodes of infection or prophylaxis (244 before and 230 after). The intervention increased the proportion of therapeutic courses that lasted for under 6 days from 31.7% to 53.8%; for prophylactic courses, the change was from 84.3% to 92.8%. A greater effect was noted on wards where therapy had been less well-defined.

Assessment of study: (strength, size of effect, generalisability)

Insufficient data were provided on case mix, timing of the study and other potential confounders. In addition, this study was open to bias due to pharmacists collecting the data. The effect was moderate but is not generalisable.

186. Hughes J and Daly M. Guidelines for antibiotic prophylaxis prior to elective surgery. A preliminary assessment. Hospital Pharmacy Practice 1991;1:41-4.

Objective:

To study the potential effectiveness of a guide to the use of prophylactic antibiotics drawn up by clinicians and drug information pharmacists and to assess the potential savings that could accrue from strict adherence to the guidelines prior to their formal introduction.

Methods:

The medical records of all patients admitted to three surgical wards in one hospital were examined over a four week period. Details were obtained on the patient, their antibiotics regimen, type of operation, stay and antibiotics given on discharge. The antibiotic courses were determined to be either prophylactic or treatment by reference to the notes. All therapy was costed and comparisons were made between the actual cost and the potential costs if the antibiotic prescribing guidelines had been followed.

Results:

Records of 261 patients were examined. Ninety two patients were monitored for their entire stay. One hundred and sixty nine patients were lost to follow-up for the following reasons; no antibiotic prescribed, patient transferred to another ward or antibiotics commenced before the start of the study or completed after the end of the study. Forty seven patients received prophylactic antibiotics; 35 went on to receive post-operative antibiotics. Forty five patients received no prophylaxis; 42 of these received post-operative courses (gynaecological, orthopaedic and urological surgery). There was a theoretical saving of 60% on the insertion of prosthesis, 39% on hysterectomies and 89% or 99% for trans-urethral resection of the prostate (depending on patient's tolerance of the drugs). The authors admitted, based on the requirements for post-operative antibiotics that they found in their study, that the theoretical savings that could be achieved were probably in excess of the realistic savings.

Assessment of study: (strength, size of effect, generalisability)

This was not an evaluation.

187. Smith JM. New drug evaluation. *Pharm J* 1985;235:369-72.

Opinion paper:

The author suggested that new drugs require evaluation before they are brought into general use and that pharmacists can facilitate this process by evaluating the literature critically.

188. Bateman DN and Smith JM. A policy for laxatives (editorial). *Br Med J* 1988;297:1420-1.

Editorial:

The authors suggested that formularies and prescribing policies are useful but cannot be implemented effectively without the support of consultants and ward or clinical pharmacists.

189. Wolfson DJ and Williamson PM. Prescribing restrictions: implications and reactions. *DICP* 1981;15:594-7.

Descriptive study:

This paper described a prescribing policy, drawn up by a multidisciplinary committee, that restricted doctor's freedom to prescribe antibiotics. A survey was carried out 21 months later to ascertain opinions on the policy. A questionnaire was mailed to 104 hospital doctors. Forty four usable responses were received, 37% were from surgeons and 57% were from physicians. Fifty eight percent of the respondents were senior doctors and 36% were junior doctors. Only 2.3% used the policy daily, 6.8% once a week, 15.9% once a month and 47.7% less frequently than that; 27.3% never used it. The policy was thought to be of most value to junior doctors and general practitioners. It was felt to be a substantial infringement on the doctor's by 11.4% but no problem usually or at all by most of the rest; 25% saw it a positive contribution to prescribing. Only 36.4% were in favour of extending the policy.

190. A report of the working party on the addition of drugs to intravenous fluids (Chair, A Breckenridge). Department of Health and Social Security, HC(76)9. London, HMSO, 1976.

Government Report:

The working party addressed issues concerning the safe preparation of intravenous infusions. They highlighted the problems of microbial contamination and incompatibilities of the constituents of intravenous infusions. They stated that those currently involved in intravenous additions were untrained for the task. In addition, intravenous additions were carried out

usually in an unsuitable area. They suggested that additions to intravenous fluids were aseptic procedures that should take place under the supervision of a pharmacist in an appropriately controlled area.

191. Daly M. Assessment of trainee nurses' perceptions of an intravenous drug administration policy. *Pharm J* 1992;248:HS11-14.
Descriptive study:
This was a questionnaire survey, with 18 descriptive scenarios of situations where an intravenous drug was to be administered. It was used to determine the extent to which nurses found the intravenous drug policy at a single hospital met their needs. One hundred and sixty seven trainees completed the questionnaires anonymously. Nurses were unsure often of when they should refer to the policy document. The percentage of correct answers varied from 8 to 99% The results were used to create a more appropriate policy.
192. Goldberg LA. Drug use review. *Br J Pharmaceutical Practice* 1988;10:129
Opinion paper:
This paper described the process of drug use review. It provided opinions on the applicability and usefulness of drug use review in informing drug policy in individual hospitals.
193. Griffiths J. Deciding priorities for drug usage review. *Pharm J* 1989;242:HS38-40.
Opinion paper:
This paper described in detail how drug use review can be applied to the rationalisation of drug policy for the benefit of patients and institutions.
194. Kaye D. An investigation of the cost of drugs used on individual patients on an acute care of the elderly ward. *Hospital Pharmacy Practice* 1991;1:281-5.
Descriptive study:
This paper described a costing system that takes individual patients' drug use and length of stay into consideration. Used with re-admissions data, the authors expected that the system could help target drug policy-making efforts, taking the quality of prescribing into account when creating such policies.
195. Farrar K. Clinical directorates - How are they developing. *Pharm J* 1993;250:HS40-41.
Opinion paper:
This paper described the development of clinical directorates and the nature of pharmacy services provided to them. It indicated that pharmacists can more easily contribute to patient care and the cost-effective use of medicines via the directorate structure.
196. O'Hare, JDG. The development and function of pharmaceutical services in psychiatric hospital practice. PhD thesis. Belfast: Queen's University, Belfast 1989.
Descriptive study:
The thesis described the development of pharmaceutical services in a large psychiatric hospital. Reasons were given for the latency in the development of services to psychiatric hospitals and comparisons were drawn between psychiatric pharmaceutical services in the United States and Canada and the services in the United Kingdom. The thesis described the initiatives that were taken to improve pharmaceutical services to the mentally ill at one hospital. The impact of the

measures that were taken by the pharmaceutical staff to alter the prescribing of solid dose potassium and iron preparations and the provision of a dedicated drug information service were described. To alter prescribing habits, a list of recommended alternatives was created and pharmacists reinforced the guidelines by consulting with prescribers who ignored them. Over 9 years, a sustained large reduction in the use of the older preparations was seen and a rise in the use of the recommended products. When the clinical pharmacy service was withdrawn in 1987, adherence to the policy declined. Although there was a saving of 45% in expenditure on iron therapy, the recommended potassium supplements were more expensive than the older ones. The author concluded that it was difficult to assess the cost-effectiveness of the service. He also ignored the cost of pharmacists' time in providing the service. Any changes in the numbers and types of patients over time were not measured nor were other potential confounders. An assessment of the queries that were directed at the drug information department of the hospital revealed that most came from doctors (46/90) or nurses (39/90). The effect of the provision of information actively by pharmacy staff was assessed when certain vitamin preparations were "blacklisted". The provision of prescribing information resulted in almost complete compliance with the recommended alternative resulting in a saving of £2960 over the first year. Once again, this ignored potential confounders and the costs of providing the information. Research undertaken into infection control had suggested a role for the pharmacist in the psychiatric hospital. The development of a monitoring role for the pharmacist and a novel system for maintaining therapeutic profiles were described. The therapeutic profiles were compiled on paper first and then transferred to a spreadsheet since their maintenance was time-consuming. Profiles were used to help monitor therapy, to help to adjust stock levels to lower, more appropriate levels, and for teaching and audit purposes. A section of the thesis considered research into the formulation and administration of alternative therapy for psychiatric patients. Other areas that were covered included managerial issues, an investigation into possible reasons for non-compliance (such as patients' inability to use child-resistant closures), and a brief account of an unsuccessful attempt to develop a pharmacokinetic service for phenytoin and digoxin. The thesis also considered the impact on therapeutic practice of changes in pharmacy staff levels.

197. Upton DR, Holmes GKT, Fox PD, Cullen AMS and Poston JW. The long-term value of the selected list as a method of controlling drug costs in a District General Hospital. *Health Trends* 1989;21:26-9.

Objective:

To determine the long term effects of the selected list on drug costs for affected drug classes in a general hospital.

Methods:

Computerised drug use data were employed to measure the use of drugs in three periods of six month each. These periods were the same six months of the year, before, after and one year after the limited list was introduced. Costs were adjusted for inflation and for variations in patient bed days.

Results:

Statistically significant reductions were observed in expenditure on several groups of drugs namely, anxiolytics, hypnotics and sedatives, antacids, expectorants and mucolytic but not on vitamins, laxatives, analgesics, and nasal preparations.

Assessment of study: (strength, size of effect, generalisability)

The effect was fairly large but the results are not generalisable. In addition, there was no information on variations in case mix over the time periods.

198. McCabe JC, Henry DA and Lawson DH. Drug information centres: a new role for pharmacists? *Scot Med J* 1977;22:147-50.
Descriptive study:
This paper described the setting up and the facilities of the drug information services in Glasgow. It also gave details on the workload in the first year. Over 85% of queries came from hospital staff, mainly from pharmacists and doctors. Most questions concerned adverse effects (21%), drug indications (20%) and availability (18%). The time taken to reply to queries was less than an hour usually (65%). The centre also provided other services such as a regular newsletter to update pharmacists on new drugs and other topics of interest.
199. McNulty H. Hospital pharmacy information centres and their role as suppliers of information. *Postgrad Med J* 1977;53:556-8.
Descriptive study:
This paper described the development of drug information centres in the United States (USA) and the United Kingdom (UK). It provided a summary of the services that were then currently available in the National Health Service and their use. The service existed to inform prescribing and to support the ward pharmacy service. The information service was especially necessary given the rapid expansion in the numbers, and increasing complexity, of medicines available. At the time, there were special information posts at regional level in 11 English regions, 3 in Scotland and one each in Wales and Northern Ireland. The Regional Drug Information Pharmacists' Group was established in 1975 to co-ordinate the services nationally, especially the abstracting and specialised information services, and to develop a national network and code of practice.
200. Rogers ML and Barrett CW. The drug information centre at the London Hospital. *Pharm J* 1972;209:37-9.
Descriptive study:
This paper described the planning, equipment and mode of operation of a drug information centre at a large general hospital. The centre served to keep pharmacists abreast of current developments, to answer questions from non-pharmacy health workers, to support the ward pharmacy service and to compile selected information for distribution to health care professionals.
201. Savage I. The information dispensers. *Pharm J* 1991;247:HS17-19.
Descriptive study:
This paper described the work of various drug information pharmacists and centres.
202. Maguire ME and D'Arcy PF. Drug information services in four capital cities in the United Kingdom. A tale of four cities - London (North East Thames), Cardiff, Belfast and Edinburgh. *J Clin Hosp Pharm* 1988;13:207-12.
Descriptive report:
This paper described the results of a survey of four drug information centres. Their facilities included access to several journals and computer databases. Their staff included up to 5

pharmacists, pre-registration students (2 centres), PhD students (one centre) and clerical officers. The total cost of centres varied from £35,700 to £67,350 per annum. The dissemination of information was wide. Published bulletins were distributed to several health professionals. The centres handled between 1325 (Edinburgh) and 3491 (Cardiff) queries each in 1985 at a cost per inquiry that varied from £5.36 (London) to £10.80 (Edinburgh). Most queries were from pharmacists, followed by doctors and nurses.

203. Rodgers ML. Evaluation of some aspects of a drug information service. *J Clin Hosp Pharm* 1978;3:189-202.

Descriptive study:

This paper described the North East Thames regional drug information service at the London Hospital. The author compared and contrasted various models for the provision of drug information within the region - a single centre, distributed services or a main centre with a sub-centre network. The last model seemed appropriate but it was decided to measure activity at the main centre and a sub-centre to inform the debate. A questionnaire was used to gather information on queries received by the centres. In the study period, June 1975 to May 1976, during which the main centre had 1.9 whole time equivalent (WTE) pharmacists and 0.8 WTE students on average and the sub-centre had a pharmacist for 25 hours a week, the main centre received 1611 queries and the sub-centre 519. In each case about 2/3 came from the base hospital. A selection of 1456 main centre queries and all sub-centre queries were included in the analysis. Results were provided on the nature of the queries, the time to answer them, the proportion that were urgent, the daily distribution of queries, the source of queries and the time by which answers were required. There were some differences between centres in these factors. About half of all queries need immediate answers but they took longer to answer at the sub-centre, probably due to part-time staff cover at the sub-centre. The main centre had a low level of utilisation; a server would only be working on a query for only 40% of their time on average. The comparable time for the sub-centre would be 15%. The author argued for centralisation of the service on economic, but not on customer, grounds. He concluded by recommending that centres should be staffed full-time. From the efficiency viewpoint, formal services were thought to be best centralised but local representation was considered to be important for optimal usage in the area served. The local representatives should have some organisational link to the central service to allow filtering and referral of queries.

204. Maguire ME, D'Arcy PF and Smith AMJ. A decade of drug information experience in Northern Ireland. *J Clin Hosp Pharm* 1985;10:297-302.

Descriptive report:

This paper described a drug information service provided at the Royal Victoria Hospital, Belfast. It received 9,615 queries in the years 1975-84 inclusive, mostly from pharmacists (46%), doctors (34%) and nurses (12%). The topics of the questions were mainly adverse drug reactions (10%), availability or supply (18%), pharmaceutical issues (19%) or administration or dosage (15%). The centre also produced bulletins. The authors described the likely future of the centre as a source of support for clinical pharmacy and drug and therapeutic committees. It was proposed that it would function within a collaborative relationship with the poisons information centre.

205. Brandon M. A study of the inquiry workload in a regional drug information centre. *J Clin Hosp Pharm* 1984;9:127-31.
- Descriptive study:**
The author described a workload study carried out over 4 weeks (20 work days) at East Anglia Drug Information Centre (DIC). Pharmacists recorded their activities for 30 minute periods. During the study, 82 queries were received of which 45 (55%) were urgent. One hundred and three queries were answered. On average, queries took 1.14 hours to answer. For urgent ones this was 0.93 hours and for non-urgent queries it was 1.51 hours. Using 6 months of data, 554 queries had been received of which 358 (65%) were classed as urgent.
206. O'Hare JDG, McKee HA and D'Arcy PF. Analysis of drug information queries received by the pharmacy in a long-stay psychiatric hospital. *J Clin Hosp Pharm* 1984;9:139-42.
- Descriptive study:**
The article described the nature, source and number of queries received at one hospital. Over 10 weeks 90 queries were received. Thirty were on psychiatric drugs and the remainder on general medical issues. Forty six queries were received from doctors and 38 from nurses. Most were on drug use (39) or on therapy or therapeutics (28).
207. Morrow NC, D'Arcy PF and Pielou LW. Drug information inquiries - Who asks what and where are the answers. *J Clin Hosp Pharm* 1984;9:322-31.
- Descriptive study:**
A survey of the workload of a drug information service over 5 years was reported. The number of queries received varied from a low of 245 (1978) to a high of 357 (1980). On average 43.9% emanated from medical staff (29.8% from junior and 12.2% from senior hospital doctors and 1.9% from general practitioners), 30.6% from hospital pharmacists, 4% from community pharmacists and 16.3% from nurses. Most queries were on drug administration and dose (23.9%), choice and adverse reactions (14%), or pharmaceutical problems (14.6%). To answer 26% of queries a primary reference source was used. The average number of such sources used for these queries was 2.47. Six months of data were considered in detail. Forty five percent of queries requiring the use of a primary reference were from hospital doctors, 38% from pharmacists and 9% from nurses.
208. Adams PR. Evaluation of Welsh Drug Information Services. PhD Thesis. Cardiff: University of Wales College at Cardiff, 1992.
- Objectives:**
To investigate how the information supplied by the drug information service in Wales was used and the effect of information provision on patient outcome.
- Method:**
A prospective questionnaire survey of hospital and community doctors and pharmacists was carried out to ascertain their perceptions of the usefulness of replies received to drug information queries from one Regional and two District drug information centres (DICs) and the use to which they put this information. The replies were validated using medical notes. In addition, opinions were obtained from general practitioners (GPs) on their future drug information requirements.
- Results:**
Two hundred and sixty three hospital doctors and 191 hospital pharmacists were sent

questionnaires. The response rates were 89% and 97% respectively. There were few significant differences in the replies that were given to questions by respondents who would have received services from the two District and the Regional drug information centres (DICs). The standard of service in all three DICs was similar. Overall, for hospital-based respondents, the information provided by DICs was found to be useful by 94% of respondents. In 66% of cases, patients' therapy had changed as a result of the information received; usually a new therapy was commenced. Information was used also to confirm existing therapy was correct or to discontinue therapy, and for personal or peer education. Information in the medical notes of a sample (20% approximately) of patients validated the results of the questionnaires. The use of the information was mentioned directly in fewer than one fifth of medical notes but its use was implicit in more than four fifths of the notes. Overall, for community-based respondents, 68% of GPs and 37% of community pharmacists had used the information provided to influence patient care directly. Four hundred and twenty one GPs in two districts had been asked to provide opinions on the DIC services. Three quarters of them replied. Few GPs in one district (23%), and more in the other (53%), had used the DIC. Utilisation of the DIC occurred mainly as a result of the GPs' perceptions of the level of expertise of DIC pharmacy staff (83 in one district and 61% in the other) and personal unfamiliarity with the subject (54 in one district and 47% in the other). Those who never used DICs said that the main reasons were that they never had a need to (55 and 37%, respectively, in the districts) or that they were unaware of the existence of the DIC (19 and 39%, respectively, in the districts). Those that had used the DIC found its services appropriate. Respondents defined various drug information needs that they felt GPs had, such as the need for reviews of drug therapy for various diseases and for reviews of new drug products.

Assessment (size of effect, design, generalisability):

The study was fairly large but was not a full evaluation since no comparisons were made. There was an assumption that patients benefited if drug information was used although this was not validated. The results are probably generalisable.

209. Taggiasco N, Sarrut B and Doreau CG. European survey of drug information centres. *Ann Pharmacother* 1992;26:422-8.

Descriptive study:

This paper reported the results of a mail questionnaire of hospital drug information centres (DICs) in 32 European countries. Two thousand and twenty six respondents were contacted and 267 questionnaires were sent. One hundred and ten (40%) questionnaires were received of which 88 were analyzed. These replies included 47 from the UK. In general, DICs were located in health care structures and run by doctors or pharmacists. The services of the DIC were available usually to other health care professionals. Only the in the UK was a national organised network maintained. The report provided details of the staff, opening hours, resources and annual workload of the centres. Most employed specialist pharmacists and were open during normal working hours. DICs used a variety of books, journals and databases and most (72 centres) dealt with under 2000 queries per annum. DIC queries were often recorded. Dics also produced bulletins and other information or educational material. Twenty DICs implemented quality assurance programs. Of the 47 UK centres, only 2 were located in a university; the remainder were located in a hospital. UK DICs were staffed by pharmacists who specialised in drug information. Most DIC queries were received by telephone (in excess of 80%). About two fifths were received from pharmacists and the same proportion from

doctors.

210. Dhalla M. The National Poisons Unit. *Pharm J* 1991;247:HS22-3.
Descriptive study:
This paper described the work, staffing and facilities of the national poisons unit in New Cross Hospital, London and number of inquiries received there each year. This unit was established in 1963 following the publication of a report on the subject the previous year by the Department of Health. No pharmacists were employed there. Its workload has increased steadily and in 1990 the service had over 94,000 inquiries.
211. Herxheimer A. The drug information cascade. *Pharm J* 1993;250:412.
Opinion paper:
This paper provided opinions on the provision of information to prescribers, including that provided by the industry, by specialised centres that provide evaluated information on drugs, by drug information centres and by the creators of formularies. The author suggested that future information initiatives should be directed towards making good quality information more accessible and easier to use so prescribers, and ultimately the patient and the public, would benefit. He suggested a national agenda to achieve this aim.
212. Anderson DA and Glare JG. VADIS - a drug information resource. *Pharm J* 1991;247:HS13-16.
Descriptive study:
This paper described the view data drug information service, a computerised drug information service that complements the British National Formulary.
213. Proudlove CR, Smith JC and Breckenridge AM. Medical awareness and usage of a regional drug information service. *Pharm J* 1983;230:394-6.
Descriptive study:
The study reported the results of a postal questionnaire survey that elicited the opinions of 665 general practice (GP) and 566 hospital doctors on the Mersey drug information centre. Seventy percent of the GPs and 62% of the hospital doctors replied. Forty six percent of the GPs were aware of the service and 14% had contacted it for information. Forty five percent of hospital doctors were aware of the service and 27% had used it. Doctors in a hospital with a drug information centre were significantly more likely to be aware of its existence and to have used it ($p < 0.01$). Most (68.1%) of those in sites with a centre were aware of the centre (compared to 41.3% who were not in such a site); 51.1% of doctors in sites with a centre had used drug information services (compared to 23.8% who were not in such a site).
214. Morrow NC. Problem-orientated drug monographs developed for physicians in Northern Ireland. *Am J Hosp Pharm* 1986;43:360-7.
Descriptive report:
This paper described the production of monographs on several drugs by a drug information centre. The monographs were evaluated using a questionnaire survey of hospital and general practice doctors. Self-completed questionnaires were sent, with the monographs, to 122 hospital and 67 general practice doctors. Fifty six (45.9%) hospital doctors and 26 (38.8%) general practice doctors returned the questionnaires. There was a trend for junior hospital

doctors, more than the more senior members of staff, to consider the monographs to be more useful. Most doctors thought that the information was of moderate or substantial benefit educationally or practically (88%), that it highlighted previous information (78%) or provided new information (46%), that it was suitably pitched (86%) and that the range of data were sufficient (66%). The majority of the doctors thought that the monographs were adequately (55%) or well (43%) written, of a suitable length (90%) and a useful basis for peer review discussion and therapeutic audit (77%), suitably designed (86%) and that their problem-orientated approach was suitable (92%). Most (85%) would like to receive them again. Important omissions were felt to be drug costs (25%). Respondents also said that information on adverse effects, interactions, dosage and administration was of prime importance. The authors claimed that the monographs were useful sources of information and could be used to influence prescribing.

215. Lugg SC, Hudson SA and Golightly PW. An evaluation of response to specialist drug information bulletins. *Proceedings of the Guild* 1980;13:43-57.

Descriptive study:

The Trent Regional Drug Information Service (DIS) produced a specialist current awareness bulletin for paediatrics and psychiatry which was sent to pharmacists, nurses and doctors. Various hospital DISs in the region helped to produce these. A questionnaire survey was distributed with the bulletins via the hospital DIS to two sample areas in the region and replies were collected over 5 weeks. There was a 20% response rate to the questionnaire. Respondents thought that the bulletins were readable, of the correct length and mostly (medical staff) or usually (pharmacists and nurses) relevant. Most respondents read all parts of the bulletins, kept them for future reference, made them available to other staff and sometimes used them to stimulate discussions with colleagues. There was general satisfaction with the format of the bulletins; 45% of medical staff, 17% of nurses and 24% of pharmacists were completely satisfied with them and only 5, 10 and 18%, respectively, were completely dissatisfied. Problems were detected with the distribution of the bulletins and there was a lack of awareness of its existence. Personal interviews were conducted with a sample of responders by a member of the DIS who was not involved in producing the bulletin. Thirty six nurses, 16 doctors and 10 pharmacists were interviewed. Interview and questionnaire data were in agreement except with regard to what respondents did with bulletins after reading them. In the interview survey, fewer medical (40%) and nursing staff (50%) said that they kept the bulletins for future reference than had stated this in the questionnaire survey.

216. Hall T. The effect of drug bulletins on the prescribing of oral nitrates. *Br J Pharmaceutical Practice* 1990;12:122-8.

Objective:

To assess the effectiveness of a bulletin, which addressed the issue of nitrate tolerance, that was produced by a hospital drug information department on nitrate prescribing.

Methods:

This was a prospective before/after study of oral nitrate prescribing at a single general hospital. In the first phase, pharmacists collected prescribing information on all patients prescribed oral nitrates in a two week period. The bulletin on oral nitrate therapy, prepared by the drug information department in a manner similar to that employed in the past in the hospital, was distributed to all medical and nursing staff. It made certain recommendations on nitrate

therapy: to use the minimum effective dose, to give isosorbide dinitrate and mononitrate three times a day and not at bedtime and to cover nitrate-free periods with other drugs for those at high risk. After a two week washout period, data were collected again as in phase I.

Results:

The proportion of patients who had a nitrate-free period (of at least 10 hours) increased from 26.7% (8/30) in the before period to 62.8% (27/43) in the period following the distribution of the bulletin. This increase of 36% was statistically significant. There was a trend to increase the total dose of nitrate (2.3%) and to use isosorbide mononitrate. For in-patients, however, the trend was to lower the average daily dose from 47.33 to 42.65 mg and to use the mononitrate. The author said that no reasonable alternative explanation, other than the effect of the bulletin, was found for the change in prescribing patterns.

Assessment of study: (strength, size of effect, generalisability)

The effect was moderate. There was a risk of bias in data collection but confounders are probably not important in this short term study. The results are not generalisable.

217. Ross AJ. Quantifying ward pharmacy and its impact on patients. *Br J Pharmaceutical Practice* 1987;9:267-73.

Objective:

To quantify the ward pharmacy service provided in four hospitals and to measure the impact of advice given by pharmacists on the treatment of patients.

Methods:

This was a prospective cross-sectional sample survey that counted and classified the type (mechanical, pharmaceutical or clinical) and outcome (accepted or rejected) of queries raised on prescriptions by pharmacists and non-pharmacists in four hospitals in 1985/6.

Results:

The number of queries raised was: Hospital A - 916 in 29 days; Hospital B - 1393 in 238 days; Hospital C - 1227 in 146 days; Hospital D - 596 in 145 days. The author found that the sampling was representative. Of the total of 4132 queries, 1034 were mechanical, 1826 pharmaceutical and 807 clinical; there were 465 other queries. Most queries (94%) raised solely during ward pharmacy (Hospital B) were raised by the pharmacist. In hospitals A, C and D, 63%, 43% and 53%, respectively, of queries were raised by the pharmacist. In hospitals A-D, 61%, 68%, 32% and 46%, respectively, of queries resulted in a change in the prescription; 31%, 12%, 63% and 47%, respectively, of queries were for information only. In total, 2177 (53%) of queries led to a change in a prescription.

Assessment of study: (strength, size of effect, generalisability)

This was a descriptive study not an evaluation. The author's claim, that a change in the prescription was an indicator of pharmaceutical advice contributing to patient care, is dubious since no information about patient care was provided. In essence this study showed that pharmacists affect the prescribing process and may improve patient care. The problems of the lack of a control group, no data on possible confounders (patient numbers, staff numbers and changes etc), potential bias in data collection (by the pharmacists concerned), absence of independent assessment of the value of the interventions and incompleteness of data collection (author admitted this was a possibility) make it difficult to use these results. The generalisability of the results is likely but would be assisted by the provision of more information on the nature of the pharmacies and hospitals that were studied.

218. Shaw P, Hollebon CE and Mason SK. An investigation into the role of pharmacists on consultant ward rounds. *Br J Pharmaceutical Practice* 1980;2:13-17.
- Descriptive study:**
- The aim of this study was to categorise and quantify the inquiries directed to three pharmacists who regularly attended three consultant ward rounds at hospitals in one district. The pharmacists had different amounts of time to spend in preparation for the rounds, differing levels of experience of attending rounds and attended differing proportions of rounds. The consultants were two general physicians and one rheumatologist. The pharmacists recorded their inquiries and contributions at 64 ward rounds over 5 months. There were differences between the results for each pharmacist, namely in the types and numbers of inquiries on the rounds and in the number of times that they initiated therapy changes or gave advice. This may reflect the differences between the pharmacists that have been mentioned. At the end of the five month period the consultants completed a questionnaire; all though it was useful to have the pharmacist on the round. The reasons give were that the pharmacists acted as a safety net and provided information on dose, drug, formulation and interactions and helped control costs. All would recommend the inclusion of a pharmacist on their colleagues' rounds.
219. Cairns CJ and Prior FGR. The clinical pharmacist: a study of his hospital involvement. *Pharm J* 1983;230:16-8.
- Descriptive study:**
- A survey was conducted of the contribution made by four pharmacists during ward pharmacist and consultant rounds on units in a single hospital over six weeks. Three hundred and thirty one queries were recorded by the pharmacists, about half of which were initiated by pharmacists and half by doctors and nurses. Most queries concerned drug choice (30%), dose (27%) or adverse effects (15%). Intervention by the pharmacist led to action in 75% of cases. Another 13% of cases concerned queries by non-pharmacy staff requiring more information.
220. Gibson P and Freeborn SF. Are pharmacists effective on clinical rounds. *Pharm J* 1985;234:201-2.
- Descriptive study:**
- This paper described the results of a retrospective analysis of the contributions made on 75 ward rounds by four pharmacists over six months at a single hospital. These contributions were those made in addition to contributions made during routine ward pharmacy visits. The study was retrospective to reduce the potential for bias because of pharmacists' prior knowledge of the study. Nine hundred patients were seen and 500 interventions were made. Most interventions concerned medication choice (24%), actions and uses of drugs (23%) and dose and frequency (17%). Forty one percent of queries were initiated by the pharmacist, 58% by the doctors and 1% by nurses. Only 9% of queries would have been detected by the ward pharmacist if they had not been in attendance on ward rounds.
221. Cloete B and Heath PE. Pharmacist participation in a psychiatric consultant ward round. *Pharm J* 1987;238:42-3.
- Objective:**
- To determine the extent to which pharmacists attending psychiatric consultant ward rounds were able to assist in reducing excessive drug usage.
- Methods:**

A prospective time series study was conducted of the contribution made by a pharmacist on ward rounds and the change in drug cost per patient over 12 months. The consultant was unaware of the full extent of the study. Only data on patients present throughout the study were used.

Results:

Thirty seven ward rounds were attended. This took a total of 103 pharmacist hours (£706) and resulted in 180 interventions. One hundred and fifty interventions resulted in changes in treatment. Drug costs were reduced from £863.20 to £518.18. The number of items prescribed per patient decreased from 3.75 to 2.66 (29%). The cumulative savings were £3,212.90 (based on the supposition that patients' therapy would have remained unchanged in the absence of the pharmacists' interventions). This was comparable to data obtained from four costing studies that had been carried out during the year. The net saving was about £2,500 per annum.

Assessment of study: (strength, size of effect, generalisability)

The effect was large but the results are not generalisable. There was a risk of bias due to the self-reported nature of the study. It was not a full economic evaluation and all costs and consequences were not taken into account (drug administration costs, patient care effects). Nevertheless, it was a reasonably sound study that took many costs and consequences into account. The presence of a multidisciplinary team that monitored changes in therapy probably protected against deleterious effects to the patient (long-stay wards with follow up of patients over 12 months) .

222. Trewin VF and Town R. Pharmacist effectiveness at case conferences. *Br J Pharmaceutical Practice* 1986;8:298-304.

Objective:

Unclear. Probably to consider the effect of pharmacists in a case conference setting.

Methods:

A survey was performed of the self-recorded activities of three pharmacists at case conferences in four wards in a geriatric department over 8 months. Records were made of all the questions that were asked of the pharmacists and of the opinions offered by them, their replies and the resultant action. The value of these interventions to the care of patients was elicited by the consultants responsible for two wards and a junior doctor using a scoring system. All interventions were scored (independently) by a pharmacist who was uninvolved in the study.

Results:

Doctors considered 18 of the 465 contributions made to be extremely helpful in the care of patients, 166 definitely helpful and 175 of some help. One hundred and six had no immediate benefit. In contrast, the pharmacists considered 2 to be extremely helpful, 39 definitely helpful, 279 to be of some help and 145 of no immediate benefit. The senior house officer was more generous in his gradings than the consultants and was more in agreement with the pharmacist than them. The commonest pharmacist interventions were drug discontinuation (86) and change of dose or formulation (100); the most frequently asked questions concerned drug information (62). Action was taken on 26% of the pharmacists' answers to questions asked of them and in 54% of instances where the pharmacist had offered an opinion. The more highly experienced pharmacist made more contributions in the ward rounds.

Assessment of study: (strength, size of effect, generalisability)

This was an uncontrolled study and is subject to bias due to self recording. It provides some evidence of pharmacists' contribution to patient management. The use of doctors to review

pharmacists' contribution helped to reduce the potential for bias. The assessments of contribution were further strengthened by the relatively high level of agreement between doctors' and pharmacists' judgements. The effect was moderate but not generalisable.

223. Ross AJ. Evaluating the benefits of a clinical pharmacy service. *Pharm J* 1985;234:683-5.

Objective:

To quantify the ward pharmacy service provided in four hospitals and to measure the impact of advice given by pharmacists on the treatment of patients.

Methods:

Prospective cross-sectional sample surveys were performed that counted and classified the source (doctor, pharmacist, nurse or other), type and outcome (accepted or rejected) of queries raised on prescriptions by pharmacists and non-pharmacists in four hospitals in 1985/6.

Results:

The number of queries raised was: Hospital A - 175 in 2 months; Hospital B - 164 in 3 months; Hospital C - 36 in 2 months; Hospital D - 96 in 3 months (Total 471). Sixty percent of the pharmacists' recommendations were accepted of which 80% resulted in a change of prescription; only 4% were rejected. Most queries were initiated by pharmacists (range 59-94%) after therapy had started (range 29-63%).

Assessment of study: (strength, size of effect, generalisability)

This was a descriptive study not an evaluation. The criticisms of the study by Ross AJ, 1987 (above) also apply here since this was an earlier report on the same study.

224. Tham PK. Outpatient counselling in a chest clinic. *Br J Pharmaceutical Practice* 1981;3(6):12-14.

Descriptive study:

The author described the activities of a single pharmacist at the chest medicine out-patient clinic of a hospital. These activities aimed to increase the rationality and cost effectiveness of drug use, patient compliance, patient education and the identification of potential adverse reactions and interactions. The pharmacist reviewed the medical records of out-patients attending the clinic and completed a medication profile for each one. This profile documented any drug-related problems. These were subsequently discussed with the consultant. No data were provided on patient numbers or workload.

225. Bishop SMJ, Gilchrist A, Kerr LJ and Donaldson S. A team approach to improving clinical pharmacy services to psychogeriatric patients. *Hospital Pharmacy Practice* 1992;2:563-9.

Objective:

To improve the quality of clinical pharmacy services to a group of psychogeriatric patients using a team approach.

Methods:

In a before/after study, patients in two wards (n=47) were actively monitored by two pharmacists and those in two others (n=49) were not monitored for two periods during July to September 1990 and 1991. The monitoring in the active group included assessment of therapy using the notes and kardex. The pharmacists then met with the consultants and senior nurses and made recommendations on therapy changes. The outcomes were noted and scored by the pharmacists. In the control group basic patient information was collected but the notes were not examined. Available expenditure and bed occupancy data were used to measure and compare

changes in expenditure between the two wards.

Results:

Of the 102 interventions in the test group, 51% were accepted. There was a reduction in the mean number of routine drugs prescribed per patient in the test group from 3.48 to 3.23 (7%); for as required drugs, the reduction was from 3.11 to 2.83 (9%). Using a process-driven, external, pharmacy rating scale, the service to the test wards was considered to have improved. Expenditure on medications, adjusted for bed occupancy, were reduced in the test wards from £3.23 to £3.05 (for the control wards the figures were £3.01 increasing to £3.34).

Assessment of study: (strength, size of effect, generalisability)

This study measured the numbers of medications prescribed and interventions made and calculated savings crudely. It did not measure changes in patient care nor total drug costs (including administration costs). In addition, there were few indications that the patients in the control and intervention groups were similar and no data were collected on control patients in the post intervention period. This gives rise to concerns about patient comparability. Self-reporting and scoring of data results in concerns about bias. The size of the effect was small and the results are not generalisable.

226. Pashley EM and Biggins CA. Prescribing trends in a hospital for mentally handicapped people over a five to eight year period. *Hospital Pharmacy Practice* 1991;1:115-7.

Objective:

To compare the medication received by the residents of a large hospital for the mentally handicapped in 1983 and five years later.

Methods:

This study measured the effect of weekly drug reviews by a clinical pharmacist, which were presented to a multidisciplinary team at one hospital, on the number and types of medications that were prescribed for a stable population of in-patients before and 5 years after the appointment of the pharmacist. A survey date was chosen in May 1988 and the medications prescribed were recorded retrospectively then and, on as near a date as possible, 5 years earlier (there were problems with data collection in 1983 and data more than 3 years from the 1983 date were not used).

Results:

Prescriptions for 296 patients were compared. The length of stay averaged 29.2 years (range 5-68). Patients' handicap levels were mild (9), moderate (28), severe (228) and profound (28). The proportion of patients receiving medication was reduced from 81% to 76%. The number of epileptics and the proportion of patients that were receiving anticonvulsants remained stable (although many more were on fewer anticonvulsants) but the proportion receiving any central nervous system drugs fell from 69 to 56%.; The proportion receiving neuroleptics fell from 43 to 29% and the proportion receiving hypnotics from 18 to 10%. Greater numbers were receiving as required medications in place of routine medications.

Assessment of study: (strength, size of effect, generalisability)

The size of the effect was moderate but the results are not generalisable. No data were presented on patient care effects but it is unlikely that patient care would have been adversely affected due to the long follow-up and the multidisciplinary nature of the therapy reviews. There was a risk of bias in this study due to pharmacists' motivation to reduce therapy.

227. Draper B and Freeborn S. Compilation of medical reports by pharmacists in a geriatric day hospital. *Br J Pharmaceutical Practice* 1981;3(8):12-17.

Descriptive study:

The authors described the taking of drug histories and the creation of a medical report on patients at a geriatric day hospital. These were discussed subsequently at a multidisciplinary clinical meeting. Patients were interviewed, where necessary, to elicit information.

228. Taylor D. Changing prescribing habits within a mental health unit. *Br J Pharmaceutical Practice* 1989;11:224-5.

Objective:

Unclear. The article provided a description of the prescribing problems identified at a mental health unit as a result of the activities of a multidisciplinary working party. It also showed how these decreased following the introduction of routine pharmacy input (attendance of a senior pharmacist at monthly consultant management rounds, preparation of drug reviews, contribution to registrar induction training and provision of advice on the correct use of the drug chart).

Methods:

A survey was carried out by pharmacy staff. It consisted of a "spot check" on all prescriptions in the hospital (two acute wards and a day unit).

Results:

The initial survey ((March 1987) of 41 charts identified several problems, the most serious of which were patients receiving depots not identified on the chart, concomitant prescribing of medications from the same pharmacological group, absence of starting and termination dates for therapy and the improper use of 'as required' prescriptions. Subsequent surveys took place in June 1987 (45 charts) and a year later (49 charts), after pharmacists had become actively involved in the unit. These showed a reduction in prescription problems in the period from March 1987 to June 1988. These were reductions in the mean number of items per chart from 4.3 to 3.7, in the proportion of regular anticholinergics from 27 to 21%, in the proportion of day time benzodiazepines from 7 to 5% and in the proportion of night time benzodiazepines from 12 to 5%, and in the proportion of charts with variable dose/route and no instructions from 35% to 18%.

Assessment of study: (strength, size of effect, generalisability)

The study suggested that pharmacy activity was effective but the absence of data on medical staff changes and patient changes leaves the results open to confounding. Collection of data by pharmacists leaves them open to bias. The effect was moderate and not generalisable.

229. Hackitt K. Pharmacist participation in a geriatric out-patient clinic. *Br J Pharmaceutical Practice* 1984;6:375-6.

Descriptive study:

This paper described the activities of a pharmacist who attended two consultant's outpatient clinics at a single hospital. The consultants had invited the pharmacist to attend the clinic following a successful period attending and contributing to ward rounds and counselling patients. Patients were interviewed by the pharmacist on arrival at the clinic and, with an awareness of the medical notes, the pharmacist reviewed their medications and prepared a medication profile on each patient. This took an average of 5 minutes per patient. It highlighted any potential side effects or drug interactions and assessed the need for patient counselling. The

patient was counselled, usually for 3-5 minutes after he had seen the doctor, and was given a medication chart describing the regimen and providing additional information if necessary. The article enumerated the advantages and problems of the service but was not an evaluation.

230. Arnold JVH and Ross HM. Drug profiles and patient counselling as part of patient services for elderly in-patients and patients attending a day hospital for the elderly. *Br J Pharmaceutical Practice* 1981;3(2):11-14.

Descriptive study:

This article described the pharmacy service provided to geriatric in-patients at three hospitals and to day patients at another facility. Pharmacists produced drug profiles on patients whilst they were in hospital and maintained the profiles if the patients were transferred to the day hospital. The profiles were used to solve drug supply problems, to clarify discharge medicine requests (since pharmacists only visited the sites twice a week) and to aid in counselling patients. Patients at the day care facility were provided with a medicines card that was updated by the pharmacist. They were counselled there and, if social workers noted problems with medications, they were counselled also at home.

231. Howards P. Pharmacist involvement with thromboprophylaxis policies. *Pharm J* 1993;250:HS51-2.

Descriptive study:

This paper described pharmacists' involvement with the creation and assessment of various thromboprophylaxis policies in four general hospitals. The audit process and the directorates were used to assist in increasing pharmacists' involvement in patient care

232. Ketley D and Godfrey B. Pharmacy and clinical directorates at Leicester Royal Infirmary. *Pharm J* 1992;248:588-9.

Descriptive study:

This paper considered the pharmacy department's response to the introduction of clinical directorates at a single general hospital. Pharmacy's role had changed to one where pharmacists had become more involved in advising on drug policy and on the economic use of medicines.

233. Hough JE, Martin P and Barrett CW. From ward to clinical pharmacy. *Pharm J* 1987;237:86-7.

Descriptive study:

This paper described the problems of changing from ward to clinical pharmacy at two hospitals. The authors discussed the training implications for pharmacists and the strengths and weaknesses of the new system compared to the old one.

234. Anderson SC and Fletcher P. Hospital advisory services. *Pharm J* 1987;236:464-6.

Descriptive study:

This paper described a method of measuring pharmacists' performance when providing advisory services in hospitals. It reported the results of a workshop sponsored by the Department of Health in 1985. The paper concentrated on drug monitoring as a precursor to the provision of advice on therapy. Services were described according to objectives, inputs, outputs and outcomes. Although outcomes included changes in patient morbidity, the authors

recognised the difficulty in measuring these.

235. Calder G. Aspects of the integration of the pharmacist into the ward therapeutic team. *J Hospital Pharmacy* 1967;24:435-42.

Descriptive study:

This paper described several small uncontrolled studies that helped the pharmacy department decide how its pharmacists might be most effective on the wards of a large general hospital and at smaller long stay geriatric hospitals. It outlined the pharmacists' contribution to audit and quality assurance of drug use and advocated their full integration into the therapeutic team.

236. Fitzpatrick RW. The pharmacist in a clinical area: a practical account. *Br J Pharmaceutical Practice* 1981;3(9):18-27.

Descriptive study:

This study described the practice of clinical pharmacy by ward pharmacists and by pharmacists who attended ward rounds in addition to providing ward pharmacy visits at two hospitals. Those attending rounds did so about twice a week. All pharmacists recorded their interventions. These included interventions on side effects, dose, deletion or addition of drugs, drug selection, rationalisation of therapy and provision of information on pharmaceutical aspects of drugs. Pharmacists who provided only ward pharmacy visits made similar, but fewer, interventions than those who also attended ward rounds but no comparative figures were provided to support this statement. The advantages of attending rounds were enumerated. The interventions made by one pharmacist, who had attended rounds, were quantified for one month. Eight rounds were attended and 23 interventions were made on these rounds. The interventions were made on side effects (1), dose recommendations (6), drug deletion (4) or addition (1), provision of information (3) and others (8). Seven patients were counselled. On the ward visits made by this pharmacist 34 interventions were made. These were on side effects (3), dose recommendations (6), drug deletion (10) or addition (2) of drugs, provision of information (4), drug interactions (1) and others (8). No patients were counselled although this activity was felt to be worthwhile by medical and nursing staff.

237. Walker R and Bussey RA. Assessment of a hospital based clinical pharmacy service. *Pharm J* 1986;237:558.

Objective:

To assess the quantity and quality of a clinical pharmacy services, particularly with respect to its contribution to patient care.

Methods:

This was a prospective time series evaluation of the interventions made by a single pharmacist on general medical and renal wards at a single general hospital. The ward pharmacist attended the ward rounds of four consultants for 23 weeks (Phase I), attended the ward rounds of two consultants and reviewed their patients' therapy for 38 weeks (Phase II) and attended the ward rounds of the other two consultants and reviewed their patients' therapy for 31 weeks (Phase III). The pharmacist recorded all interventions and classified them according to whether they were rejected or accepted. Accepted interventions were subsequently assessed by a panel of 4 hospital pharmacists and 3 general practitioners who were not based at the hospital. Interventions were ranked on a visual analogue scale (VAS) according to whether they were good (+3) or bad (-3) with respect to their contribution to patient care and to the optimisation

of drug expenditure. Rejected interventions were graded similarly but according to whether the pharmacist should or should not have made them.

Results:

Eighty five interventions were made in Phase I, 457 in Phase II and 620 in Phase III. Most (82%) were made during ward rounds and the number of interventions significantly correlated with the number of rounds attended. Of the 1162 interventions, 988 (85%) were accepted. Interventions were made mainly on dose adjustment (23%), discontinuation of medicines (19%), selection of medicines (12%) and side effects (9%). Doctor and pharmacist assessors were in agreement on the grading of interventions. Of the 542 interventions that were made in the first 2 phases, 461 (85%) were accepted. Of those that were accepted, 232 scored between 2.01 and 3 for contribution to patient care and 206 between 1.01 and 2; only one was given a negative mark. In addition, 105 interventions scored 2.01-3 for their contribution to the optimisation of drug expenditure and 216 scored 0.01-1; 15 scored a negative mark. This was despite the pharmacist recording that only 7 interventions were made to optimise drug expenditure. Of the 81 rejected interventions, 74 were considered to be worth making.

Assessment of study: (strength, size of effect, generalisability)

The lack of proper controls in Phase I of this evaluation makes it difficult to draw conclusions from the data. The effect was large when the number of interventions is considered but it is impossible to say if patient throughput and medical and nursing staff factors were confounders. The independent review of the interventions provided protection against bias in assessing the contributions to care but bias remained a possibility due to data collection by the pharmacist under study. The results are not generalisable.

238. Evans TC. The pharmacist's role in improving the quality of life of patients receiving chemotherapy. *Proceedings of the Guild* 1987;24:3-25.

Objective:

To evaluate the pharmacists' role, as part of an oncology team, in improving the quality of life of oncology patients.

Methods:

This was a prospective 16 week controlled study of the effect of counselling by a pharmacist on patients' quality of life and knowledge of therapy. All patients receiving parenteral chemotherapy were asked to complete daily questionnaires about their symptoms. Patients were allocated to two groups by sequential matching based on their symptom score, age, type of cancer, chemotherapy, number of cycles received and karnofski index. All patients were counselled initially but only those in Group A received follow-up counselling. Patients were asked to complete an assessment form giving their views on their treatment and the counselling. Counselling took place after consultation between the pharmacist and other members of the oncology team to preserve a unified approach to therapy.

Results:

The 13 patients in the group that had been given additional counselling received 60 counselling sessions lasting 1-1.5 hours each. A summary of these was recorded in the notes and reported at team meetings by the pharmacist. All 24 of the pharmacists' interventions were acted upon by doctors. At 49 counselling sessions information was given to patients about therapy. Compliance with the questionnaire was 100% (although 2 patients in each group died during the 16 week study). The average weekly symptom score in both groups was similar for appetite, mouth care, activity, vomiting, mood, nausea, pain and indigestion. Anxiety and sleep

scores were better in the group that had received additional counselling although this improvement was not significant. Scores for information about treatment and overall feeling of wellbeing were significantly better in the group that had received additional counselling. The 22 patients who were still alive at week 16 found the questionnaire useful in relaying information about their treatment to the doctors. All in Group A commented on the helpfulness of pharmacist counselling. The study suggested that pharmacists, acting as a member of a multidisciplinary team, can improve the quality of care of patient receiving chemotherapy.

Assessment of study: (strength, size of effect, generalisability)

This study was carried out using a questionnaire which was not validated hence its results are questionable. It appeared to have content validity. There was a risk of bias since the pharmacist was collecting all the information and knew he was under study. The size of the effect was moderate, although numbers were small. The results are not generalisable.

239. Cole R, Batson GA, Escritt A and Walker C. An integrated district-wide cancer care scheme. *Pharm J* 1991;246:576-9.

Descriptive study:

This described the creation of a district-wide cancer care service, involving hospital and community nurses, doctors and pharmacy staff, in South Humberside. The scheme was the end result of a regional initiative on the use of chemotherapeutic agents. A multidisciplinary working party met at intervals over four years to establish a system for the safe and economic prescribing, and the supply and administration of these agents to improve the quality of patients' lives. The working party created a cytotoxics record sheet, a district-wide reconstitution facility serving hospitals and the community, a system for liaising between all staff involved in the care of patients receiving cytotoxics and computerised records. Recently, a clinical psychologist had become involved in the assessment of care. The pharmacy's involvement was described in detail as were various problems and their solutions. The authors' impressions were that medical and nursing staff appreciated pharmacists' assistance and the system has benefited patients.

240. Branford D. Four years working with chronically disturbed mentally ill patients. *Pharm J* 1989;242:HS32-4.

Objective:

To assess the effect of a pharmacist on a new team (consultant, junior doctor, nurses, pharmacist, occupational therapist and psychologist) that was set up to cater for the needs of chronically disturbed mentally ill patients on two locked wards at one hospital.

Methods:

This was a prospective before/after 4 year study assessing the effects of the pharmacist on drug treatment for patients on the two wards (nine males and nine females). The team met weekly to discuss therapy. The pharmacists prepared drug histories and rationalisation programs for therapy. They recorded the outcomes of changes in therapy. Data were collected each month on the drugs that had been used by each patient, additional doses of antipsychotics required and drug costs. Patient well being was assessed subjectively due to lack of input by the psychologist.

Results:

The female ward was converted from a locked to an open ward after one year but the male ward remained locked due to problems with a single patient. The mean number of medicines

prescribed fell from 3.6 (1-6 range) to 1.8 (1-3 range) for males and 3.1 (1-5 range) to 2.3 (1-4 range) for females. The mean dose of antipsychotic received also fell (converted to mg of chlorpromazine); for males it fell from 1,367mg (range = 3000mg to 4000mg) to 567mg (range = 100mg to 2100mg) and for females from 817mg (range 20mg to 2050mg) to 800mg (range 0 to 2800mg). The cost of therapy (inflation adjusted) fell from £3411 to £2097 for males and from £2484 to £1575 for females. The numbers of nursing staff remained unchanged on the male ward but external changes (staff turnover, admittance of new severely disturbed patients) affected staff on the female ward and may have affected the rationalisation program. The number of 'as required' antipsychotics used also fell. Staff rated patients as being well, more active and more responsive than they had been before. Many male patients were ready for transfer to community care and 3 females had become day patients.

Assessment of study: (strength, size of effect, generalisability)

The effects were moderate to large although the group was small. The failure to measure additional costs and benefits, such as the reduction in staff time associated with drug administration, meant that some of the effects of the intervention were ignored. Pharmacists' and other team members' time was not measured either making it impossible to assess the true effect of the intervention on costs. Bias was possible due to self-measurement but its effect was likely to have been small in a long term study such as this. The results are not generalisable.

241. Cloete BG, Gomez C, Lyon R and Male BM. Costs and benefits of multi-disciplinary medication review in a long stay psychiatric ward. *Pharm J* 1992;248:102-3.

Objective:

To assess the effect of pharmacist participation in a multidisciplinary team on the use of drugs and patients' well-being in a long-stay psychiatric ward. The team consisted of a consultant, a junior doctor, a nurse and senior pharmacist. They met every 2 weeks for 2 hours. The pharmacist took patient medication histories and participated in a review of patients' therapy.

Methods:

A 6 week time series study was performed on 19 patients. Seven days prior to the review on the ward round, a nurse assessed the patients' mental state using an unpublished questionnaire. This questionnaire appeared to be logical and informative (personal communication, B Cloete, 1993). The average monthly costs of drugs that were used on the ward was calculated from hospital computer data, the doses of neuroleptics were converted to chlorpromazine equivalents and compared before and after the study. The use of other drugs was also recorded.

Results:

The service reduced the incidence of polytherapy. The numbers of patients that were on more than one antipsychotic dropped from 13 to 4, the number on an antidepressant plus an antipsychotic from 8 to 1, the number on an antiparkinsonian agents plus an antipsychotic from 16 to 4, and the number on oral plus depot antipsychotics from 10 to 4. The mean number of drugs per patient fell from 3.4 to 2.5 and the average daily chlorpromazine equivalent taken by patients fell from 642mg to 434 mg. Monthly drug costs fell from £501 to £313 and this level of expenditure had been maintained for a further 17 months. The pharmacy cost of the service was £853 per annum. This compared with estimated drug savings of £2256 per annum (based on the assumption that drug therapy would otherwise have continued unchanged). Patients' global mental states improved by 62.5% on average and no patient deteriorated.

Assessment of study: (strength, size of effect, generalisability)

Only 19 patients on one unit in a single hospital and the efforts of one pharmacist were studied

hence the results are not generalisable. The study was open to bias since the health care professionals taking part were aware of the study and collected the data. The maintenance of savings for an additional 17 months, however, lends credence to the figures for savings. In addition, the assessment of patients' mental state six months after the end of the study showed no deterioration (Personal communication, Cloete 1993), thereby reducing anxieties regarding bias. Most pharmacy costs were included but non-pharmacy costs were not and the moderate effects that were produced by the service on costs were probably underestimated.

242. Ferguson BG and Weirs T. Are neuroleptics overused? *Hospital Pharmacy Practice* 1994;4:49-50.

Objective:

To evaluate the pharmacists' role as a member of the clinical team looking after 12 long stay psychiatric patients and to audit neuroleptic use over 3 years.

Methods:

A prospective before/after study was performed to assess the effect of pharmacists on drug use over 3 years. The pharmacists took part in weekly multidisciplinary therapy review sessions. Their input included an assessment of patients' therapy before the rounds, recommendations on changes and provision of information on adverse effects and therapies.

Results:

Daily chlorpromazine equivalent doses of neuroleptics fell for all patients, usually by 48% (range 0-100%). Patients functioning was subjectively assessed, by other staff, and was subjectively thought to have improved.

Assessment of study: (strength, size of effect, generalisability)

The effect was moderate to large. Failure to assess patients' functional status more rigorously, and to provide data on the use of other medicines, makes it difficult to assess if patients' functioning or therapy improved. Changes in costs were not measured. The study was open to bias although the effects are unlikely to have been large in such a long term study. The results are not generalisable.

243. Pilkington K. The role of the paediatric pharmacist. *Hospital Pharmacist* 1994;1:42-44.

Descriptive study:

This study described the role of the paediatric pharmacist in specialised hospitals. This role includes the preparation, formulation and supply of medications in a form suitable for individual paediatric patients, the provision of advice on therapy, adverse effects, specialised doses, dosage forms and administration of drugs in intensive care facilities, the creation of formularies and prescribing protocols, the contribution to financial control of paediatric budgets, and the contribution to research. A day's work for a paediatric pharmacist was described. This included the functions described above plus the provision of a formal drug information service to the hospital and to other institutions and the provision of information and counselling to the parents of patients. The expanding role of the pharmacist in this area included the provision of intravenous additives and home total parenteral nutrition, and participation in pain teams and in directorate services. Opinions were provided on the future role of paediatric pharmacists and the need for specialist training in this area.

244. Taylor DM and Heath ML. A disposable device for patient controlled analgesia compared to intramuscular papaveretum. *Hospital Pharmacy Practice* 1992;2:623-8.
- Descriptive study:**
- This paper described the results of a study of 16 patients receiving patient controlled analgesia (PCA) and 16 receiving conventional pain relief using intramuscular opiates (controls). Parameters compared were pain, opiate consumption and time to prepare the PCA devices. Patients in both groups were similar in age, operation undergone (all hysterectomies) and weight. There was no significant difference between groups in opiate consumption (78mg/48 hrs in the test group and 73mg/48 hrs in the controls). A questionnaire, completed by the patients on discharge, showed that patients on PCA experienced significantly less pain than control patients. The authors claimed that the study showed that PCA was useful and that pharmacists and anaesthetists could collaborate successfully in providing PCA for patients.
245. Ashby N and Taylor DM. Patient-controlled analgesia and the hospital pharmacist. *The Hospital Pharmacist* 1994;1:38-41.
- Descriptive study:**
- This paper reviewed the development of patient controlled analgesia (PCA) and the extent of pharmacists' involvement in this area. The early devices, which nurses operated on the patient's behalf, were described. So also were technical advances in the equipment that helped to allay nurses' fears of overdosing patients. The range of currently available devices were explained. The administration route is usually intravenous. The advantages and disadvantages of PCA were described. Pain relief was thought to be more immediate but the preparation and administration of PCA could be hazardous. Although PCA services have been run by anaesthetists in the past, pharmacists were increasingly becoming involved in this service due to the recognition, by a working party of the Royal Colleges, that a comprehensive multidisciplinary team service offers advantages. Pharmacist involvement in PCA services have included helping evaluate and select PCA devices, producing guidelines and protocols for PCA, educating various staff involved in the service, producing pre-filled devices and programming of the pumps, educating and counselling patients, monitoring to prevent adverse effects and evaluating and assuring the quality of the service. Most references to these pharmacists' roles were non-UK but there was some evidence that UK pharmacy departments were becoming involved in several of these roles.
246. Cousins DH. The pharmacist on the resuscitation team - parts 1 & 2. *Current Practice* 1990;3:1-5 and 8-9.
- Descriptive study:**
- This paper described the institution of pharmacists on cardiopulmonary resuscitation teams in one English hospital, their activities and their potential contributions to care.
247. Cousins D and Tempest SM. The hospital pharmacist's role in cardiopulmonary resuscitation. *Pharm J* 1991;246:HS21-23.
- Objective:**
- To assess the effectiveness of clinical pharmacists on the cardiopulmonary resuscitation (CPR) team.
- Methods:**
- A 10 statement questionnaire was used to ask 15 medical and 16 nursing staff their opinions on

the pharmacy service on a 5 point scale ranging from strongly agree to strongly disagree.

Results:

All respondents agreed that the pharmacist contributed significantly to the organisation of medication preparation and administration, that they provided expedient and accurate preparation of medicines, and accurate labelling and record keeping, and that the service was valuable and should be continued. Doctors agreed less strongly that the pharmacist helped with dosage recommendations and calculations and provided pharmacological and therapeutic information during the arrest although nurses agreed as strongly with these statements as they did with other statements.

Assessment of study: (strength, size of effect, generalisability)

This evaluation was uncontrolled and based on opinions. It indicated that health professionals thought that the service was worthwhile.

248. Hebron BS, Horton SW, Graham-Clarke EM and McGettigan AT. A pharmacy-based parenteral nutrition service. *Pharm J* 1989;242:HS20-22.

Objective:

Unclear. To evaluate the effects of a pharmacist-run total parenteral nutrition (TPN) service.

Methods:

General data on patients, their biochemistry results and their outcomes were collected for three successive 9 month periods during which pharmacists input in parenteral nutrition gradually increased from simply supplying ampoules (Phase I), to more active intervention in therapy choice plus the institution of a total parenteral nutrition (TPN) compounding service (Phase II) to a full pharmacy service (Phase III). Patients in the three phases had broadly comparable diagnoses (although they were not matched on this factor) and the numbers treated remained fairly constant.

Results:

When phases I and III were compared, during which 25 and 23 patients, respectively, were treated, the mean duration of feeding increased from 6.88 to 16.1 days, the proportion of time that serum electrolytes were outside the normal range decreased (significant for sodium and potassium), the number of iatrogenic complications fell from 4 to 2 and the number of iatrogenic complications per patient fell from 0.16 to 0.09, the number of unexplained pyrexias fell from 10 to 5, the number of cases of sepsis increased from 6 to 12 but the percentage of pyrexias per patient day decreased from 3.5 to 1.6 (significant). The cost/patient/day decreased from £70 to £47 (adjusted for inflation). The proportion of patients alive at discharge increased from 9/25 to 14/23. These mortality figures remained the same one month after discharge.

Assessment of study: (strength, size of effect, generalisability)

The effects were moderate but failure to match patients on the basis of diagnosis, changes in general treatment and nutrition therapy over time, and lack of controls make it impossible to assess the precise effect of the TPN service. It is likely that it contributed to some of the improvements seen. The risk of bias was probably not high since many measurements were carried out by non-pharmacists. The results are not generalisable.

249. Goldberg LA. The pharmacist as a member of the nutritional support team. *Irish Pharmacy Journal* 1983;61:421-3.

Opinion paper:

This paper provided an opinion on the pharmacists' role on the nutrition team, the contribution

that would be made to the team as a result of the pharmacist being present, the use of computers and of pharmacists' special skill in the production of parenteral nutrition and the economic and patient safety benefits of the team service.

250. Farwell JA. Pharmaceutical factors in long-term parenteral nutrition. *Proceedings of the Guild* 1986;8:3-37.

Descriptive study:

This paper described the background to the development of total parenteral nutrition (TPN) services in the UK and elsewhere. The team approach to service management was described and advocated. Its benefits for patient (safety and quality of care), organisations (safety and economy) and health care professionals (utilisation of skills and education) were enumerated. Teams usually included doctors but may be led by nurses, doctors or pharmacists. The teams may be organised in a variety of ways. Teamwork was felt to lead to the development of protocols and better practice. Some units were said to undertake the provision of home parenteral nutrition. The needs for staff training and regular updating, and patient training, were emphasised and pharmacist were thought to have a role to play in providing this education.

251. The report of the Working Party on pain after surgery. Joint Commission of the Royal College of Surgeons and College of Anaesthetists. 1990.

Report:

This report recognised the deficiencies in current approaches to pain control and advocated the provision of a comprehensive postoperative pain control service by multidisciplinary teams.

252. Cannon PJ, Bertch KE and Cousins DH. The introduction of a satellite pharmacy service for the intensive care and coronary care units at a district general hospital. *Pharm J* 1990;244:36-9.

Descriptive study:

This paper described the creation of a satellite pharmacy in a single hospital. The total time that nurses spent on the preparation of intravenous injections was calculated and the costs of setting up the satellite pharmacy were provided. Savings in nursing time and in drugs, and the increased pharmacy costs, were enumerated. The authors discussed how the satellite had facilitated the development of clinical pharmacy services, such as advisory services on drug administration, pharmacokinetic monitoring and product selection, education for health professionals and assistance at medical emergencies. They also emphasised the role of satellite pharmacy in increasing the integration of the pharmacist onto the health care team.

253. Anon. Role of the pharmacist in health education. *Pharm J* 1989;244:HS30-31.

Opinion paper:

This paper described the views of the Guild of Hospital Pharmacists on the pharmacists' role in educating patients and health professionals in primary and secondary care. In particular, it mentioned their role in providing information leaflets for patients, providing advice on dealing with drug abuse to health care workers and providing education for nurses, community pharmacists and other community groups. They endorsed a co-operative approach between pharmacists and other groups and professionals and enumerated various potential problems in making full use of hospital pharmacists' skills, such as practical and ethical problems, the lack

of remuneration and of time.

254. Report of the Royal Pharmaceutical Society working party on education and training, Part III (Chair MR NL Wood). The feasibility of assessing competence to practice pharmacy. *Pharm J* 1990;247:496-9.
Report:
This document detailed the working party's assessment of the feasibility of introducing competence assessment for practising pharmacists.
255. Royal Pharmaceutical Society of Great Britain. National continuing education syllabus for pharmacy. *Pharm J* 1993;249:152-6.
Report:
This report set out the Society's position on postgraduate education. They endorsed continuing education and suggested various methods of providing it.
256. Ashcroft CE and Hynam BM. An in-service clinical training program for hospital pharmacists. Part III. Hospital activities. *Pharmacy International* 1982;3:254-6.
Report:
This paper described the activities in which the author thought hospital pharmacists should receive training and the environment in which such training was considered to be possible, such as on ward rounds and at clinical meetings, and via journal clubs and intra-departmental meetings.
257. Flint J and Hancox D. Postgraduate education and training. *Hospital Pharmacist* 1994;1:31-3.
Review:
This report reviewed the means whereby hospital pharmacists were educated in the United Kingdom in 1994. Mechanisms included the provision of education by hospital pharmacies (ward pharmacists' meetings, review of interventions, journal clubs, induction training, reports on study days and in-house programs), Schools of Pharmacy postgraduate diploma and Masters courses, regional training, management training and the contribution made by professional organisations (Guild of hospital pharmacists, Hospital pharmacists group of the RPSGB, UKCPA, College of Pharmacy Practice). Opinions were provided on future trends, such as the use of distance learning.
258. Bentley A and Green R. A clinical pharmacy training program. *Pharm J* 1981;227:247-9.
Report:
This paper described a course in clinical pharmacy that had been set up in 1981.
259. Clarke CM. Setting up a clinical pharmacy training programme on a medical professorial unit in association with a university department of pharmacy. *Proceedings of the Guild* 1979;6:23-7.
Report:
This paper described the setting up of a new course in clinical pharmacy, enumerated the aims of the course, and described the teaching methods and learning situations used in the course.

260. Noyce PR and Hibberd AR. Launch of the London MSc in Clinical Pharmacy. *Pharm J* 1980;225:4733-4.
Report:
 This paper described a course in clinical pharmacy that had been set up at the time.
261. Veitch GBA. Postgraduate studies in clinical pharmacy at the University of Aston. *J Clin Pharm* 1979;4:189-97.
Report:
 This paper described the development and philosophy behind the 2 year MSc course in Pharmaceutical Sciences that was founded in 1970 and its subsequent development into a diploma course in the 1970s.
262. Florence AT. The Master's courses in clinical pharmacy at the University of Strathclyde. *J Clin Pharm* 1977;2:119-24.
Report:
 This paper described the background to, and development of, a 2 year part time MSc course in clinical pharmacy established in 1975.
263. Ashcroft C, Hynam BM and Rowland M. An in-service clinical training program for hospital pharmacists. Part I. Historical developments. *Pharmacy International* 1982;3:192-4.
Report:
 This paper described the creation of the first in-service training program in clinical pharmacy for hospital pharmacists in the UK in 1977. It was a joint development between the University of Manchester and North Staffordshire Health Authority. The development of such programs was in response to the needs of the newly developed clinical pharmacy service. MSc courses were available but only for the select few hence a more widely-available course was required. The article described the initiation of the course and the course activities in which hospital pharmacists participated. The courses involved the co-operation of doctors, who allowed pharmacists on ward rounds, and university staff, who held a one day meetings with the participants each month to facilitate presentations of items such as case reports and drug reviews. Nine and 16 pharmacists, respectively, participated in the first two groups that took the course.
264. Fitzpatrick RW. An evaluation of a postgraduate training program in clinical pharmacokinetics. *Pharm J* 1989;242:HS18-19.
Objective:
 To evaluate a 60 hour clinical pharmacokinetics teaching programme for pharmacists.
Methods:
 A before/after questionnaire was used to assess participants' understanding of the concepts and knowledge covered in the course and their applications in practice. Participants were also asked for their views on the course using another questionnaire.
Results:
 Thirty four pharmacists assessed the course, 10 in year 2, 15 in year 3 and 9 in year 4. Overall, there was an improvement in understanding of concepts (mean change +96%) and equations (+157%). All participants were satisfied with the course and found it useful.
Assessment of study: (strength, size of effect, generalisability)

The size of the effect was large but the results are not generalisable. The risk of bias was reduced by assuring anonymity of assessment. The main problem with the study was that competence, rather than performance, was assessed.

265. Mottram DR. A viable alternative in postgraduate continuing education. *Pharm J* 1991;245:E12-14.
Descriptive study:
This paper described the institution and evaluation of a video-loan scheme for postgraduate education in Wales. Pharmacists in all branches of the profession, but mainly in community pharmacy, used them. Over the years 1985/6 to '87/8 the proportion of hospital and industrial pharmacists using the Mersey region scheme had increased whereas the proportion of community pharmacists using it had decreased. In Wales the total number of users had increased from 36 (1987) to 74 (June 1988). Pharmacists who replied to an assessment form were positive about the scheme. The authors claimed that it was more economical and convenient for the profession to use the schemes' videos than to organise evening courses.
266. Pugh J and Moss-Barclay C. Development of interactive computerised education for clinical pharmacists. *Pharm J* 1991;246:327-9.
Descriptive study:
This paper described the development of an interactive computerised system for training clinical pharmacists in nebuliser therapy. Pharmacists involved in testing the program (n=12) found it took 35-50 minutes to complete the cycle and their average score improved from 53% (initial test) to 92% (re-test). They found it easy to use and liked training at their own pace. The authors said that it was a valuable addition to existing training methods.
267. Verheul J. Computer-assisted learning (CAL) in pharmacy education and training. *Pharm J* 1992;249:467-9.
Descriptive report:
This paper described the development and applications of a computer assisted learning (CAL) package in pharmacy. The author provided an appraisal of the currently-available packages, most of which were more widely used by community pharmacists than their hospital colleagues. He said that poorly designed software may have dampened initial enthusiasm for CAL and he advocated the assurance of the quality of new CAL packages. He also commented on new media that had become available such as hypermedia and videodisc.
268. Gerrett D. A postgraduate programme in social and administrative pharmacy by multimedia. *Pharm J* 1994;252:88-9.
Descriptive report:
This paper described a new postgraduate course in social and administrative pharmacy that utilised multimedia techniques.
269. Anon. Continuing education activities in Wales. *Pharm J* 1992;250:426.
Report:
This paper described the activities of the Welsh Centre for Postgraduate Pharmaceutical Education. Education was provided to community and hospital pharmacists using a network of tutors who educate pharmacy staff using lectures and group discussions. Distance learning

using videos and computer assisted learning were also available. Therapeutic teaching packages had been developed specifically for hospital pharmacists. These could be used to supplement in-house teaching material. In 1990-91, 63% of hospital pharmacists in Wales took part in some educational activities.

270. Davies G and Dodds L. The cascade method for clinical training. *Pharm J* 1992;248:120-2.

Objective:

To describe the use and assessment of a cascade system to provide training for hospital clinical pharmacists in South East Thames.

Methods:

A description of the system was followed by the provision of results of before/after multiple choice questionnaire assessments of trainee's knowledge. Trainees also completed a questionnaire providing their views on the service.

Results:

This system allowed trainers to prepare material co-operatively thereby utilising all trainers' expertise to produce better quality training packages. These could then be used by any trainer in the region thereby optimising the use of resources. Pharmacists (n=7) who took a cardiac failure cascade training session improved their score by 5.3 points (from an average of 18.6 to 23.9). In a broader sample of 6 districts (38 pharmacists) the average improvement in score was 4.9 (range -4 to +13). Trainees' comments were said to be generally positive. The authors claimed that the method had not increased the cost of training in the region.

Assessment of study: (strength, size of effect, generalisability)

This was not a full evaluation since the only data provided were some data on improvements in knowledge (rather than performance) after completion of a single course of the programme. Costs and details of trainees' satisfaction with the course were not provided. Neither was the scheme compared with other available training methods. The size of the effect was moderate and is generalisable for that course only. Lack of information on the assessment method precludes comments on bias or confounding.

271. Beswick DT, Cooper P and Elliot DN. Clinical pharmacy training in the South Western region. *Pharm J* 1988;243:E7,E11.

Descriptive report:

This paper described the organisation of postgraduate clinical pharmacy education for pharmacists in the South Western region.

272. Kay E. Training pharmacists and technicians in Leeds Western health authority. *Pharm J* 1990;245:524-5.

Descriptive report:

This paper described an approach to the provision of education for pharmacists and technicians at a single hospital. Junior pharmacists received training in a planned rotation that involved a combination of practical experience and formal training. Assessment was performed using an appraisal interview with the pharmacists' departmental manager. Clinical training was mandatory for these pharmacists. It was organised in blocks of 5 weeks. Participants received a training manual which contained reading lists, a series of objectives, a selection of case histories and examples of patient management problems. About 3 hours a week were devoted to training for each participant. Trainees were assessed by a tutor using standard forms which

allowed the tutee to give their opinions on the training received. Training initiatives for other pharmacists included seminars, workshops and a journal club (which was shared with junior medical staff). Technician training included weekly seminars on appropriate topics.

273. Clarke CM. The development of clinical pharmacy training programmes with special reference to the development, structuring and assessment of an in-service training programme. *Proceedings of the Guild* 1986;21:3-17.

Report:

This paper described the factors that had created a demand for clinical training, such as pharmacists' increasing involvement in clinical pharmacy activities that demanded a new perspective on their role. The aims and objectives of the course were listed and compared to existing MSc and undergraduate courses at the local university. The aims of the different courses were similar but the goals for, and the expectations of, the students were different. The in-service training offered an intense period of exposure to patient-orientated activities. The undergraduate teaching course involved 10 weeks of weekly three hour sessions at the hospital in patient-orientated situations and weekly three hour tutorial. The article described the teaching methods and learning situations used and tutor and trainee activities and responsibilities. A survey was carried out three months after the in-service course to assess participants' clinical pharmacy activities before and after completing the course. A random sample of 30 was analyzed. There was an increase in pharmacist attendance on consultant ward rounds from 15 to 20, in reading medical notes from 17 to 23, in taking drug histories from 2 to 7, in the provision of patient counselling from 12 to 17, in the provision of presentations to colleagues from 10 to 12 and in keeping a log book from 1 to 5; there was no increase in routine ward visits (26). Participants listed reading the notes, interpretation of biochemistry results and haematology reports, intensive involvement on the ward, keeping a log book and individual and group tutorials as the most useful aspects of the course.

274. Mitchell R and Veitch B. Continuing professional development - a role for the College of Pharmacy Practice. *Pharm J* 1992;246:E8.

Report:

The College of Pharmacy Practice (CPP), in this paper, considered continuing education an essential part of professional development. They described various college activities in the educational sphere.

275. Gillow JL, Pratt JP and Banks R. Pharmacy involvement with registrar training in learning disabilities. *Pharm J* 1994;252:370.

Descriptive study:

This paper described pharmacy input into training for a registrar using an audit cycle where the doctor's training needs were assessed, efforts were made to meet them and the registrar's needs were reassessed. A form was designed to allow the recording of clinical problems encountered by the registrar, the action required and the outcome. The forms enabled the provision of constructive targeted education by pharmacists for the registrar.

276. Noyce PR. The role of the hospital pharmacist in the introduction of new medicines. *Clinical Trials*. *Pharm J* 1985;235:367-69.
Opinion paper:
The author advocated a role for pharmacists in the design, ethics, organisation and implementation of clinical trials.
277. Bramble P. The role of hospital pharmacists in clinical trials (letter). *Pharm J* 1992;248:6.
Descriptive study:
This paper reported the results of a pre-registration project which assessed what consultants and pharmaceutical companies thought of the hospital pharmacists' role in trials. Although most thought that pharmacists should be involved in organising the supply, recording and dispensing of trial medicines, only half thought that they should be involved in the initial liaison with companies and about 60% thought that they should be involved in the ethics committee.
278. Anon. Clinical trials. *Pharm J* 1992;248:766.
Report:
This paper reported a policy statement issued by the Guild of Hospital Pharmacists on the role of hospital pharmacy in clinical trials. According to the Guild, pharmacists should be involved in all aspects of trials. This included ethical committee involvement as well as the storage and supply of drugs and the documentation of dispensing.
279. Ambler S. Pharmacy practice research and the Department of Health. Proceedings of a conference on Pharmacy Practice Research hosted by the Department of Health and the Royal Pharmaceutical Society. London: The Royal Pharmaceutical Society, 1991:77-9.
Statement:
The author described Department of Health initiatives to increase pharmacy practice research. Included was a description of the Enterprise Award scheme to fund pharmacists to undertake research and research training in approved (non-pharmacy) institutions. The aim of the scheme was to increase the pool of knowledge in pharmacy of social and behavioural sciences methods.
280. Anon. Practice Research Strategy for Britain. *Int J Pharm Pract* 1993;2:188.
Statement:
This stated that a practice research strategy for pharmacy had been agreed by the Royal Pharmaceutical Society of Great Britain and the College of Pharmacy Practice in consultation with the Government health departments. The statement defined practice research and underlined the Society's commitment to its development. It stated that the research would advance knowledge, help in strategic developments and be applicable in practice. The Society was to appoint a head of pharmacy practice research.
281. Jesson J, Jepson M, Kendall H and Pocock R. Multidisciplinary, commissioned research. *Pharm J* 1991;247:8.
Opinion paper:
This paper supported the use of multidisciplinary teams in practice research and discussed the implications of commissioned work in pharmacy practice.

282. Dingwall R. Pharmacy practice and the social sciences. *Pharm J* 1993;251:59-61.
Opinion paper:
This paper provided a view on how pharmacy practice research should develop. The author argued that a partnership between various social sciences and pharmacy would benefit practice research but the uncritical adoption of social science methods to pharmacy problems might lead to poor quality research. He supported the idea (in the Enterprise Scheme) of training pharmacists in non-pharmacy disciplines in non-pharmacy institutions. He examined the arguments for applying social science methods to pharmacy problems as opposed to treating pharmacy as a field in which social issues can be researched. He then explored a potential research agenda for practice research that included research on pharmacy as a profession and as an organisation, the effects on pharmacy of the changing division of labour in primary care, and of changing health beliefs and the implications for medicine use. He also advocated the consideration of the social process whereby new pharmaceutical entities enter the market place, the impact of legislation on pharmacy, and the role of pharmacy in the social control of medicines.
283. Report of a joint conference on Pharmacy Practice Research, Royal Pharmaceutical Society and the Department of Health, 1991.
Report:
Many of the contributions in this publication reviewed the history of, and progress in, pharmacy practice research in the UK and abroad, advantageous developments between pharmacy and other health services researchers, and initiatives being undertaken by the Department of Health and the Royal Pharmaceutical Society to promote pharmacy practice research in the UK.
284. Savage I. Linking academic and pharmacy practice: the Brighton experience. *Pharm J* 1993;250:158-9.
Descriptive report:
This paper described how the integration of research and practice can benefit both aspects of pharmacy.
285. Savage I. Training for practice research. *Pharm J* 1992;248:155-7.
Descriptive report:
This paper described the Enterprise scheme which funded and encouraged the development of non-pharmacy research skills and hence further improved pharmacists' skills in practice research.
286. Anon. Pharmacy practice research essential says Bill Darling. *Pharm J* 1994;252:411.
Opinion report:
This paper reported the opinion expressed by a senior pharmacy figure that practice research was necessary to evaluate pharmacy services.
287. Greene R. Research methods in hospital pharmacy. *Proceedings of the Guild* 1983;16:3-6.
Descriptive report:
The author described research methods workshops that had been established at Chelsea School of Pharmacy. The course was piloted in 1981 and run fully in subsequent years. It concentrated

on teaching pharmacists research methods since the lack of research skills was thought to be one of the main factors causing the poor quality of published pharmacy practice research. Invited speakers, including sociologists and psychologists, taught on research theory and methods that were applicable to pharmacy practice research. These courses placed research in the context of the social situation. Teaching on the planning of research, sociological and psychological methods of measurement, group work and other tasks filled the course. An assessments of the course by 1981 participants rated it highly.

288. Branch CE, Bowden S, Roberts DE, Spencer MG and Luscombe DK. Is there a need for improved pharmacy services to the operating theatre. *J Clin Pharm Ther* 1993;18:179-82.

Objective:

To determine the extent to which problems with stock control, accountability and wastage, existed in theatres in a single hospital. To assess the need also for improved pharmacy services to the operating theatre complex to improve drug control and patient safety and to assess the feasibility of an operating theatre satellite.

Methods:

This study consisted of a review of the literature followed by an assessment of the cost of drugs supplied to theatres in 1991/2 and the cost of usable and unusable (out of date, not in usable condition) stock in theatres on a single day. Various options for the provision of pharmacy services were costed.

Results:

In the financial year 1991/2 the value of stock supplied to theatre was £322056, which was 11% of the total drug budget for the hospital. Cost of stock in theatre was valued at £25574 of which £887 (3.5%) was unusable. There was considerable duplication, poor storage and organisation of stock in the theatres. The options for pharmacy services that were costed were a satellite (too expensive at present since, unlike the US situation, no revenue could be generated from the service), preparation of individual patient packs in the central pharmacy (unacceptable because of possible delays in providing therapy and the cost of extra pharmacy staff and porters) and expansion of the traditional distribution service plus clinical pharmacy visits (the option chosen).

Assessment of study: (strength, size of effect, generalisability)

This was not an evaluation; it was an appraisal of the needs of a theatre complex for a pharmacy service and the comparison of the costs of the various alternative strategies available to solve the problems detected in a needs assessment. The study is representative of the better studies on clinical pharmacy services in the UK, where many studies are designed to solve problems rather than to evaluate services.

289. Mays N. *Health Services Research in Pharmacy: A Critical Personal Review*. Manchester: Pharmacy Practice Research Resource Centre, 1994.

Descriptive Paper:

This was a personal review of some of the health services research literature in pharmacy practice, particularly that relating to community pharmacy in the United Kingdom. Hand and on-line search methods were used to locate literature. Three hundred abstracts of papers were identified of which 130 were selected for complete reading. Selection was made subjectively on the basis that the paper tackled important general health services research issues, that it tried to assess costs, consequences or quality of services, that it tested hypotheses or tried to answer a

research question, or that it drew on social science theory or methods. Mays found that the pharmacy practice research literature mainly consisted of papers justifying the need for or development of a service. This resulted in much useful descriptive research but little research that was hypotheses driven, drew on social science theory or methods or involved collaboration with other health care groups. The author focused mainly on community pharmacy. He described the types of research that were commonly found, the limitations of this research and the examples of sound pharmacy practice research. He created a list of his perceptions of the current gaps in pharmacy practice research literature and indicated several methods that could be used fruitfully by future researchers. The research gaps included the lack of large, multi-site evaluations in primary care, studies of relations between pharmacists and other health professionals and clients, studies of service quality, and studies of the influence of the pharmaceutical industry and of health policy on pharmacy.

290. Noyce PR. Information to patients and quality of life. Proceedings of the Guild 1986;22:35-8.
Opinion paper:

This paper set out the legal situation regarding patients' entitlement to information on medications. It also discussed the impact and use of this information on patients' actions and their quality of well-being and the complexities of the issues surrounding the provision of appropriate information in a form that is useful to patients.

291. Kay EA, Moss IG and Rees JA. Patient information on antimalarial therapy for rheumatoid patients. Pharm J 1987;239:19-20.

Objective:

To create and evaluate the effects on patients' knowledge of a patient information leaflet on chloroquine.

Methods:

A prospective before/after survey was carried out to assess patients' knowledge of their therapy. The study was performed at a single hospital. Knowledge was assessed using a standardised questionnaires before, and one week, after patients had received the leaflet.

Results:

Informal discussions between a pharmacist and arthritic patients receiving chloroquine revealed a need for additional information. The scores of 50 patients, who had not previously been questioned about their therapy, improved significantly after receiving leaflets ($p < 0.001$). Improvements were found in knowledge of the reason for taking chloroquine with food (2% increased to 50%), of the time lag for effects to be seen (48% increased to 84%), of the long term nature of the therapy (32% increased to 76%) and awareness of various side effects other than eye effects (such as skin rash, diarrhoea and nausea). Patients found the leaflet interesting.

Assessment of study: (strength, size of effect, generalisability)

This was a small study with moderate to large effect. There was a risk of confounding since the interviewer could not be sure that patients were not reading from the leaflets in the after phase of the telephone survey. The results are not generalisable. The results are limited also since the study assessed only knowledge.

292. Punchak SS and Kay EA. Educating arthritic patients about their drugs. *Pharm J* 1988;241:247-9.

Objective:

To describe an investigation into patients' knowledge of non-steroidal anti-inflammatory drugs (NSAIDs) and intra-articular steroids (IACs). To write and test specific information leaflets.

Methods:

An assessment of patients' current knowledge of their therapy was conducted using a 30 minute structured interview. The results were used to help create information leaflets. A prospective randomised controlled trial was then undertaken to assess the effect of the information leaflets on patients' knowledge of their therapy at a single hospital. Knowledge was assessed by a standardised questionnaire, using a system that weighted the answers to important questions more highly than those to less important questions. Assessment was carried out before, and one week, after patients had received the leaflet.

Results:

Sixty eight outpatients and 32 inpatients were interviewed. Many showed that they knew little about their therapy. The types of information requested by these patients included the purpose of joint injections (24/59), the name of the preparation (14/59), the potential complications (12/59), the expected duration of action (11/59), the frequency of repeat injections (7/59), the side effects of NSAIDs and what to do about them (72/86), the problems with NSAID drug interactions (61/86), how to recognise a response to NSAIDs (58/86), the purpose of the NSAIDs (55/86), the name of the NSAID and the precautions to be taken whilst on NSAIDs (49/86), when and how to take NSAIDs (47/86), and what to do if a dose is missed or how long to continue the NSAID (46/86). Forty patients on NSAIDs and 40 on intra-articular injections (IACs) were randomised to two test and control groups (n=20 in each). Those who received patient information leaflets knew significantly more about their medicines than the controls ($p < 0.001$) and showed a significant improvement in their knowledge of their therapy after receiving the leaflets. Control patients did not improve. The mean control group scores were 5.8 in the before and 6.5 in the after phase; for the test group the scores were 6.7 before and 14.8 after. For those on IACs, control group scores were 2.5 in the before and 2.8 in the after phase; test IAC scores were 3.1 before and 8.5 after. After reading the leaflet patients taking NSAIDs all took their drug after food and knew why this was necessary whereas before receiving the leaflet 16 did so but only 9 knew why. All patients found the leaflets helpful.

Assessment of study: (strength, size of effect, generalisability)

This was a small study with moderate to large effect. There was a risk of confounding since the interviewer could not be sure that patients were not reading from the leaflets in the after phase of the telephone survey. The results are not generalisable. They are limited in that they assessed no factors other than knowledge and the taking NSAIDs with food.

293. Catterall G and Littlewood A. Compliance with steroid treatment card advice. *Pharm J* 1989;242:R27-8.

Descriptive study:

One hundred patients (64 in-patients and 36 out-patients) aged 27-83 at a single hospital who had been prescribed prednisolone for the maintenance of respiratory/rheumatological conditions, were interviewed using a structured questionnaire to determine if they carried a steroid card and to establish the extent of their knowledge of their therapy. Eighty four patients claimed that they had a card but only 67 could produce one. Sixty three patients had a card and

knew that abrupt discontinuation of therapy was undesirable; only 22 kept a supply of tablets in reserve. Only one third knew what to do in the case of illness or knew that indigestion was a side effect of therapy. Twenty percent knew what to do if they experienced indigestion. Half would show the card to a doctor, 26% to a dentist, 21% to a nurse, and 8% to a pharmacist. Of the 84 claiming that they had a card, 46 said that the dose recorded on the card was not up to date and was different from that being taken. Only 47 patients knew that prednisolone was a steroid and a only further 16 could relate it to their illness in some way.

294. Butler N, Skinner C and Graham NC. Asthmatics' attitudes to their condition and understanding of their medication. *Pharm J* 1989;242:R25-7.

Descriptive study:

Eighty asthmatic patients, aged 16-77, at a single hospital (46 referrals to an asthma clinic and 34 who had been admitted with acute severe asthma) completed a structured questionnaire soon after the first clinic visit or, for acute admissions, as soon as possible after recovery, to assess their knowledge of and attitude to their disease and its treatment and prevention. Inhaler technique was checked for 68 patients using a pre-determined method. Three quarters of young smokers said that they had been advised to stop smoking by a doctor compared to 33% of older smokers. Thirty seven (46%) patients thought that their asthma was sometimes or always serious whereas 38 regarded it as just a nuisance. Of those taking prophylactic medication, 58% of young men, and 43% of the rest, thought that it prevented asthma. The majority (63%) of patients scored the maximum for inhaler technique and many of the rest scored highly. Most patients had been shown how to take their inhaler by a doctor, nurse or pharmacy technician. Many young men would simply increase their medication if their asthma worsened suddenly. A quarter of patients said they had received helpful information on their asthma but none said that it had been given by a pharmacist. Most patients (89%) would like more information on how to prevent attacks (74%), on what the drugs do (66%), what to do when having an attack (59%), what happens during an attack (57%) and how to take treatment properly (34%); the preferred sources were hospital doctors or general practitioners.

295. Kay EA. Teaching patients about gold therapy. *Pharm J* 1985;235:545-6.

Objective:

To investigate patients' knowledge of gold therapy and to produce and assess a booklet providing information on the topic.

Methods:

An interview study was conducted, using a standardised questionnaire to assess the knowledge of patients attending out-patient clinics at one hospital. Based on the results, a booklet was created and assessed by professionals prior to assessment by patients in a randomised trial. Twenty six patients were randomly selected and divided into three groups as follows; group A (n=12) got no additional information and groups B (n=7) and C (n=7) were given the booklet. Group A were re-interviewed after 3 months. Group C were warned to expect an interview after a week and Group B were not. Those in Groups B and C were matched for age, sex and initial knowledge score but were not matched with Group A.

Results:

Ninety one patients were interviewed of which 70 considered the therapy to be effective, 42 said it reduced their pain and 38 said that it made them feel better. Seven patients were unable

to recall any possible side effects. They said that the usual source of information on side effects was the hospital doctor (48%) followed by the gold monitoring card (25%) and nurses (20%). Only 45% could name a single monitoring test and 37% were dissatisfied with the information that had been provided in the past. Group A's knowledge remained unchanged. All Group B had read the booklet; 3 read it twice. Six of seven in Group C read all the booklet and 1 read part of it. Reading the booklet took 15-30 minutes. Six patients in groups B and C who had been dissatisfied with previous information were now satisfied. Patients in groups B and C knew more about their therapy than those in group A but no data were provided on this; often the increase was small and the score in group C was not different from that in group B (showing that the promise of a re-interview had no effect).

Assessment of study: (strength, size of effect, generalisability)

This was a description since no evaluative information was presented.

296. Booth C. Would diabetic patients find talking to a pharmacist useful? *Pharm J* 1993;251:169-70.

Descriptive study:

A self-completed questionnaire survey of 51 adults with diabetes mellitus (DM) (23 insulin-dependent (IDDM) and 27 non-insulin dependent (NIDDM)) attending an out-patient clinic at a single hospital showed that 78% of IDDM patients could correctly name their medication regime compared to 54% of those with NIDDM. Most (71%) IDDM patients, and 58% of NIDDM patients, said that they knew enough about their diabetes yet many indicated that they would like to know more about specific areas (70% with IDDM and 50% with NIDDM), including side effects of drugs, what to do about missed doses and information on the complications of DM. Most claimed that they received the most useful information from doctors (83% and 76% respectively for IDDM and NIDDM). None mentioned receiving information from a pharmacist. More NIDDM (76%) than IDDM (40%) patients said that they would find it useful to talk with a pharmacist about their medicines. Half of IDDM patients and 65% of NIDDM patients would find an information leaflet on their medicines useful.

297. Eagleton JM, Walker FS and Barber ND. An investigation into patient compliance with hospital discharge medication. *Int J Pharm Pract* 1993;2:107-10.

Descriptive study:

Using a structure attitudinal questionnaire, administered in an interview by a clinical pharmacist and tablet counts, an assessment was made of 50 adult medical patients' knowledge of their medicines and their compliance within 2 weeks of discharge from a single hospital. Eleven patients deviated from their regimen. Fewer than 25% knew the name of their medications or the purpose for which it was being taken and 70% knew no side effects. No correlation was found between knowledge and compliance but the authors concluded that patients on more than 4 medicines may be at a high risk of non-compliance. Half of the patients felt they got insufficient information on their medicines.

298. Morrison J. Eye drop aids and counselling sessions for glaucoma patients. *Hospital Pharmacy Practice* 1993;3:413-8.

Objective:

To find out any problems that glaucoma patients might have with eye drops, how to help them overcome these problems and to discover the usefulness of certain eye drop aids.

Methods:

This was a prospective cross-sectional and before/after study. A structured interview was used to find out patients' knowledge of their condition and any problems they were experiencing with their eye drops. A skill test was used to assess technique. Some patients were thereby selected for follow-up. These received counselling and/or an installation aid and were followed-up 5 weeks later by telephone or postal questionnaire.

Results:

Thirty five patients were recruited from an out-patient clinic in a single hospital. Thirty three of these knew their diagnosis but only 3 could describe the cause of the glaucoma. The same number knew the name of their medication but 21 did not know why it had been prescribed. Three said that they did not understand or could not remember the directions that they had been given. Sixteen patients were followed-up and 15 responded to the second questionnaire. Of these 13 knew the cause of their glaucoma and felt more confident about using their eye drops after the counselling session, and 12 fared better with their administration aid than they had before.

Assessment of study: (strength, size of effect, generalisability)

The study was small, poorly controlled, subject to bias (clinical pharmacist, telephone interview) and was carried out at a single site. Many measurements were subjective. The results are not generalisable.

299. Kay EA, Bailie GR and Bernstein A. Patient knowledge of cardio-respiratory drugs. *J Clin Pharm Ther* 1988;13:263-8.

Descriptive study:

This paper described the results of a structured questionnaire interview study of 85 out patients at a single hospital to ascertain their knowledge of their therapy. Most (85%) knew the reason for their therapy, and the frequency of its use (73%) but few had been told of the duration of use (16%) or of potential adverse effects (8%). Patients often changed the dose when they felt like it (34%) and many (47%) felt that they had experienced side effects. Many (68%) asked question about their treatment on topics such as indication (38%), side effects (26%), dose (20%), and duration (18%).

300. O'Connor M, Malone M and Hambleton R. An investigation into information provided for patients on home parenteral nutrition. *J Clin Pharm Ther* 1988;13:403-9.

Descriptive study:

This paper described the results of a structured questionnaire interview of 76 randomly chosen controls and the 34 patients receiving home parenteral nutrition from a single hospital to ascertain their knowledge of therapy and to facilitate the production of an information booklet. Patients and controls were similar in age, sex, education and marital status. The patients had an adequate, but not significantly better, knowledge of nutrition (73% correct answers to questions) than controls. Patients had significantly less understanding of parenteral nutrition and the procedures used to monitor home nutrition than controls. Eighteen percent were unable to name any components of feeding bags, 50% were aware they were receiving protein, only 15/29 knew why they were asked to breath into a metabolic cart (assesses basal metabolic rate) and only 29% knew what brought about changes in their regimens. A booklet was created to fill the knowledge gap based on the information that patients had said that they would find useful. Thirty two patients completed an assessment questionnaire on the booklet. Most found

it generally easy (53%) or very easy (44%) to understand, 28% said it contained information that they did not know already but 72% said they learnt little from it and 19% said that they would have appreciated getting the information at an earlier stage in therapy.

301. Horsley MG and Bailie GR. Risk factors for inadequate use of pressurised aerosol inhalers. *J Clin Pharm Ther* 1988;13:139-43.

Objective:

To quantify the extent and nature of errors in pressurised aerosol inhalation (PAI) technique in asthmatics, to identify risk factors for poor technique and to assess the effect of structured counselling by a pharmacist.

Methods:

Eighty six asthmatics, in-patients and out-patients, were interviewed by a pharmacist and their inhaler technique assessed using a structured assessment. If the score was less than a pre-set figure, they were given instruction by a pharmacist using a standard technique. These patients' techniques were then reassessed directly after instruction.

Results:

Most patients were on one inhaler (56) and 24% had been using it for less than a week, 18% for a period of a week to 6 months, 17% for 6 months to 2 years and 41% for more than 2 years. There were 59 inadequate users. Inadequate use significantly correlated with increasing age ($p < 0.02$) and with the number of inhalers taken ($p < 0.02$) but not with duration of use. Seventy five patients underwent reinstruction. This caused a significant improvement in score ($p < 0.001$); 54 were adequate users after instruction although older patients still fared worse.

Assessment of study: (strength, size of effect, generalisability)

This was a moderately-sized study. There were problems of potential bias, validity of assessment and brevity of follow-up. The size of the result was moderate but the results were not generalisable.

302. Cantrill JA. Discharge counselling by pharmacy - the need and the reality. *Hospital Pharmacy Practice* 1992;2:429-33.

Descriptive study:

This article described an assessment of needs for discharge counselling that utilised changes in therapy as a proxy for need. One hundred and twenty three patients medication was examined over 12 weeks on one ward (93) and 4 weeks (30) on another. Sixty patients subsequently received counselling from one of two pharmacists because they were being discharged on medications. In total there were 544 changes in therapy in patients or an average of 4.8 medication changes/patient/admission (range 1-16). At the discharge counselling session, 52 problems were found in 37 patients. Some had received inadequate information (22), had an inaccurate prescription (12) and had medication administration problems (9).

303. Akhtar R, Preece G and Sutcliffe I. A short drug history and identification service. *Pharm J* 1981;227:80-1.

Descriptive study:

This paper described the setting up of a drug history and identification service in a single general hospital. The service was initially provided to two surgical wards with the aims of identifying the drugs patients were taking on admission, providing any relevant information on drugs taken prior to admission and evaluating the feasibility of extending the service to all

surgical wards as part of the ward pharmacy service. The pharmacist examined all the drugs brought into the hospital by the patients, examined any general practitioners letters or other relevant documents, and completed a drug identification form before talking informally with the patient about their therapy and clarifying any other problems regarding medications. The completed report was signed and left for the doctor's attention. During the 4 month trial period 188 forms were completed. In 19% of cases clarification of medicines being taken was required but the pharmacy only had one request for this service from the other 12 wards in the hospital. The authors claimed that this indicated a lack of nursing/medical awareness of these issues. The service took a variable amount of time (2-45 minutes/day) and was continued with a similar workload for the ensuing five months.

304. Dodds LJ. An objective assessment of the role of the pharmacist in medication and compliance history taking. *Br J Pharmaceutical practice* 1982;3:12-24.

Objective:

To assess the impact of pharmacists taking medication histories by comparing those taken by pharmacists and doctors and considering the interventions made as a result of the history-taking.

Methods:

This project contained two studies.

Study I

Pharmacists took a medication history, separately from the doctor's normal history, on patients admitted to gynaecological ward in a single hospital. Neither pharmacist nor doctor were to look at the other's notes until both interviews were complete. Pharmacists used a questionnaire designed for the purpose; doctors continued as normal. The content of doctor's and pharmacist's interviews were compared for the second two months. The possible effects of the history taking on patient counselling was assessed.

Study II

Interviews of GP admissions to a unit in another hospital were used to detect the number of interventions that a pharmacist would make on the basis of medication histories. In this study the pharmacist could consult the medical notes and nursing staff as required. Interviews took place in the first 48 hours after admission.

Results:

Study I

Three hundred and two patients were interviewed over 4 months. Interviews occurred in the first 24 hours of the admission and took 10 minutes on average. Forty one percent of the entries in the pharmacists history in the first month of the comparison and 21% in the second were not recorded by the Senior House Officer (SHO). This difference was significant. Doctors usually noted prescribed medicines but not those that were not prescribed. Fifty six percent (month one) and 15% (month 2) of the adverse drug reactions (ADRs) detected by the pharmacist were not reported by the SHO. Although 55% of ADRs reported by the pharmacist were classed as drug allergies the physician had detected all except one ADR classified as an allergy whereas the pharmacist often detected ADRs that seriously upset the patient or reduced their quality of life and could affect compliance. About 20% of patients admitted to compliance problems; 25% of these received discharge counselling as a result. Doctors, patients and nurses were pleased with the service and reacted positively towards it.

Study II

Interviews took about 15-30 minutes and 47 elderly patients were interviewed in 4 months. There were 29 interventions directly resulting from the medication history taking service 16 of which were directed at the prescriber. Therapy was adjusted in 13 cases. 8/16 interventions were about drug side effects and 2 queried the need for the item. 10 of the 22 patients who needed counselling would not have been selected for counselling in the absence of an interview.

Assessment of study: (strength, size of effect, generalisability)

There was a risk of considerable bias in Study I since the doctor was aware of more information at the time of drug history taking than the pharmacist. Other factors such as learning curve and Hawthorne effects were addressed. The size of the effect was moderate. The lack of data on outcome makes it difficult to assess the pharmacists' contribution to care. The process of care was, however, enhanced. The results are not generalisable. Bias might have been a problem in study II but this was not an evaluation. It was a description and the results are not generalisable.

305. Oakley JM and Perkins PT. A self-medication scheme for convalescent patients. *Pharm J* 1987;238:378-80.

Descriptive study:

This described the setting up of a self-medication program for rehabilitation and convalescent patients in a small (60 bed) hospital. The aim was to increase patient's ability to care for themselves following discharge. The scheme has been in operation since 1984 and over 1800 patients have been through it in this time. Nurses assessed the patient on admission and the pharmacist assessed the medication regimen and discussed any changes with the doctor. Patients who are very capable were given a week's supply in fully labelled containers and self-medicated. Those who were less capable were started on daily supplies with nurse supervision of self-administration. Gradually the supply was increased and the supervision decreased. Patients who were initially judged incapable of self-medication were helped to cope better and may eventually self-medicate. Patients were counselled as necessary by the pharmacist who also answered any patient questions on drugs. Three cases were described to illustrate the system.

306. Owen DS, James DW and Howard P. Self-medication schemes on the rheumatology ward. *Br J Pharmaceutical Practice* 1987;9:386-90.

Descriptive study:

This paper described a self-medication scheme, started in 1984, for rheumatology patients at a single hospital. The pharmacist took a medication history. After patients entered the scheme the pharmacist counselled them and provided them with a card telling them how to take their medicines. Of the 280 patients that had gone through the system, 91% were compliant with their medications. The study claimed that patients knowledge of their therapy improved and their satisfaction with the service was high but provided no data to substantiate these statements.

307. Massey C. An evaluation of the benefits of pharmacist-acquired drug histories. *Proceedings of the Guild* 1987;25:80-1.

Objective:

To establish whether a pre-registration pharmacist takes more complete drug-histories than

house officers and, if so, whether this is clinically important. To estimate the resource implications of such a service.

Methods:

Newly admitted patients on 3 wards were identified by the pharmacist, their medical histories read in the medical notes and their drug histories taken as soon as possible after admission. The result of the medication histories were placed in the notes. Pharmacist drug histories were compared with those taken by medical staff.

Results:

Sixty medication histories were taken by a pharmacist. This took 10 minutes per patient on average. Compared with doctors' drug histories, those taken by the pharmacist were more complete; doctors omitted 11.3% of prescription only medicines (POMs) taken regularly and 92.9% of those taken as required (prn), 35.9% of P category medicines taken regularly and 59.7% of those taken prn, and 100% of General Sales List (GSL) medicines taken regularly and 75.6% of those taken prn. In total, doctors missed 40% of medicines being taken by patients but only 8 omissions were thought to be clinically significant by the pharmacist. The pharmacist noted 17 drug allergies and 13 adverse reactions; the doctor noted only 14 allergies. Overall, 41.7% of the doctors' drug histories were inaccurate.

Assessment of study: (strength, size of effect, generalisability)

The effect was moderate. There was no estimation of the potential effect on patient outcomes as a result of any omissions by the doctors that were detected by the pharmacist. The study design was open to bias because the pharmacist knew of the study, looked at the doctors' medical history prior to taking the medication history and judged the importance of the omissions. The results are not generalisable.

308. Higham C. Drug history taking - a role for the ward pharmacist. *Pharm J* 1982;228:302-6.

Descriptive study:

This paper described the establishment of a drug history taking service for rheumatology patients at a single hospital. The history-taking method was described in detail and examples of these provided. Histories taken by the pharmacist were entered in the case notes.

309. Corrigan MS. Primary pharmacy - a patients' self-help service. *Pharm J* 1989;243:458-60.

Descriptive study:

This paper described a self-medication scheme for medical patients at a single hospital. The scheme ran alongside the primary nursing service. Patients used their own medicines in hospital where possible and the pharmacy purchased special locked drug trolleys with individual patient drawers, at a cost of £722 each, for the purpose of storing patients' medications. Other costs were absorbed by the department of pharmacy but pharmacy staff spent about double the amount of time that had been spent previously on the wards taking medication histories and counselling patients. The article described the service and its advantages and disadvantages. After six months 672 patients had been through the system. Ward stocks had decreased by 20% and the health professionals involved had backed the scheme enthusiastically.

310. Baxendale C, Gourlay M and Gibson IJM. A self-medication retraining program. *Br Med J* 1978;ii:1278-9.
- Descriptive study:**
- This was a description of a self-medication program for geriatric patients in a single general hospital in Glasgow. The consultant identified suitable patients at least 2 weeks prior to discharge. The drug regimen was simplified if possible and a pharmacist interviewed the patient, assessed their needs with respect to containers and labels and transferred the patients to a self-medication system. Two days supply were given initially and nursing staff closely supervised medication taking. After this the pharmacist checked with the patients on their progress. If all was well, the scheme continued with reduced nursing supervision. The pharmacist contacted the patient's own pharmacist prior to discharge to ensure that future supplies were dispensed in suitable containers and contacted them again on the day of discharge. They hoped to have patients followed up in the community by district nurses but this has proved difficult. Overall, the scheme had progressed well.
311. Walker CA and Martin PC. In-patients self-medication in the elderly: a pilot scheme (abstract of British Pharmaceutical Conference). *Pharm J* 1986;237:767-8.
- Descriptive study:**
- This abstract described the setting up of a self-medication program for elderly patients in a London hospital. Patients were selected for inclusion at a multidisciplinary ward meeting at least two weeks before discharge. They were counselled by the pharmacist and given their own drugs box. Patients progressed through various stages during which nurse supervision decreased and patient self-care increased. The supply of drugs given to patients increased gradually. Fifty patients have been through the scheme (21% of all discharges from the ward). Seventy percent of those in the scheme derived some benefit from it. Of the remainder, 15% would have managed without the scheme and 15% derived no benefit since they could not self-medicate at all. The scheme took 50-60 minutes of pharmacist time per patient. Nursing staff welcomed the scheme.
312. Trewin VF and Veitch GBA. Elderly patients at risk. Part 4: An assessment of self-medication in the elderly. *Br J Pharmaceutical Practice* 1987;9:228-35.
- Descriptive study:**
- This paper described the setting up of a self-medication program for elderly patients in one hospital. Patients were selected at a multidisciplinary case conference. They were subsequently counselled by pharmacists and had their medication-taking supervised by nurses. Nursing supervision gradually decreased, and the quantity of drugs supplied to patients increased, as patients become more self-caring. Patients receiving only one drug item had the best compliance. Patients were re-counselled after 24 hours if necessary. This was found to improve compliance for 31 (26.2%) of patients, had no effect in 29 (24.6%) and reduced compliance for 48.2% (58).
313. Simpson J and May LG. Self-administration in hospital - towards better compliance. *Hospital Pharmacy Practice* 1992;2:30-33.
- Descriptive study:**
- This paper described a self-medication scheme for use on acute medical wards at one hospital. Any patient could be selected and assessed for self-medication. Doctors, nurse and pharmacists

could assess patients but this was normally done by the doctors or nurses in the first 24 hours. The paper described the scheme in detail.

314. Pratt JP and Dunnett NGM. A rehabilitation project for psychiatric patients. *Pharm J* 1985;234:172-3.
Descriptive study:
This paper described a self-medication program for psychiatric patients to facilitate their discharge to the community.
315. Wood SI, Calvert RT, Acomb C and Kay EA. A self-medication scheme for elderly patients improves compliance with their medication regimens. *Int J Pharm Pract* 1992;1:240-1.
Objective:
To determine the effect of an in-patient self-medication programme on compliance post discharge in elderly patients from 4 wards at two units of a single hospital.
Methods:
A prospective controlled trial was performed where patients were allocated to a control group or a self-medication group depending on the unit of the hospital and the ward to which they were admitted. Patients were similar as regards age, sex, mental test score and number of drug taking events per day. Self-medicating patients graduated through a pre-set program whilst controls received their discharge medication from nurses in the usual manner. The pharmacist was involved in patient selection and in the creation of individualised self-medication regimens. The pharmacist counselled selected patients on discharge. Compliance was assessed by tablet count at 2 weeks and 3 months after discharge. Non-compliance could be 0 (full-compliance), up to 15% (few errors) or in excess of 15% (many errors).
Results:
Of the 18 patients in the test group, 44% displayed full compliance and an additional 50% had few errors at 2 weeks (compared to 13% and 40%, respectively, amongst the 15 patients in the control group). At 3 months 7/11 test patients still being followed were fully compliant and a further 1 had few errors. In contrast, 2/11 in the control group were fully compliant and a further 1/11 made few errors. The differences between test and control groups in rates of non-compliance in excess of 15% at 2 weeks and 3 months were significant ($p < 0.05$).
Assessment of study: (strength, size of effect, generalisability)
The effect was moderate to large but the results are not generalisable. Due to the method of assessing compliance (tablet count), however, there are concerns regarding the validity of the results. One of the criteria for patients entry to the study was complete responsibility for their own therapy so third party help was not formally assessed in this study. Yet 2/18 (11%) test patients and 7/15 (47%) controls did receive some help from neighbours (Personal communication, S Wood, 1993). This additional help did not improve medication taking in the control group.
316. Snell M. Bristol's pharmacist for rheumatology and self-medication. *Pharm J* 1993;251:HS18-9.
Descriptive study:
This paper described the work of a rheumatology pharmacist who established and ran a scheme to educate patients about their drugs. The self medication scheme was part of a multidisciplinary patient education scheme. The article described the self-medication scheme in

detail.

317. Sexton JA. Improvements in comprehension and other benefits to long stay psychiatric patients following individualisation of medication. *Proceedings of the Guild* 1991;29:59-63.
- Objective:**
To discover if individualisation of supply would increase psychiatric patients' comprehension of their medicines at one hospital.
- Methods:**
Patients, selected by nurses as being representative, were allowed to handle their own drugs under nursing supervision. Drugs were labelled individually and supplies were provided on a fortnightly basis. Patients' comprehension of therapy was assessed on entry and at 10 weeks after starting the program. Nurses' opinions were sought by questionnaire.
- Results:**
Sixteen patients completed the ten week study. Their comprehension scores improved significantly ($p < 0.02$). Twenty one nursing staff felt that the patients were more motivated not to refuse medicines, that patient comprehension and compliance problems were now tackled before discharge and patients gained an increased sense of responsibility, confidence insight, self esteem, independence and decision-making capacity.
- Assessment of study: (strength, size of effect, generalisability)**
This study suffers from potential bias and small numbers. The results are not generalisable and the effect was modest.
318. Baker D. An evaluation of drug information for cardiology patients. *Proceedings of the Guild* 1990;28:65-72. (Also published by Baker D, Roberts DE, Newcombe RG and Fox KAA in *Br J Clin Pharmac* 1991;31:525-531).
- Objective:**
To establish if specially prepared drug information leaflets improves cardiology patients' satisfaction with, and understanding of, their drug treatment.
- Methods:**
This was a prospective, randomised (patient allocation) trial. All patients over 18 years and able to read who were admitted to a regional cardiology unit were invited to participate. On discharge those agreeing to participate, and receiving drugs for which information leaflets had been created, were randomised blindly to two groups; Group I (control) received the normal verbal counselling about their medications and Group II (test) was given an individualised drug information wallet. This wallet contained a leaflet giving general advice on medicines and individual leaflets on each drug that the patient was receiving. Leaflets had been prepared on a wide variety of drugs. Two weeks after discharge patients were asked to complete a postal questionnaire to determine their satisfaction with the information provided and their understanding of the use of the drug that they were receiving. This questionnaire was designed in consultation with a clinical psychologist and had been piloted. Comparisons were made using a Mann Whitney, Chi squared or Fischer exact test as appropriate.
- Results:**
One hundred and seventy of the 195 patients were receiving drugs for which leaflets were available. Forty five patients were lost to follow-up due to their transfer to the surgery department and 125 patients were randomised eventually. Questionnaires were returned from 101 (81%) and there were 12 non-responders in each group. Group I (n=49) and Group II

(n=52) patients were similar in age, sex and the number of drugs that they were receiving (mean=3.4, sd=1.5). Patients receiving written information in addition to verbal information showed significantly greater recall of information received and a greater knowledge of what to do about missed doses, and of side effects and what to do about side effects ($p < 0.001$). These patients were significantly more satisfied with the amount, quality, clarity and usefulness of information given to them ($p < 0.001$) and were less worried by it ($p < 0.05$) than were controls. There was no significant difference between groups in the proportion of patients that would continue the drug but tell the doctor if they experienced side effects for digoxin or beta blockers. The findings suggested that the use of information leaflets in addition to verbal counselling increased patients' understanding of their drug therapy and their satisfaction with the information provided.

Assessment of study: (strength, size of effect, generalisability)

The size of the effect was moderate to large. This was a well-conducted study but there was a risk that patients would have used the leaflets to answer questions related to recall of information. This was not discussed in the paper. Nevertheless, patient satisfaction was higher in the test group. Patients were comparable, the exclusion criteria were reasonable and bias in assessment (by health professionals) was not an issue. The results are not generalisable.

319. MacDonald ET, MacDonald JB and Phoenix M. Improving drug compliance after hospital discharge. *Br Med J* 1977;(ii):618-21.

Objective:

To assess the value of discharge counselling by a pharmacist and memory aids in improving compliance in geriatric patients at one hospital.

Methods:

Patients were allocated, by rotation, to three groups. Sixty patients were counselled by a pharmacist before discharge and their understanding of their therapy was checked. A formal assessment was made of their understanding at the end of the session. About 15 minutes was spent by the pharmacist in each session. Forty five patients were counselled before discharge in the above manner but they were also issued with a memory aid, a pill wheel, an individual tear off daily calendar specifying the medication schedule, or a tablet identification card with a sample of the tablets alongside the dosage schedule. Sixty patients acting as controls received no extra counselling from the pharmacist but received only the usual brief description of tablet types. No patient was excluded on the basis of mental frailty or visual acuity. All patients completed the mental status questionnaire (MSQ). Where patients were illiterate, or had poor vision, the tablet bottles were marked in a manner appropriate to their disability. All patients were able to manage to take their tablets before leaving hospital. A week after discharge patients were asked to detail their dosing schedule and to describe the purpose of the tablets. Drug compliance was checked and the patient was given another weeks' supply. Patients attended the day hospital twice a week and were formally assessed at 1,6 and 12 weeks after discharge in addition to random "spot" tests.

Results:

Patients in the three groups were similar in age, sex, MSQ score and number of tablets being taken. Improved compliance was seen in the counselled groups at follow-up. The increase in correct tablet taking was significant in those whose MSQ exceeded 12 ($p < 0.01$) and in those with an MSQ score of less than 12 ($p < 0.05$). Multiple errors were more common in patients who had not received any counselling. The use of memory aids in addition to counselling did

not improve compliance in general. At 12 weeks 14/60 patients who received no counselling were making no errors in their medication (compared to 31/60 of those who had received counselling and 18/45 of those counselled and given dosage aids). Forty two percent of those who had received no counselling could remember their dosage regimen (compared to 68% of those counselled and 67% of those counselled and given dosage aids).

Assessment of study: (strength, size of effect, generalisability)

The size of the effect was moderate. Problems with the compliance assessment method brings the validity of the study into question. Tablet count may not give a reliable indication of the number of tablets actually being taken and, additionally, does not measure when the tablets were taken. The spot checks and the examination of patients' knowledge of their dosage schedule reduced this potential problem in this study but the assessment of patients' knowledge by the counsellor (pharmacist) may have biased the results. The results are not generalisable since they involved a single pharmacist at one hospital.

320. Wandless I and Whitmore J. The effects of counselling by a pharmacist of drug compliance in elderly patients. *J Clin Hosp Pharm* 1981;1:51-6.

Objective:

To assess the effect of counselling by a pharmacist on drug compliance in a group of elderly patients (65 years or over) attending a day hospital.

Methods:

The study randomly allocated patients with a mental test score (MTS) of 20 or more to a control or test group. Test patients were counselled by a pharmacist and controls received no counselling. On attendance at the day hospital patients were asked to bring their tablets with them. Compliance was assessed by tablet count. Initial knowledge was assessed, for the test group, by the pharmacist having them disclose their dosage regimen. The patient was counselled and then asked to recall the regimen to ensure understanding. Their knowledge was assessed at the time using a 10 point scale. Interviews usually lasted 14.4 minutes (range 8-20).

Results:

Twenty three patients were allocated to the control group and 30 to the test group. Patients were similar in age, MTS and number of prescribed medicines but their error rates at the beginning of the study were significantly different. Test patients were counselled within 2-4 weeks of entry into the trial. Before counselling, 13 test patients were non-compliant; after counselling 14 were non-compliant. The number of errors did not decrease significantly. The initial difference between the test and control groups persisted past 4 weeks after counselling. Verbal counselling did not improve compliance.

Assessment of study: (strength, size of effect, generalisability)

Differences in patients at baseline, the use of tablet counts as a method of assessing compliance and the use of the counsellor to assess knowledge and errors, make the results subject to bias and confounding and hence difficult to interpret. No effect was seen and the results are not generalisable.

321. Palmer B. Patient education and drug therapy. *Pharm J* 1979;223:562-6.

Descriptive study:

This was a description of a number of efforts to provide more, and better quality, information to general medical patients with chronic illnesses on four wards at one general hospital. The activities undertaken were better labelling, patient counselling on discharge and the provision of

an information sheet and a medication record card for each patient. Labelling increased pharmacy costs by 20% for labour and about £4/month for labels but patients were pleased with them and found them helpful. Over 4 weeks 436 patients were discharged of which 80% (350) were counselled by the pharmacist. This took an average of 5-6 minutes per patient (range 2-30 minutes). The ward sisters were very appreciative of the service since it saved them time. Information sheets and record cards were prepared for 20 common classes of medicines. These were sent to physicians for comment. The information provided included drug name, use, action, advice on drug use and side effects and what to do if side effects occurred. The record card, which contained a record of the medications being taken on discharge, was given to patients and they could have their community pharmacist update the card in the future. The information and record cards were welcomed by patients, doctors and nurses and also patients' relatives. There was a subjective feeling of increased patient knowledge. A questionnaire administered to patients the day before discharge ascertained the type of information they would like to receive. The commonest types were how and when to take the medicine (95%), what it was for (95%), its name (90%), the importance of taking it regularly (83%) and side effects and what to do about them (74%). An additional pharmacist would be required if the service were to be provided in the hospital.

322. Edwards M and Pathy MSJ. Drug counselling in the elderly and predicting compliance. *The Practitioner* 1984;228:291-300.

Objective:

To compare the effect on patient compliance of the use of a standardised counselling protocol by doctors, nurses and pharmacists.

Methods:

This was a prospective randomised controlled trial (single blind). Consecutive convalescent elderly patients at a single hospital, who were over 65 years, living at home by themselves or with their spouse, capable of being responsible for their own medication and taking at least one oral preparation, were randomly allocated to one of four groups. These were no counselling (n=20) or counselling by a nurse (n=25), doctor (n=19) or pharmacist (n=18). On the day of discharge, patients were given a weeks' supply of drugs and counselling was carried out using a standardised protocol. Patients who were unable to comprehend the instructions after three attempts were withdrawn. This resulted in one withdrawal each in the doctor and nurse groups. These patients were, however, included in the analyses as complete non-compliers. Ten doctors, fifteen nurses and three pharmacists were involved in the study. Control patients received a weeks' drug supply, which was given to them by the nurses in the usual manner. All patients' mental status was assessed prior to discharge by nurses. Six days after returning home a health visitor, who was unaware of the group to which the patient had been assigned, visited the patient and assessed compliance by tablet count. Patients were asked to recall their drug regimen. Inability to read the labels and any other problems were also noted. Results were analyzed appropriately.

Results:

Patients in all groups were similar in age, sex and number of drugs/doses per day prescribed; differences in home status had no effect on compliance. The mean mental test score was significantly lower in the control group than in the test group. Improvement in compliance was seen in the counselled group irrespective of who did the counselling ($p < 0.01$). Doctors ($p < 0.05$) performed better than pharmacists or nurses ($p < 0.1$). Counsellled patients also

showed better recall ($p < 0.02$) and a greater awareness of how to obtain further supplies of medicines. All counselled patients knew how to obtain more medicines compared with 3/20 controls ($p < 0.05$) but counselling did not, however, lessen the taking of additional non-prescription medications.

Assessment of study: (strength, size of effect, generalisability)

There was a possibility of bias in this study due to difference in mental score between counselled and non-counselled groups. The size of the effect was moderate-large but the results are not generalisable since the study was carried out at a single site. The involvement of several practitioners makes the results more robust than those of other studies but the shortness of follow-up limits the study.

323. Johnston M, Clarke A, Mundy K, Cromarty E and Ridout K. Facilitating comprehension of discharge medication in elderly patients. *Age and Aging* 1986;15:304-6.

Objective:

To assess the effect of counselling on compliance in elderly patients.

Methods:

A prospective randomised controlled trial was conducted in a single hospital. The control group received the usual nurse counselling on discharge. Patients in the test group were given additional standardised counselling (15 minutes) by a clinical pharmacist. Later on the day when patients were counselled, a psychologist blindly assessed the patients' knowledge using a standardised format and assessed their degree of orientation.

Results:

Thirteen controls and 14 test patients were recruited. Elderly patients' knowledge of medicines was increased in the short term by pharmacy counselling. Test and control patients were similar in age, sex, orientation score and the number of drugs being taken. Counselled patients were significantly better informed about their medicines than controls ($p < 0.02$).

Assessment of study: (strength, size of effect, generalisability)

A modest to large effect was seen but the assessment was not followed by a post-discharge assessment making it difficult to estimate the true effects of the counselling. The results are not generalisable.

324. Curtis CE. Pharmacist conducted patient discharge medication counselling. *Pharm J* 1988;241:HS33-4.

Descriptive study:

This paper assessed the feasibility of a pharmacist providing discharge counselling. Patient's views on this service were assessed at a single hospital. Fifty eight general medical patients on three or more medicines (22% of discharges) were counselled on discharge by one of the pharmacists. This took an average of 11.4 minutes per patient or 60 minutes/week for the ward studied. Fifty five of the 58 patients received questionnaires which they were asked to complete at one week after discharge; 26 (47%) returned the questionnaire. Twenty four found the sessions useful. They could recall the names of 4 medicine on average (discharged on mean of 4.9), could recall many of the reasons for taking the medicines and fewer side effects. Ranked in order of importance, 52% of patients thought that information on when to take medicines was the most important followed by what the medicines are (29%), side effects (52%), drug names (41%) and storage information (64%) (results from 17 patients).

325. Colaluca A, Glet R, Smith D, Hunter G, Kinsman M and Purkiss R. In-patient counselling - a technician's role. *Br J Pharmaceutical Practice* 1988;10:334-40.

Descriptive study:

This paper reported on the setting up of a program to train technicians to counsel patients. An eight week training program was set up. Suitable patients were selected for counselling at discharge by pharmacists. The pharmacist provided the technician with information on the patient and gave sufficient advance notice to allow the technician to prepare the counselling material. In routine practice patient selection took 5-10 minutes per patient and technician counselling took 30-60 minutes (including preparation time). The scheme was considered to be worthwhile.

326. Sweeney SJ, Dixon JS and Sutcliffe I. The impact of the clinical pharmacist on compliance in a geriatric population. *Pharm J* 1989;242:R4-6.

Objective:

To ascertain if a pharmacist could increase compliance by counselling elderly patients prior to discharge using large print labels, compliance aids and information leaflets where appropriate. To evaluate the effect on compliance of the number of medicines prescribed, the frequency of administration and patients' social status.

Methods:

A prospective controlled study was carried out on 103 consecutive patients discharged from a single hospital who were over 60, taking more than two medicines, responsible for self-administration, and not receiving anticoagulants, chemotherapy or topical dermatological preparations. Patients were allocated first to the control group (n=52) and then to the test group (n=51). Patients were followed up at one and 6-7 weeks post discharge by the pharmacist to assess their ability to cope with their medicines (by questioning) and to assess their compliance (tablet count). Questions were asked also about other medicines that were being taken. A re-supply of medicines was given (2 weeks supply initially and at 6-7 weeks an 8 weeks supply at the first visit). Patients were divided into those whose compliance was excellent, those who made few errors and those who made sufficient errors to compromise their well-being (> 15% non-compliance as assessed by tablet count).

Results:

Patients were similar in age and sex. The mean number of medicines being taken by controls was 3.7 (4.6 for test patients). Seventy percent of patients were followed up fully. Perfect compliance was doubled in the test group and serious non-compliance reduced by 80% at 6-7 weeks. Counselling took 5-15 minutes. Many patients found the large print helpful; other aids were also found to be helpful.

Assessment of study: (strength, size of effect, generalisability)

This study was open to bias, because the assessor was aware of the group to which patients belonged, and confounding, due to compliance being assessed by tablet counting. In the circumstances it was reasonable not to randomise but a larger number of medicines were being taken by test patients at baseline which may have influenced the results. The effect was moderate but not generalisable.

327. Dodds LJ. Effects of information leaflets on compliance with antibiotic therapy. *Pharm J* 1986; 236:48-51.

Objective:

To evaluate the effect of antibiotic information leaflets on compliance by patients who had been discharged from hospital.

Methods:

In a prospective single blind controlled study at a single hospital, patients were randomly allocated to a control group or to receive a leaflet on one antibiotic. Nurses were requested not to provide additional counselling; if the patient asked for it they were withdrawn. Compliance was assessed, by a pharmacist who was aware of the group to which patients belonged, using tablet count and an interview 3-5 days after discharge. The interview was standardised and was scored by the pharmacist doing the visit and an independent assessor.

Results:

Over 3 months, 30 control and 31 test patients were recruited. They were similar at baseline in age, sex, number of drugs prescribed, and the number and doses of antibiotics prescribed. Compliance, knowledge and behavioral scores were significantly higher in the test group than in the control group ($p < 0.01$). Patients receiving two antibiotics ($n=22$) were given a leaflet on one. Their scores for that antibiotic were significantly higher than for the other antibiotic that they were taking and for which they had received no leaflet ($p < 0.05$). There were no differences between groups in the number of ADRs that patients reported. Patients receiving the leaflets reacted favourably to them; 80% thought that they were useful and 70% thought that they were necessary.

Assessment of study: (strength, size of effect, generalisability)

The study controlled for bias and confounding but it was conducted at a single site. The results for study with an appropriately short follow-up period cannot be extended to other drugs that may be taken for longer periods. The effect was modest to large but the results are not generalisable.

328. Sandler DA, Mitchell JRA, Fellows A and Garner ST. Is an information booklet for patients leaving hospital helpful and useful? *Br Med J* 1989;298;870-4.

Objective:

To determine if a booklet given to general medical patients on discharge, which included details of their admission and treatment, increased their knowledge and recall at subsequent outpatient clinics.

Methods:

A prospective trial was carried out with alternate allocation to test ($n=65$) and control ($n=66$) groups. Patients were stratified by age (up to 65 years and over 65 years) and the number of weeks between discharge and first outpatient visit (up to 3, 4, 5, 8 and over 8). The assessment was made using a questionnaire administered by the investigators at the first outpatient attendance. Data were collected over nine months. Patients' educational status was noted and also whether they used the booklet or other sources to answer questions on their treatment at the assessment. Patients' general practitioners were asked to return an appraisal form on the booklet.

Results:

Patients' knowledge of their medicines was increased by a joint pharmacy-physician booklet; recall of drug name, frequency of dose and reason for taking the drug was better in the test

(86%, 95% and 85% respectively) than in the control group (47%, 58% and 42% respectively) ($p < 0.001$). Many patients used the booklet as an aide memoir. Even if these patients' results were excluded, a significant difference remained between test and control groups in their ability to recall information about their therapy. Most (98%) test patients and 73% of control patients would take the correct action when their supply ran out. Most patients (86%) had read the booklet at least once. Seventy two percent of GPs replied to the appraisal forms. Of these 91% thought it was a good idea, 81% thought it would be helpful to them and to the patients, and 72% thought that it was an improvement on the old system.

Assessment of study: (strength, size of effect, generalisability)

A moderate to large effect was seen in this well-performed study but the results may be subject to bias due to alternate rather than random allocation of patients. The results are not generalisable since the study was conducted at a single site.

329. Raynor DK, Booth TG and Blenkinsopp A. Effects of a computer generated reminder chart on patients' compliance with drug regimens. *Br Med J* 1993;306:1158-61.

Objective:

To investigate whether a reminder chart improved patients' compliance with their drug regimen after discharge from hospital.

Methods:

A prospective randomised controlled trial was performed of patients being discharged from a single general hospital who were regularly receiving two or more medications. Patients were randomised to four groups. Two groups received the reminder chart (a computer generated chart which listed details of the medicines being taken and when they were to be taken). One of these two groups also received routine counselling from a nurse and the other group received structured counselling from a pharmacist which included an explanation of the reminder chart. The other two groups received only counselling, from either a nurse or a pharmacist. Patients were visited 10 days later and questioned about their regimen to assess their knowledge. Compliance was assessed by a pharmacist investigator using tablet count.

Results:

One hundred and ninety seven patients were involved. The statistical method was appropriate and groups were similar at baseline with respect to age, sex and number of medicines being taken. Patient compliance and knowledge of medicines were increased by a pharmacy-generated reminder chart. Of those receiving it, 83% correctly described their drug regimen (95% confidence interval=74-90%) compared with 47% (95% CI=37-58%) of those without the chart ($p < 0.001$). Pharmacist counselling alone did not improve knowledge nor had it an additional effect on knowledge over nurse counselling. The mean compliance score was 86% (95% CI=81-91%) in the two groups with no reminder chart compared to 91% (95% CI=87-94%) in the group with a chart but no counselling and 95% (95% CI=93-98%) in the group with the chart and counselling. A mean compliance score in excess of 85% was achieved by 63% (95% CI=53-73%) of those without a reminder chart and by 86% (95% CI=78-93%) by those with it ($p < 0.001$). Most patients receiving the chart thought it was useful in helping them take their medicines correctly (66/98) and had used it (86/98).

Assessment of study: (strength, size of effect, generalisability)

This was a well-conducted moderately-sized randomised trial. The effect was moderate to large. Precautions were taken to optimise the validity of tablet counting as a method of assessing compliance and to ensure that a note was made of patients who read the instructions

from labels reminder chart. A small risk of bias remained due to the pharmacist assessing patients' knowledge. It excluded patients with reading difficulties, the illiterate, and those with visual impairment (among others), followed patients for only 10 days and was conducted at a single site, hence the results are of limited generalisability.

330. Gibbs S, Waters WE and George CF. Prescription information leaflets: a national survey. *J Royal Society Medicine* 1990;83:292-7.

Descriptive study:

This was an evaluative study of the effect of information leaflets (on penicillins, NSAIDs or beta blockers) that were given to patients in community pharmacies on their knowledge of their medicines and satisfaction with this information. The 1809 patients who received leaflets were significantly more satisfied with the information received and knew more about their medicines than the 1601 who had not been given them.

331. Furner M, Habing-Ridout H, Cross J, Wray L, Dodds L and Collins G. Patient information leaflets. *Pharm J* 1994;252:7.

Opinion paper:

The view was expressed in this paper that patient information leaflets, which from 1/1/94 must be provided as package inserts by the pharmaceutical industry, could be helpful in increasing patient information on their medicines. Although there will be a need for the industry and pharmacists to adjust to the new situation, they felt that pharmacists should take advantage of the change in the law to optimise the provision of advice to patients.

332. Dodds L. Industry-produced patient information leaflets; Are hospital pharmacies making use of them? *Pharm J* 1993;250:311-4.

Descriptive study:

As part of this study the attitudes of a systematic sample of 100 hospital pharmacies to industry-produced patient information leaflets (PILs) were assessed. Sixty one percent (all dispensary pharmacists) returned a postal questionnaire. Forty eight were providing verbal and/or written information to some or all out-patients and 44 were providing this service to a proportion of discharged patients. Most, however, greatly underestimated the number of companies producing PILs. Few had read any PILs and many (70%) seldom or never (7%) used them in counselling patients. Eighty five percent thought that hospital pharmacies should distribute PILs and 84% said that they would use them if they were supplied by the industry. Most (98%) thought that the provision of PILs should be accompanied by verbal counselling.

333. McElnay JC, Scott MG, Armstrong AP and Stanford CF. Audiovisual demonstration for patient counselling in the use of pressurised aerosol bronchodilator inhalers. *J Clin Pharm Ther* 1989;14:135-44.

Descriptive study:

This paper described the development and use of a video to help train asthmatics in the correct use of their inhaler therapy. An assessment of the method using non-asthmatic volunteers found that the video was as effective as personal counselling by a pharmacist and better than the use of the package insert ($p < 0.05$). An assessment of the acceptability of the video to community ($n=40$) and hospital ($n=68$) patients found that 95% and 85%, respectively, found the video useful. Two thirds of community patients and 50% of hospital patients identified an error in

their technique as a result of seeing the video. Most thought that the video should be available in all pharmacies (95 and 87% respectively). Almost all patients thought that the video explained the inhaler technique well. This was not a service evaluation.

334. Freemantle N and Maynard A. Something rotten in the state of clinical and economic evaluations. *Health Economics* 1994;3:63-7.
Opinion:
This paper described the lack of rigour in the currently available economic and clinical evaluations of health interventions.
335. Mazzuca SA. Does patient education in chronic disease have therapeutic value? *J Chronic Dis* 1982;35:521-9.
This paper was a meta analysis of 30 controlled trials (24 of which used randomisation) on the education of patients with chronic diseases. These papers were taken from the worldwide literature on the topic. The results showed that programmes that tried to increase patient knowledge alone were rarely successful; behaviourally-orientated programs were consistently more successful in improving the clinical outcome of chronic disease. Patient education was successful in improving compliance but knowledge and compliance may not be linked. There were problems in this meta analysis due to variations in the definitions of counselling and compliance.
336. Raynor DK. Patient compliance: the pharmacists' role. *Int J Pharm Pract* 1992;1:126-35.
Review:
The author based the review on work completed for his doctoral thesis (University of Bradford, 1991). He described a variety of methods used to improve patient compliance including counselling, information leaflets, compliance aids, packaging, tailoring the regimen to the patient's lifestyle, self-administration schemes and individualised leaflets. He said that no single intervention on its own had been effective. The relatively high cost of providing many services plus the present cost-conscious NHS environment meant that pharmacists, whom he felt had a role in improving patient compliance by informing and educating patients, will have to direct their efforts to developing cheap, effective programs that are generally applicable and acceptable to patients and the medical profession. He stated that effective verbal counselling improved knowledge but not necessarily compliance. He felt that the approach to patient education should combine verbal information with written information that is easily understood. Certain compliance aids, such as reminder charts, may improve compliance in sub-groups of patients. Pharmacist's greatest effect would be to simplify regimens to reduce the number of medicines being taken to four and dosing to twice a day at most.
337. Goodyer LI. Measurement of the effects of medication counselling given to elderly patients with heart failure. (PhD thesis). London: University of London, 1992.
Objective:
To determine whether improved compliance, as a result of intensive medication counselling by a pharmacist, in elderly patients with chronic stable heart failure can influence both objective and subjective measures of heart failure.
Methods:
This was a prospective randomised controlled study of the effect of counselling on knowledge

(measured by questionnaire), compliance (tablet count), and outcome (sub-maximal 6 minute exercise test, visual analogue scores (VAS) of breathlessness, the Nottingham Health Profile (NPH) and clinical signs of heart failure) of elderly patients with congestive heart failure. These factors were measured at baseline and three months after patients had been receiving counselling from a pharmacist.

Results:

Fifty patients were recruited to the test and control groups. Patients were similar at baseline. Patients' knowledge of their medication increased in the test group. The proportion of test patients able to name their medication increased from 25% to 83% (controls remained at 0%). The proportion of test patients able to state the purpose of their medication increased from 83% to 100% (increased from 87% to 91% for controls) and the proportion of test patients able to state the dose of their medication remained at 100% for both groups. The proportion of test patients able to name adverse drug reactions increased also. In all cases the difference was statistically significant. Compliance increased by 32% in the test group (from 61% to 93%) whereas it increased only slightly, from 49% to 51%, for control patients. Outcomes improved for the test group: the six minute test increased by 20m and the distance travelled until breathless increased by 26m (compared to reductions of 22m and 19m, respectively, for controls). All changes were statistically significant ($P < 0.05$). No correlation was found, however, between changes in exercise tests and improved compliance. Peripheral and pulmonary oedema scores improved for the test patients and remained unchanged for controls but this was not statistically significant. The NPH score differences did not reach statistical significance but changes in VAS did.

Assessment of study: (strength, size of effect, generalisability)

This was a moderately-sized, well-performed, study. Patients and researchers were aware of the study and the designation of the patients hence there was a risk of bias. The use of several assessors would have reduced this potential effect. The validity of tablet counts as a means of assessing compliance is open to question. Patients' clinical conditions were said to have remained stable since their prescriptions altered very little. Change in outcomes that were observed were small. In addition, the absence of a correlation between changes in compliance and outcome could have been due to confounding (tablet counts might have reflected compliance poorly). The results were not generalisable.

338. Vincent CA Research into medical accidents: a case of negligence? *Br Med J* 1989;299:1150-3.

Report:

This paper described the systems that were available in the UK for studying and tracking the incidence of medical error. These systems, which include the literature, confidential inquiries, negligence cases, audits and studies of errors, were considered to be inadequate in providing information about the causes and methods of preventing error.

339. Leape LL, Brennan TA, Laird N, Lawthers AG and Hiatt H. Adverse events and negligence in hospitalised patients. *Iatrogenics* 1991;1:17-21.

Descriptive study:

A survey of a random sample of 30195 patients discharged from hospital in New York state in 1984 showed that 1133 (3.7%) had suffered disabling injuries due to medical treatment. In 27.6% of cases the injury was due to negligence. Drug complications were the commonest form of adverse effect (19%) and antibiotics, anticoagulants and antitumour drugs were most

often implicated. Drug-related adverse events were responsible for 17.7% of all cases deemed negligent and 14.1% of events resulting in serious disability. The authors claimed that some adverse events could have been prevented by redesigning the systems for processing medication orders and administering medicines. They suggested the use of a computerised system with patient-specific feedback to the prescriber.

340. Dubois RW and Brook RH. Preventable deaths: Who, how often, and why? *Ann Intern Med* 1988;109:582-9.

Descriptive study:

This paper described the creation of a method that examines the issue of preventable deaths. Summaries of the hospital course of 182 patients who died in 12 hospitals due to cerebrovascular accident, pneumonia and myocardial infarction were reviewed by a panel of at least three doctors. Using a majority rule criterion they found that 27% of deaths may have been preventable; with unanimity rule this became 14%. They admitted that there was a need to validate their methods but claimed that among the major causes of preventable death were inadequate fluid management, control of arrhythmias, and treatment of angina, cerebral oedema and sepsis, and improper use of antibiotics.

341. Einarson TR. Drug-related hospital admissions. *Am J Hosp Pharm* 1993;27:832-40.

Descriptive report:

This paper reviewed and summarised studies reporting drug-related hospital admissions obtained by computerised and manual literature searches. Medline, Index Medicus and International Pharmaceutical Abstracts were searched using the key words drug, drug-related or iatrogenic; admission, hospital admission, or hospitalisation; and ADR or adverse drug reaction. References from the articles that were found were followed up. The studies that were selected were in English. They reported the results of studies of humans admitted to hospital due to drug related adverse events resulting from drug use, non-compliance or unintentional inappropriate drug use. Adverse events due to drug abuse, alcoholism, suicide attempts, intoxication or inadequate prescribing were excluded. Between 1966-1989 the ADR rates at 49 hospitals or groups of hospitals in a variety of international settings, including the UK, were published in 36 articles. Sample sizes ranged from 41-11891 patients (median=714, IQR=275-1245; mean=1412, sd=2233). The prevalence of reported admissions resulting from ADRs ranged from 0.2-21.7%. The median was 4.9% (IQR = 2.9-6.7%). The mean was 5.5% (sd=4.1%). The weighted meta analytic estimate of ADR prevalence was 5.1% (95% CI = 4.4-5.8%). Of the ADR admissions, 71.5% were due to side effects, 16.8% were due to excessive effects, 11.3% were hypersensitivity reactions and 0.4% were idiosyncratic. Of those admitted with ADRs, 3.7% died. Eleven reports indicated that 22.7% of ADR hospitalisations were induced by non-compliance. The results only apply to hospitalisations in developed countries. No economic analyses of ADRs were found.

342. Hutcheon AW, Lawson DH and Jick H. Hospital admissions due to adverse drug reactions. *J Clin Pharm* 1978;3:219-24.

Descriptive study:

The authors described the results of participation by two Scottish hospitals in the Boston Collaborative Drug Surveillance Program. Of 2580 consecutive admissions to medical wards in these hospitals, 85 (3.3%) were attributed to drugs taken at normal doses and 66 (2.6%) to

overdoses. The proportions in the two hospitals were similar. The most frequently implicated drugs at normal doses were aspirin, digoxin, warfarin, phenylbutazone and insulin. These accounted for 51% of all admissions due to adverse effects. The authors described the adverse effects in detail. For overdoses, central nervous system drugs were the most frequently implicated.

343. Alexander AM and Barnett JW. The Hereford Hospital prescribing study: Hospital activity analysis as a source of adverse drug reaction data. *J Clin Hosp Pharm* 1983;9:45-50.
Descriptive study:
This paper described a study that assessed the usefulness of a hospital activity analysis (HAA) system in recording adverse drug reactions (ADRs) at a single hospital. Five years of data were examined for ADRs and the notes of those identified as potentially having experienced ADRs were examined to obtain more information. ADRs were recorded as diagnoses for 126 (0.5%) of the 27,398 admissions. In 110 (87%) of these cases, ADRs were the cause of admission. Most ADRs were due to cardiovascular drugs (34.9%), primarily digoxin (28%). Most (87%) ADRs occurred prior to admission. ADRs experienced during the hospital stay were diagnoses for 0.03% of patients.
344. Lawson DH and Jick H. Drug surveillance for adverse drug effects. A study of medical inpatients. *J Clin Pharm* 1978;3:203-10.
Descriptive study:
The authors described the results of participation by two Scottish hospitals in the Boston Collaborative Drug Surveillance Program. Two thousand five hundred and eighty consecutive admissions to 2 medical wards in each of these hospitals were studied over three years. On average, patients received 4.6 drugs during admissions. The commonest adverse effects were nausea (5.4%), vomiting (4.3%), elevated urea levels (3.7%) and drowsiness (3.4%). Serious side effects were rare and included arrhythmias (1.5%), hypokalaemia (1.4%) and coagulation abnormalities (0.9%). The reporting physician only expressed significant doubts regarding causality in 7.1% of instances.
345. Inman WHW, Richards DJ and Rondel RK (eds). Monitoring by voluntary reporting at national levels. *Adverse Drug Reactions; their prediction, detection and assessment*. Edinburgh: Churchill Livingstone 1972 page 86.
Descriptive report:
This paper stated that only 1-10% of adverse effects are reported to the Committee of Safety of Medicine in the UK.
346. Veitch GBA and Talbot JCC. The pharmacist and adverse drug reaction reporting. *Pharm J* 1985;234:107-9.
Descriptive study:
This paper described adverse reactions (ADR) reporting schemes in the UK and abroad and 10 years experience with such a scheme in the West Midlands. Ten percent of queries about ADRs to a hospital in the region resulted in Committee of Safety of Medicines (CSM) reports in the years 1976 to 1981. The paper provided opinions on ways of using ward and clinical pharmacists to help detect and report ADRs.

347. Spencer MG. Post marketing surveillance. *Pharm J* 1985;235:372-5.
Opinion paper:
This paper described the potential and actual contribution that pharmacists can make to post marketing surveillance in hospital. The author described the Welsh voluntary reporting scheme in detail and the contribution that drug information centres made in replying to adverse reaction queries. He advocated an increased role for hospital pharmacists in reporting adverse reactions to the Committee of Safety of Medicines.
348. Biddolph A. The developing role of the hospital pharmacist in adverse drug reaction reporting. *Proceedings of the Guild* 1983;17:21-43.
Descriptive study:
This paper examined the role that Australian hospital pharmacists played in adverse drug reaction (ADR) monitoring and explored the potential for the development of this role in the United Kingdom. It also described roles adopted in this area in the UK. In particular, it described the work done in the Northern Region and Wales (in combination with their drug information units) and in the West Midlands and Trent Regions.
349. Talbot JCC and Beeley L. Adverse drug reaction reporting in the West Midlands. *J Clin Hosp Pharm* 1980;5:49-54.
Descriptive study:
This paper described the setting up and success of a voluntary adverse drug reaction (ADR) reporting scheme in one region. Pharmacists were involved in assessing the ADR reports, requesting additional information if necessary, and compiling bulletins for distribution to pharmacists, doctors and others in the UK and abroad. Pharmacists were encouraged also to help complete yellow cards.
350. Talbot JCC. The hospital pharmacists' contribution towards monitoring and reporting adverse drug reactions. *Proceedings of the Guild* 1982;12:11-33.
Descriptive study:
This paper described the West Midlands ADR reporting scheme, the roles played by the drug information pharmacists, the ward pharmacists and others involved, and claims that the scheme had increased reporting between 1976 and 1980. The change in the number of ADR reports sent to the CSM was unknown hence the effectiveness of the scheme had not been evaluated.
351. Booth NJ, Luscombe DH, Smith CC, Veitch GBA and Grahame-Smith DG. Scheme to promote, monitor and assess the reporting of adverse drug reactions. *Pharm J* 1988;241:R3.
Descriptive study:
This paper described an ADR scheme in one Oxfordshire hospital. Reports were collected, followed-up and assessed by a team that included a pharmacist and a clinical pharmacologist. The scheme was similar to that described by Irvine et al (1987). ADR reports were assessed for causality, using an algorithm, and severity, using a five point scale. Where appropriate the reporter was advised to send the report to the CSM. In 6 months 125 reports had been made (2029 total admissions) of which 17 were sent to the CSM. The authors discussed how they overcame several problems in ADR reporting schemes, such as doctors' ignorance of schemes, doctors' lack of time to complete forms, the lack of provision of feedback to medical staff and the lack of awareness amongst medical staff of the relationship between an ADR and drug use.

352. Hardman C and Lloyd B. Adverse drug reaction monitoring by ward pharmacists. *J Clin Hosp Pharm* 1982;7:71-3.
Descriptive study:
In 5 weeks, ward pharmacists at a 500 bed hospital detected 68 ADRs. Of these 71% were definite, 9.7% probably, 12.9% doubtful and 6.4% unlikely using the West Midlands algorithm form for assessing ADRs. One report was sent to the CSM.
353. Smith D. Prescription flagging to stimulate yellow card reporting. *Hospital Pharmacy Practice* 1992;2:103-4.
Objective:
To assess a system to increase adverse drug reaction (ADR) reporting rates.
Methods:
A prospective before/after study was performed at a single large general hospital to assess the effects of pharmacists using the CSM black triangle on drug charts to increase awareness of the potential for an ADR occurring.
Results:
The number of reports sent to the CSM in the two years preceding the scheme were 3 and 5, respectively, of which 1 in each year were on blank triangle drugs. Following the introduction of the scheme these figures increased over the next two years to 7 and 10 reports were sent of which 3 and 4, respectively, were on blank triangle drugs.
Assessment of study: (strength, size of effect, generalisability)
The size of the effect was small. The results were open to bias and confounding due to poor implementation of the scheme and assumptions regarding the numbers of ADR reports to the CSM. They are not generalisable.
354. Richardson J and Gibb C. Active adverse drug reaction reporting. A pilot study. *Hospital Pharmacy Practice* 1992;2:247-8.
Objective:
To assess the effects of a system to increase ADR reporting rates.
Methods:
A prospective before/after study was performed at a single large general hospital to assess the effects on adverse drug reaction (ADR) reporting rates of pharmacists using the CSM black triangle on drug charts, in addition to labelling the medication container with a yellow warning sticker and increasing awareness by a campaign sponsored by the Drug and Therapeutics Committee. The number of ADRs reported was counted.
Results:
The scheme had increased the monthly number of ADR reports from 4 to 12 in the first three months.
Assessment of study: (strength, size of effect, generalisability)
The size of the effect was moderate to large. The results were open to bias and confounding since it was an uncontrolled study. They are not generalisable.
355. Spencer MG. Adverse reactions - monitoring side effects. The Welsh adverse drug reaction scheme. *Proceedings of the Guild* 1986;21:58-61.
Descriptive report:
This paper described the setting up and success of a voluntary adverse drug reaction (ADR)

- reporting scheme in Wales. The scheme was similar to that established in the West Midlands. Before the scheme was instituted, the average annual number of adverse events reported in Wales (to the Committee of Safety of Medicines) was lower than the UK average. One pharmacist helped to co-ordinate the scheme. The scheme has improved reporting from 385 to 520 ADR reports in the first year (37%).
356. Anon. Hospital pharmacists "should be involved in ADR reporting". *Pharm J* 1988;241:656.
Report:
 It was advocated in this report that the Committee of Safety of Medicines should allow pharmacists to participate in their yellow card scheme. The West Midlands scheme encouraged pharmacist participation and had achieved a higher rate of reporting than elsewhere.
357. Anon. Hospital pharmacists seek involvement in ADR monitoring. *Pharm J* 1989;242:433-4.
Report:
 Some clinical pharmacologists supported hospital pharmacists' involvement in ADR reporting although there was debate about the cost-effectiveness, and benefit, to patients from such a system.
358. Committee of Safety of Medicines. Report of the adverse reactions working party. London: Department of Health and Social Security, 1985.
Report:
 The working party accepted that hospitals pharmacists had a role in investigating and assessing ADR reports but they recommended that pharmacists should not report ADRs to the CSM independently.
359. Anon. Hospital pharmacists to use yellow cards in proposed CSM study. *Pharm J* 1990;244:330.
Report:
 This report stated that the CSM had started a trial that allowed hospital pharmacist in the Northern Region to report ADRs to them using specifically labelled yellow cards. Reports from a pharmacist could only follow from a discussion between the pharmacist and the patient's doctor about the ADR.
360. Randhawa HK, Smith JC and Irvin LE. Hospital doctors' attitudes to adverse drug reactions and their reporting. *Pharm J* 1987;238:793-5.
Descriptive study:
 The authors described the results of an interview survey of 60 randomly-chosen hospital doctors to determine their attitudes towards adverse drug reaction (ADR) reporting (one year after the local scheme had started). The survey was carried out by a pharmacy student. Twenty seven doctors had reported an ADR previously. There were 17 consultants, 13 senior registrars/registrar and 10 senior and 20 junior house officers. Most (85%) doctors thought that there was a low level of ADR reporting. This perception was similar for reporters and non-reporters although reporters perceived a higher incidence of ADRs causing admissions than non-reporters. Only 26% knew what the new product awareness sign meant. Seventy two percent felt they would be able to identify ADRs if they occurred. The problems in identifying ADRs were establishing which drug was causing the ADR when patients were on multiple

drugs (34%) and difficulty in distinguishing between organic disease and ADRs (30%). Seventy percent said that would report ADRs but only those that were significant ADRs. Reasons for under-reporting were complacency (2%), fear of litigation/breach of confidentiality (2%), guilt that harm had been caused (2%), ambition to publish case reports (5%), ignorance of how (5%) and what (32%) to report, difficulty in reporting suspected ADRs (39%) and lethargy/lack of time (13%). Eighty two percent were aware of the local ADR scheme (95% for reporters and 68% for non-reporters). Seventy one percent felt that there were advantages in a local ADR scheme such as simplicity in completion of reports (29%) and encouragement of discussion and feedback (22%). Forty seven percent said that greater involvement of the pharmacist would be an advantage. When asked if pharmacists should be involved in actual reporting 70% agreed that they should report in conjunction with doctors, 10% thought that they should report directly and 20% felt they should not report at all.

361. The NHS Management Executive. Clinical Audit. Meeting and improving standards in healthcare. London: Department of Health, 1993.
Policy:
This described the Department's policy on, and commitment to, clinical audit.
362. Pruce D. Professional audit in hospital pharmacy. Pharm J 1993;251:151.
Opinion paper:
This paper outlined the Royal Pharmaceutical Society audit development fellow for England's opinions on hospital pharmacy audit. He concluded that there was evidence that UK pharmacists were participating in professionals audit and quality assurance.
363. Shaw R. Quality assurance of hospital pharmacy services. Pharm J 1993;251:HS45-6.
Descriptive study:
This article outlined the use of quality assurance in measuring performance in hospital pharmacy services and in improving their quality. It addressed standard setting, performance measurement and customer care and provided a view on future initiatives in the quality assurance of hospital clinical pharmacy services.
364. Pruce D. Professional audit. Audit activities within English hospitals. Pharm J 1993;251:HS40-1.
Report:
The Royal Pharmaceutical Society audit development fellow for England reported on the extent and depth of interest in audit in hospital pharmacy. His advertisement in the Pharmaceutical Journal asking for information on audits led to 50 replies. In addition, there were 23 bids for audit money from a Society fund. Several hospitals had adopted standards documents for services but there was variation in the conduct of audit. Some pharmacies had also used external audit to assess their services. Many audits concentrated on intervention monitoring, waiting times, patient satisfaction, national schemes (drug information, radiopharmacy and community services pharmacy) and focused audits (problem areas). Pharmacists were also taking part in clinical audit.

365. Kelly CA and Mason-Duff J. Two years on the audit trail in Scotland. *Pharm J* 1993;251:HS42-3.
Descriptive study:
This paper described the national audit structures and the local ones in Scotland. It also described education and training initiatives to support audit and various audit projects in clinical pharmacy, drug information and other areas of service provision.
366. Roberts DE. Professional audit in Wales. *Pharm J* 1993;251:HS44-5.
Descriptive study:
This paper described the progress that had been made in Wales to increase pharmacists' participation in pharmacy and clinical audit. A survey of 8 hospitals showed that audits were being performed. The topics that had been addressed included interventions, waiting times, dispensing errors, efficiency of drug purchasing systems and complaints.
367. Audit in pharmacy. A report of a working party of the Royal Pharmaceutical Society (Chair; N Wood). *Pharm J* 1992;248:505-9.
Report:
This report described audit, the types of audit, the audit structure and process, the training implications for pharmacists and the case for audit. The potential interaction between pharmacy audit and the audits being undertaken by other professions was briefly covered. This document outlined the Society's support for audit in the profession and the efforts that they intend to make to develop audit.
368. Cole SE, Hebron B and Scott D. The quality of the pharmacy supply service to wards. *Pharm J* 1988;241:R8.
Descriptive study:
This paper described a system that assess nurse satisfaction with pharmacy supply services. Over a 6 week period, less than 1% of the 27740 doses that would have been administered to patients were missed. Half of all missed doses were first doses. The system was seen as a step towards improving the quality of service.
369. Cox H and Mounsey C. Pharmacy quality circles. *Pharm J* 1989;245:HS34-5.
Descriptive study:
This study described the setting-up of a quality circle in a single general hospital. Most staff were interested in the idea and 11/30 went on to receive training after initial introduction to the idea. The article described the training given (techniques used were brainstorming, flow charts, cause and effect analysis, pareto analysis and paired comparisons), the selection of the problem for analysis (inaccuracies in computer stock levels) and the process of solving the problem. There was a 70% reduction in the number of visits made to stores by dispensary staff as a result of implementing a corrective system.
370. Godfrey B, Smith EJ, Williams MA, Burberry PN and Farrar KT. Using workload audit to enhance the quality of pharmacy services. *Pharm J* 1990;246:R1-3.
Objectives:
To assess the effects of various strategies to improve workflow in the dispensary in a large general hospital.

Method:

A prospective cross-sectional survey of dispensary workload, waiting times, processing times, and dispensing times was carried out before and after the sequential introduction of various changes in work practices. The changes were designation of a specific checking area (1987-8) and of a professional checker to check prescriptions on arrival and a technician to check final products (1988-9). The surveys took place over one week periods in October 1987 (before) and October 1988 (after 1) and in March 1989 (after 2) for the in-patient dispensary and in October 1987 (before) and March 1988 (after) for outpatients. Staffing factors were also noted.

Results:

There was no change in overall staffing levels but the ratio of pharmacists to technicians and pre-registration pharmacists fell from 1.16 (1987) to 0.99 (1988) and 0.71 (1989). Despite an 8% increase in workload from 1987 to 1988, and a further 16% increase between 1988 and 1989, queuing, dispensing and checking times fell in successive years in the main dispensary. Waiting times in excess of 140 minutes fell and those less than 140 minutes rose. There was a reduction in the percentage of prescriptions with waiting times of more than 60 minutes from 36 to 30%. Despite a 7% increase in workload in the out-patients dispensary, most prescriptions were completed within 20 minutes (84%) after the changes compared to 31% completed in 20 minutes before the changes.

Assessment (size of effect, design, generalisability):

The size of the effect was moderate. The study was well-conducted but may be subject to bias. The results are not generalisable.

371. Hayes P, Kayne S, Martin T and McMurdo A. Use of professional self audit in pharmacy practice. *Pharm J* 1992;249:650-2.

Report:

The paper provided a practical interpretation of the Pharmaceutical Society's guide to self-audit. It drew on experience of audit in New Zealand to do this.

372. Hynam B. Pharmaceutical audit in practice. *Pharm J* 1993;250:844-5.

Descriptive report:

The author reported on the external audit activities of a group of pharmacists from the West Midlands region. They piloted an audit process in several hospital in the region with much success. The process included a visit to a hospital pharmacy by 3 senior pharmacists from other districts. The team-members rotated. In the first year they concentrated on ward pharmacy and distribution systems. The visiting team audited the service in the hospital in co-operation with the pharmacists there and reported their findings back to the hospital pharmacy. The team did not follow-up sites to complete the audit cycle. The author claimed that the system had been well-accepted and that there was support for creating a permanent team to perform this function.

373. Glin J, Hubbard N and Pickup JF. Intervention reporting on the South Western Region computer system. *Pharm J* 1993;251:HS24-6.

Descriptive study:

This paper described the background to the development of a region-wide computer system for recording and monitoring interventions. The system was based on standards set for the prescription monitoring service by clinical pharmacy managers in the region over a number of

years. The system, which had been developed at one site, allowed the routine collection of data. These data had been used to provide continuous management and clinical information, to record clinical pharmacy advice, to provide data for audit, to highlight recurrent problems, to provide material for continuous education and peer-review, and to reduce duplication of effort when pharmacists provided services to the same patients. The original system was upgraded and was found to reduce the number of queries from dispensary staff to clinical pharmacists but further adaptations were subsequently made to increase the comprehensiveness of the data set. The main modifications were to permit the recording of the clinical significance of interventions and their cost avoidance, and to log patient counselling and therapeutic drug monitoring advice. This new system was currently being piloted and it was envisaged that it might have applications in community pharmacy.

374. Hubbard CN and Elliott DN. Clinical pharmacy standards and audit: the South Western RHA approach. *Pharm J* 1994;252:61-2.

Descriptive report:

The authors discussed the approach taken to quality assurance of clinical pharmacy services in their region. A core document was created by one of the authors and refined by the clinical pharmacy managers group. This contained standards and criteria in a number of areas of activity. Standards were set for patient related services (ward pharmacy, provision of drugs and clinical pharmacy interventions), policy related clinical pharmacy (drug policy making committee work, drug use evaluation, written guidelines for drug use and formularies) and education and training (in-house and external courses, induction training and performance review). Criteria and object parameters were set and performance was being assessed in 13 provider units in the region as part of routine internal audit.

375. Davies G and Lewis L. Clinical audit - a new development? *Pharm J* 1989;245:HS30-1.

Descriptive study:

The conduct of clinical audit at a single general hospital was outlined in this paper. Pharmacists were initially invited to participate in a review of drug therapy for audit purposes by a hospital consultant. More recently their input had increased to two audits per month. The article described the audit process from the pharmacy perspective (aims, patient selection, preparation and presentation) and proposed certain benefits to patient and the hospital staff from their involvement. Benefits included an increase in pharmacists' ability to influence prescribing, an improved perception of pharmacy as a source of information, an increase in doctors' awareness of costs and prescribing trends, the subjection of prescribing to peer review, the optimisation and rationalisation of therapy and an increased awareness of issues such as compliance.

376. Ridley-Siegert D, van Kan E and Anthistle J. Audit of benzodiazepine prescriptions in hospital admissions. *Hospital Pharmacy Practice* 1991;1:311-3.

Descriptive study:

This paper described the results of a 3 month audit of all prescription charts of patients admitted to one ward in each of four areas (general medicine, general surgery, psychiatry and care of the elderly) in a general hospital. Doctors were unaware of the drug classes being studied, and in some cases, of the whole study. Details of patients and prescriptions were obtained by the pharmacists and recorded on special audit cards. Seven hundred and five patients were admitted, of which 344 were prescribed benzodiazepines. Three hundred and

ninety six prescriptions for the drugs under study were recorded; 41 patients were given more than one benzodiazepine or given them on more than one occasion. Most patients (328) were prescribed the drugs 'as required', usually for sleep (95%). At least 69% of prescriptions were initiated during the admission but few (4.7%) were continued on discharge. Forty one of 101 prescriptions for benzodiazepines started prior to admission were discontinued. Information was also gathered on prescriber and patient factors that influenced prescribing. The study showed that current prescribing guidelines at the hospital were being followed. The authors identified some areas for improvement which could be taken forward in the audit cycle.

377. Eccles S, Barber N, Frater A and Wilson P. A better pill to swallow. *The Health Services Journal* 1992;102:22-3.

Descriptive report:

This paper described efforts being made by pharmacists to become more involved in medical audit at four hospitals in a London Region.

378. Harris SK, Smith FJ and Moss F. The pharmacist's contribution to medical audit: Perceptions of doctors and pharmacists in the North West Thames Regional Health Authority. *J Soc Admin Pharm* 1993;10:36-41.

Descriptive study:

A random sample of 45 doctors and 15 pharmacists were selected for interview to obtain their views on pharmacists' potential contribution to medical audit. Forty two of the forty five doctors and all 15 pharmacists agreed to the interview. In general, doctors were positive in their attitude to pharmacist participation in audit. Although 10 had attended audits where pharmacists had participated, most (73%) would not have thought of inviting a pharmacist to their audits. On reflection 10 thought that it would be a good idea. Doctors suggested several areas where pharmacists could contribute such as the provision of drug usage and expenditure data (18/42), the provision of advice on drug choice during case presentation audits and the performance of drug use review reports (4/42), and the provision of drug information (5/42). When doctors were presented with 6 scenarios of pharmacist involvement in audit most would accept pharmacist involvement (acceptance ranged from 79 to 100%). Pharmacists thought that the doctors would accept their involvement also when presented with these scenarios but, in general, they were more negative and thought that there were medical and pharmacy barriers to pharmacists' participation in audit, such as conflict with medical staff and resource issues.

379. Bussey RA and Martin AM. Adverse drug reaction monitoring and the pharmacist. *Pharm J* 1985;235:593.

Objective:

To investigate how a clinical pharmacist working in close collaboration with clinicians could stimulate, complete and improve adverse drug reaction (ADR) reporting.

Methods:

This was an uncontrolled before/after study of the number of ADR reports made by medical and renal physicians in a single hospital.

Results:

The pharmacist assisted in collecting information and interviewing patients with suspected ADRs. Evidence was assessed by the pharmacist and the relevant clinician. If the result was a decision to report the ADR to the CSM then the pharmacist completed the form. It was then

signed by the doctor and forwarded it to the Northern Region reporting centre. For the 12 months before the study 2 ADRs were reported from the unit. In the 21 months of the study 79 ADRs were investigated of which 44 were decided to be true ADRs (39 reported by doctors and 5 by the pharmacist). These were forwarded to the CSM. The pharmacist interviewed 28 patients in hospital and a further 14 at outpatient clinic to gather evidence for the assessments. The pharmacist helped to establish the lack of evidence in support of 35 ADRs thereby improving the quality of reporting.

Assessment of study: (strength, size of effect, generalisability)

The effect was large. There was a risk of bias due to pharmacist collection of data and lack of controls. The results are not generalisable.

380. Irvin LE, Grimmer SFM and Smith JC. Adverse drug reaction reporting. *Br J Pharmaceutical Practice* 1987;9:316-21.

Objective:

To investigate ways in which the pharmacy department could encourage the identification and reporting of ADRs.

Methods:

A multidisciplinary team was set up to investigate problems associated with ADR reporting in a hospital. The numbers of ADR reports before and after setting up the team ADR reporting service were counted.

Results:

The multidisciplinary team (doctors and pharmacists) found that the lack of availability of CSM cards, the lack of time to fill them in and the lack of feedback on the reports were the main problems in ADR reporting. The team made changes. They monitored the ADRs reported and co-ordinated a reporting scheme. Clinical pharmacists became more involved in stimulating interest in the scheme in their daily work. A simple initial report card, which was collected twice daily by pharmacists and completed by them, was provided. An easily identifiable ADR card holder was placed on the wards. Feedback was given to doctors and others on the ADRs that had been reported by the medical and nursing staff and a regular bulletin on ADRs was published. In the year prior to the scheme the annual number of CSM reports/1000 acute beds was 18 (93% of reports); in the year following, this had increased to 74 (69%). In the first half of 1986, 47 reports were made per 1000 beds (56%). The proportion of ADR reports that were subsequently reported to the CSM (shown as a percentage in brackets) fell. The highest relative proportion of reports came from clinical pharmacology beds. Most cards were completed by doctors (58%) and pharmacists (40%). Subjectively, the authors thought that the service was improving the ease with which ADR reports were made. They felt also that patients had benefited from the earlier reporting of their ADRs, pharmacists' help in this area was more obvious to others and had become better appreciated and that the service had improved inter-disciplinary relationships.

Assessment of study: (strength, size of effect, generalisability)

The effect was large but the results were open to bias and confounding and are not generalisable.

381. Alexander AM, Barnett JW and Veitch GBA. The Hereford Hospital prescribing study. Investigation of methods to identify patients with adverse drug reactions. *J Clin Hosp Pharm* 1981;6:20-6.

Descriptive study:

This paper described a study that assessed the effectiveness of four methods of detecting adverse drug reactions (ADRs) at a single hospital that had a computerised patient data collection system called HAA. Patients receiving indomethacin were used to test the four methods. These were, firstly, diagnostic summaries were examined for references to ADRs, secondly, HAA data were searched for referral/transfer to an additional consultant, thirdly, prescribing data were searched for discontinuation of indomethacin and, fourthly, prescribing data were searched for evidence of the use of drugs that counteract the adverse effects of indomethacin. Of 2852 admissions in 1977, 120 were receiving indomethacin. Thirty seven percent were on it prior to admission, 82% received it during their stay and 38% received it on discharge. Diagnostic summaries revealed 3 ADRs and transfer data revealed none. Prescribing data revealed 19 discontinuations of indomethacin on admission of which 8 were ADRs. There were also 21 discontinuations of indomethacin for those who had been started on it during their stay of which 4 were ADRs. Prescribing data revealed also that 23 patients received antacids, 3 received anti-ulcer drugs, 12 received iron and 5 received antidepressants (drugs which were thought might potentially be prescribed for ADRs). No ADRs were investigated for validity or causality but the authors stated that routine monitoring of prescriptions was helpful in identifying ADRs.

382. Everden AJ. Adverse drug reactions. *Br J Pharmaceutical Practice* 1981;3(8)6-8.

Descriptive study:

The author reported a method of detecting adverse drug reactions (ADRs) based on examining the prescriptions for anti-diarrhoeals and antihistamines at a single hospital. Patients' notes were then reviewed and the probability of an ADR having occurred ascertained. Twenty eight patients received one, and 1 received two, anti-diarrhoeals. An ADR was a possible cause in 10 instances. Fourteen patients received antihistamines of which 10 were possible ADRs.

383. Robb J, McEvoy J, Greenwood E, Hollands R and Kopleman P. Blood glucose monitoring; completing the audit cycle. *Pharm J* 1990;248:590-1.

Objectives:

To review the effects of the audit process on the use of diabetic monitoring.

Method:

A time series study was carried out. It consisted of a questionnaire survey of nursing staff and ward pharmacists. Nursing staff were asked about the ward's use of glucose monitoring strips daily during two separate assessment weeks. In addition, ward pharmacists were surveyed daily and asked more specific questions about the use of glucose monitoring strips. The survey was conducted during the same months of 1987, 1988 and 1991 on the medical wards of two hospitals.

Results:

Pharmacy involvement in multidisciplinary audit in two UK District General Hospitals (DGHs) increased the appropriateness of the use of blood glucose monitoring in diabetics between 1987 (before) and 1988 (after 1). It also showed that the lack of a continuous involvement by pharmacy resulted in the ward staff reverting to their original pattern of practice (after 2,

1991). This indicated a continuing need for reinforcement of training via the audit cycle. The numbers of patients surveyed and the proportion of insulin-dependent diabetics were similar on all three occasions.

Assessment (size of effect, design, generalisability):

The study design suffers from time-related non-comparability; staff and other factors may have changed and influenced the result. The effect was moderate and generalisable although the numbers were small.

384. Cavell GF and Taylor KA. Prescription endorsing standards. An audit of clinical pharmacy practice. *Hospital Pharmacy Practice* 1993;3:367-72.

Objectives:

To develop an agreed list of prescription monitoring standards and to measure performance against them.

Method:

Two pharmacists developed the standards. An audit was carried out of the prescription monitoring activities of pharmacists before and 5 weeks after introducing the standards at hospitals in a healthcare district. Ten medication charts were selected at random on each ward on the same weekday and the pharmacists' endorsements were compared, by the two senior clinical pharmacists, with those recommended in the standards document. A seminar was held after the first audit to educate pharmacists and to allow them to put their ideas forward on prescription monitoring. The numbers of omissions were calculated for each phase of the study.

Results:

In the first audit 380 drug charts monitored by 17 pharmacists on 44 wards were audited (2276 items). In the second 391 drug charts monitored by 15 pharmacists on 44 wards were audited (2492 items). Twelve pharmacists took part in both audits. For these pharmacists, there was a significant ($p < 0.0001$) improvement in performance. On average the improvement was 63%. The proportion of omissions decreased from 20.6% on average (range = 6-41%) to 11.3% (range = 3.2-20.5). There was no correlation between workload and omission rate.

Assessment (size of effect, design, generalisability):

This study was well-conducted. The effect was large and the results are generalisable although the numbers were fairly small.

385. Bond CM, Williams A, Taylor RJ, Grimshaw J, Maitland J and MacLeod N. An introduction to audit in Grampian: a basic course for pharmacists. *Pharm J* 1993;250:645-7.

Objectives:

An introductory course in audit, run for community and hospital pharmacists in a single Scottish Health Board by a multidisciplinary group, was evaluated for its effects on pharmacists' attitudes to audit.

Method:

This was a prospective before/after attitudinal survey.

Results:

Sixteen community and hospital pharmacists attended the one day course. They all found it useful and enjoyable. Attitudes to audit tended to improve as did participants' perceptions of their ability to conduct audit.

Assessment (size of effect, design, generalisability):

The study used a survey which did not seem to have been validated. The numbers were small. The attitudinal changes were small and are not generalisable.

386. Cousins D. From CIVA to DIVA. *Pharm J* 1994;252:198-9.

Opinion paper:

The author provided an opinion on the importance of supplying intravenous additives (IVAs) in the 1990s. The former centralised service (CIVAs) was giving way to a de-centralised service (DIVAs), mainly due to the need for a patient-focused responsive service, the creation of the clinical directorate structure within hospitals, and the institution of internal contracts. It was envisaged that the industry would provide high use items and de-centralised pharmacy units would provide specialist items. The advantages of this new model, and its implications for the practice of pharmacy in the United Kingdom, were outlined.

387. Anon. CIVA services come of age. *Pharm J* 1993;250:882-3.

Report:

This article reported on a joint meeting of the Royal Pharmaceutical Society's Hospital Pharmacists Group and the National CIVAs (central intravenous additives) Group. Issues discussed included the stability of products, special licensing requirements, medical devices, quality assurance and clinical pharmacy implications. A few sites that reported customer satisfaction data found that the service was appreciated.

388. Anon. CIVAS - The cost-effective service customers want. *Pharm J* 1990;246:HS32-3.

Report:

This article reported on CIVA (central intravenous additive) services provided at a number of hospitals. At one site a service of some sort had been provided since the 1950s. Pharmacists at several sites reported a high level of customer satisfaction with the service and claimed that it was cost-effective.

389. Goldberg LA. The preparation of cytotoxic drugs. *Pharm J* 1983;230:224-5.

Descriptive study:

This paper described the setting up of an aseptic unit for the preparation of cytotoxic drugs in one hospital.

390. Hatton I and Barrett CW. A trial 24-hour pharmacy intravenous additive service in a London teaching hospital. *J Clin Pharm* 1979;4:71-86.

Descriptive study:

This paper described the introduction of a trial 24 hour intravenous additive service (IVAs). The introduction of the service was preceded by a survey of prescribing to determine commonly-used IVAs. This provided an idea of workload (150 items per 24 hours). Some items were purchased commercially thereby reducing the expected demand to 28 items per 24 hours. The survey also showed that few IVAs were required after 22.00 and before 08.00 hours. Nursing and medical staff were surveyed to establish the acceptability of the commercial solutions three months after their introduction. Most were satisfied and the service went ahead for 11 weeks. The paper described the service in detail. Two thousand one hundred and fifty two IVAs were provided (195 IVAs per week). Before the service was introduced an average of 1071 were made each week. Excluding cytotoxics, 37 drugs were used. Only 3% of calls

were made after 22.00. The questionnaire survey of junior medical staff had a 65% response rate. Most (99%) had used the service and were satisfied with it (97%). One fifth considered it to be an essential service, 50% thought it was a valuable service and 25% thought that it saved time. Only 6 doctors thought that it was too expensive.

391. Mounsey A, Bell D and Fahey M. Resident pharmacist services - An overview. *Pharm J* 1993;250:HS9-11.

Descriptive report:

The authors described the residency service at a large general hospital. They also reported the results of their telephone survey of activities performed by 31 hospitals that provided a residency service. Resident pharmacists represented 133 of the estimated 5000 hospital pharmacists in the UK. The types of rotas worked by resident pharmacists varied and all were backed up by more senior pharmacists at home. The level of activity also varied from so low that no time off in lieu was given on weekdays to very busy rotas. Hospital pharmacy opening hours affected the rotas and workload as did the availability of casualty pre-packs, emergency drug cupboard stocks, the size of the hospital, the length of time for which the residency had been established, the appropriateness of ward stocks to case mix and restrictions on the type/grade of staff who could bleep the pharmacist. The residents' major tasks were to provide drugs and drug information but some provided more advanced services such as ward visits, poisons information, cardiac arrest team services and aseptic dispensing. The advantages and disadvantages of a residency services were enumerated and a computer system for monitoring workload was mentioned.

392. Talbot JCC. A survey of the 24-hour pharmaceutical service at Nottingham City Hospital. *Proceedings of the Guild* 1977;1:41-4.

Descriptive study:

This paper described the residency service at a single hospital. The workload for 15 months (2512 calls) was analyzed and showed that 59.1% of calls were for new prescription items, 14.4% for drug information, 11.1% for stock items, 6.3% for to discharge drugs, 4.4% were outside calls, 3.5% were for controlled drugs and 1.2% for manufacturing items. The proportion of calls that resulted in the prescriber being contacted was 4.3% on average, rising to 6.9% when new house officers started. Few (5.6%) calls were received after midnight and only 7.5% of calls were urgent. The cost of the service was £2700 per annum. The benefits of the service included the rapid and reliable provision of drugs and drug information, lower drug stocks on wards, greater training and experience for pharmacists and increased medical-pharmacy contact.

393. Cullen AMS, Norman AJ and Sandwich N. Identification of a demand for an out of hours service at a district general hospital. *Br J Pharmaceutical Practice* 1980;2(3):10-13.

Descriptive study:

This was a needs assessment for residency services at a large general hospital. Calls to the on-call pharmacist over one year were examined. Eighty two calls were for drug supply, 11 were for information only and 16 were for both supply and information. There were 10 other calls of which one was a drug recall. This hospital also had an emergency drug cupboard and calls to the on-call pharmacist were discouraged and could only be made by senior staff. Ninety eight items were borrowed from the emergency cupboard over the same period but, during a

one month survey, wards borrowed 68 items from each other (wards were asked to make records of borrowings). Of these 68 borrowed items, 41 were non-stock items. An earlier study had shown that only 10 intravenous additions were made to each week that could not have been kept as stock items. The annual total number of items that could have been dealt with by a resident was estimated to be 1553 items. This was thought to indicate a need for a residency service.

394. O'Kane MK and Barrett CW. Problems of determining and meeting the requirements for providing an effective pharmacy service during evenings, nights and weekends at a London teaching hospital. *J Clin Pharm* 1979;4:59-70.

Descriptive study:

The current method of providing out-of-hours pharmacy services at one hospital was to contact any pharmacist named on a call-out list. The service depended on pharmacist's goodwill. This was found to be unsatisfactory and a series of surveys were conducted to determine the true demand for out-of-hours pharmacy services. A five month survey of calls to pharmacy staff showed that the average number of calls was one per week. A survey was also conducted during a 3 week period, in which the old system was used and a further 3 weeks in which only pharmacist who lived near the hospital were named on the call-out list. In the first 3 weeks the number of calls was similar to that in the first study but, in the second 3 weeks, it had increased to 9/week. A third survey was conducted whilst a trial intravenous additive (IVA) service was in operation and the list of call-out pharmacist included only those who lived close to the hospital. During this survey the average number of calls rose from 8/week to a maximum of 44/week. The call out rate dropped off again when the trial IVA service stopped. The nature and timing of calls was analyzed also. One hundred and ninety four calls (62%) were for supply only, 66 (21%) for information leading to supply, 61 (19%) would have required a pharmacist to come in and 54 (17%) were for information only. The authors said that it was not easy to determine the need for an on-call service. They said that they would need additional information if making a case for funding a residency service but felt that there was a need to improve out-of-hours pharmacy services.

395. Chrystyn H and Mulley BA. Therapeutic drug monitoring: the way ahead. *Br J Pharmaceutical Practice* 1984;6:282-7.

Descriptive study:

The authors described the development of therapeutic drug monitoring services for anticonvulsants, theophylline and aminoglycosides in a general hospital. The service was a co-operative venture involving the pharmacy, biochemistry and microbiology departments and the medical staff. Most of the article was devoted to describing pharmacokinetic calculations using a programmable calculator.

396. Brown AM. Establishment of a pharmacy-run TDM service. *Br J Pharmaceutical Practice* 1986;8:154-9.

Descriptive study:

This paper described the institution of pharmacy TDM services at a Birmingham hospital.

397. Bourne JG, Farrar KT and Fitzpatrick RW. Practical involvement in therapeutic drug monitoring. *Pharm J* 1985;234:530-31.
Descriptive study:
This paper described the use of ward pharmacists to interpret aminoglycoside levels. They used two case studies to illustrate the service.
398. Betts A, Huppler C, Hookway J and McCluckie J An investigation of the potential for pharmacy involvement in drug monitoring. *Proceedings of the Guild* 1980;8:51-7.
Descriptive study:
This paper described the results of four projects used to investigate the application of drug monitoring for four drugs at a Manchester hospital. The projects involved interpreting the levels, providing the results to doctors and assessing pharmacists' contribution to patient care. Samples were assayed at a hospital or regional facility for 9 patients receiving digoxin, 22 receiving phenytoin, 9 receiving theophylline and 3 receiving lithium. The authors concluded by questioning the usefulness of monitoring digoxin levels routinely and assay services that take 10 days to provide a result for theophylline and 14 for digoxin. Clinicians were sceptical about the usefulness of the services.
399. Henley HE. Gentamicin in neonates. Is there a need for a therapeutic drug monitoring service. *Hospital Pharmacy Practice* 1993;3:149-57.
Descriptive study:
The aims of this study were to evaluate the use of gentamicin in a neonatal unit in a general hospital, to assess the need for a TDM service, and if a need was identified, to investigate methods for its introduction. Over a five month period data on neonates receiving gentamicin was collected daily by the author or, for her, by the unit's staff. The information collected included age, gestational age, sex, weight, dosage regimen, serum level monitoring data, and results. Individual patient levels were predicted using population data and a computer program and were compared to the actual levels. Fifty neonates were studied. Only 56% received a dose that maintained correct trough and peak levels. Forty percent had toxic trough concentrations and 4.2% had subtherapeutic or toxic peak concentrations. The computer program was significantly more accurate in its predictions than population data. There was a perceived need for a TDM service. It was thought that the computer program could assist in its provision.
400. Elfellah M, Doran JF and Grieve MS. Audit of digoxin monitoring in Tayside. *Pharm J* 1990;244:726-8.
Descriptive study:
The authors considered the appropriateness of general practice and hospital requests for serum digoxin levels in a one week period in a Scottish health board where pharmacists involvement with the service was variable. The requester was contacted 1-2 days after the results were made available by the laboratory. This allowed judgement of the appropriateness of the request, sampling and dosage adjustment. Fifty nine requests were made in one week, 18 of which were from general practice. The remainder were from 8 different hospitals. Data were obtained from the requester in 56 cases (15 GPs only). Thirty of these 56 (54%) requests were for appropriate indications. For hospital requests, this was 20/41 (49%). Forty eight percent of samples (27/56) were drawn less than 6 hours from the last dose and 20% were drawn prior to reaching steady state; for the hospital requests these percentages were 44% and 22%.

respectively. Forty three percent of samples were taken at the appropriate time (49% for hospital-derived ones). Seventy three percent of patients had their dose adjusted/maintained to achieve therapeutic levels (28/41 for hospital requests). In the remainder, doses were not changed despite levels outside the therapeutic range. In 18 cases the doctor adjusted the dose despite the level having been taken at the incorrect time. Only 15 (27%) requests were appropriate (correct timing of sample and indication for assay); in hospitals the figure was 12 (29%). No formal TDM services appear to have been available in the board. The authors claimed that the results were likely to have been representative and that the misuse represented £4,500 per annum in assay material costs.

401. Brodie MJ. Overuse of monitoring blood concentrations on antiepileptic drugs (letter). *Br Med J* 1987;294:1097-8.

Correspondence:

The author said that only 24 (43%) therapeutic drug monitoring requests were appropriate at his hospital. He claimed that the service was misused and that doctors used it because it was available (the Everest factor). He also raised the issue that therapeutic ranges have been derived from population values and that there may be problems in adjusting therapy for individuals on that basis. In an ongoing prospective evaluation of the anticonvulsant monitoring service at his hospital one third of the 700 assays over the year showed a plasma concentration that surprised the requester. Twenty percent of patients had had their dose adjusted as a result showing that the service was useful.

402. Gibb I, Campbell Cowan JC, Parnham AJ and Thomas TH. Use and misuse of a digoxin assay service. *Br Med J* 1986;293:678-80.

Descriptive study:

The authors audited the serum digoxin assay service over 12 weeks to assess the clinical indication for assay requests and the role of assays in clinical management. On requesting a level doctors were asked to complete a form giving patient details, dosage regimen, time from last dose to sample, reasons for using digoxin and for the sample, and any changes that would be made in therapy whilst awaiting the results of the assay. A second form was then sent which included assay result reports. This asked the requester to indicate the use to which the assay result had been put in patient management. Six hundred and twenty three assays were performed; 358 were from within the hospital and were included in the results. Both questionnaire were returned for 285 (80%) of requests. For 67 (24%) requests there was no clear indication for the request. For 225 (79%) assays, the timing of the samples were given but these were inappropriate because they were within 6 hours of the last dose for 80. Of these incorrectly timed samples, 15 of 69 led to a reduction in dose, compared to 10/116 of those taken at the correct time ($p < 0.05$) thereby demonstrating that inappropriate clinical decisions may be made due to incorrect sampling. Therapy was changed for 44 patients in the time whilst the results were awaited and for 55 after getting them. Twenty four changes appeared to have been related solely to assay results. They concluded that about 75% of assays were justified but admitted that awareness of the audit may have influenced the results. In addition, wasteful use of assays resulted in about a £6000 loss to the hospital per annum.

403. Doran JF. Requests for digoxin assays (letter). *Lancet* 1986;i:321-2.
Correspondence:
 Two thousand nine hundred and two requests for digoxin levels made in one year were analyzed. Those made in one week were analyzed in detail (n=55). Only 20 (36%) were appropriate; most (64%) were requested because the service existed. The process of requesting the levels was poor. Thirty six (64%) samples were taken within 6 hours of the last dose (incorrect time) and only 14 samples were taken at the correct time. Requests were accompanied by a reason for them and an appropriately taken sample in only 8 (14%) cases.
404. Purkiss R. Development of a pharmacokinetic service - experience after one year. *Pharm J* 1982;229:61-3.
Descriptive study:
 This paper described the setting up of a therapeutic drug monitoring (TDM) service and the methods used to monitor anticonvulsant therapy in a Birmingham hospital. Four hundred and thirty patients' levels were monitored in the first year.
405. Copeland RJ, Thorpe H and Kay EA. Inappropriate digoxin monitoring. *J Clin Pharm Ther* 1992;17:172-4.
Descriptive study:
 The authors evaluated the use of the digoxin assay services for in-patients at a single general hospital over a seven week period. The requester was contacted within 48 hours of the request and interviewed using a structured questionnaire to ascertain the appropriateness of the request, sampling and dosage adjustment. One hundred and thirteen requests were made over seven weeks. Data were obtained from the requester in 88 cases. In 22 (25%) cases, requests were considered to have met all the criteria for appropriateness and action (timing of sample, indication and appropriate action). Sixty six requests were considered wasteful. Of these, 48 (55%) were for appropriate indications. In 24 (48.5%) cases the samples were drawn at the correct time. Thirteen requests were drawn less than 6 hours from the last dose and, of these, 2 patients had their dose adjusted on the result. Six samples were drawn prior to reaching steady state. A further 7 of the appropriate requests (that had been taken at the correct time) were considered to have been wasteful since inappropriate action was taken after receipt of the results. The authors found also that doctors' actions showed no improvement during the study despite repeat interviewing. They claimed that the results indicated potential danger to patients from inappropriate adjustment of dose based on results from inappropriately-taken samples and represented £3,777 per annum in assay costs. They suggested increased education and intervention by health care professionals to improve the situation.
406. Horsley MG and Bailie GR. Effectiveness of theophylline monitoring by the use of serum assays. *J Clin Hosp Pharm* 1988;13:359-64.
Descriptive study:
 Criteria were created on indications for assay and sampling, and documentation of therapeutic drug monitoring requests. Data from 10 male and 10 female out-patients receiving theophylline were studied to determine the effectiveness of the use of serum levels in their therapy. There were definite indications for drawing levels in 9, none in 3 and a contraindication in 8 patients. Adequate records, permitting interpretation of levels, were made for 6 patients. The daily dose was stated incorrectly for 7 patients and other information was often incorrect. Interpretation of

levels was appropriate for 12 patients. Reports were sent to 10 of the patients' general practitioners of which only 4 stated the result. A number of recommendations were made for improvement, including the compilation of a list of indications for drawing levels, the redesigning of the request and report forms, and the education of personnel.

407. Roberts JE and Hughes DK. Audit of anticonvulsant plasma level assays. *Br J Pharmaceutical Practice* 1990;12:298-305.

Descriptive study:

The authors considered the appropriateness of general practice and hospital requests for serum anticonvulsant levels at a single general hospital using a self-completed questionnaire survey. Information from the request form and the questionnaires was used by the authors to judge appropriateness of requests. Ninety six of the 149 (64%) questionnaires were returned from 50 hospital (52%) and 44 (48%) general practice doctors. Assays were carried out to investigate poor control (26%), check compliance (24%) and as a routine investigation (30%). Many doctors stated that they would not request routine levels despite having done so. Sixty two percent of requests were from house officers or registrars and 38% from consultants. Many assays were performed prior to steady state (phenytoin 15% and carbamazepine 14%) and several of these patients had their dose changed as a result (phenytoin 8% and carbamazepine 4%). Of the hospital doctors, 38% thought that there was no need for an advisory service for interpreting levels, 36% thought there was a need for such a service and 26% were unsure. The corresponding figures for general practitioners were 11%, 74% and 15%, respectively. The authors felt that there was a need for pharmacy input in drug level monitoring.

408. Taylor D. Therapeutic drug monitoring - another way forward. *Pharm J* 1991;247:34.

Opinion paper:

The perceived inadequacies of the current drug monitoring system were described. These included inappropriate requests for levels using samples drawn incorrectly and provision of inadequate information on the meaning of the results of assays by laboratory staff. The author advocated a pharmacy-run interpretation service to counter the current problems. Pharmacists could also take on the analytical aspects of the service and even take blood samples.

409. Thomson AH. Meeting the challenges of therapeutic drug monitoring. *Pharm J* 1993;251:HS20-2.

Opinion paper:

The author advocated a multidisciplinary approach to therapeutic drug monitoring (TDM) but recognised that this may be difficult in the light of interprofessional conflicts and economic constraints. She believed that pharmacists have specific knowledge that better suits them to interpret drug level data than other groups. Where necessary, training should be provided to enable pharmacists to fulfil this role. Increasing computerisation of hospital departments may, she thought, facilitate pharmacy involvement in this service. Drugs monitored in the future may be different from those monitored in the past.

410. Duxbury B. Control of anticoagulant therapy (letter). *Lancet* 1981;i:1001.

Correspondence:

It was claimed that anticoagulant therapy control is poor in the United Kingdom despite advances in testing methods.

411. Harries AD, Birthwell AJ and Jones DB. Anticoagulant control (letter). *Lancet* 1981;i:1320.
Correspondence:
 In a retrospective study of 157 patients who had attended three medical wards for anticoagulant therapy on a total of 3216 occasions over periods of up to 7 years, it was found that 34% of levels were outside the therapeutic range. Fifty five patients, who had visited more than 20 times each, had levels outside the therapeutic range on 26% of occasions. Fifty two of these 55 were in the therapeutic range for more than 50% of the time and 35 were in the therapeutic range for more than 70% of the time. Under therapy was the commonest problem.
412. Kemp CC and Carrington DW. Pharmacists as members of clinical team. *Pharm J* 1978;222:564.
Descriptive study:
 This paper described the development of the pharmacists' role in anticoagulation control as a member of the clinical team in a single hospital. Pharmacists were seconded to an anticoagulation clinic and assisted doctors there in running the clinic by seeing the patient at the same time as the doctor, by providing advice and information on interactions and by making records of dose changes in patients' personal therapy books.
413. Pegg M, Bourne J, MacKay AD, Lawton WA and Cole RB. The role of the pharmacist in the anticoagulant clinic. *J Royal Coll Physicians* 1985;19:39-44.
Objective:
 To describe the management and organisation of an anticoagulation clinic, jointly run by doctors and pharmacists, and to retrospectively compare their results with those obtained by standard (doctor only) clinics.
Methods:
 A retrospective study was carried out on 116 randomly-selected patients records, 62 of whom had attended the jointly-run clinic and 54 who had attended the doctor-only clinic. Data (notes and records) were examined to elicit information on patient's age, sex, weight, smoking history, alcohol consumption, indication for anticoagulation, biochemical results, dose and duration of heparin and warfarin therapy, loading dose of warfarin, length of stay after commencement of warfarin, use of drugs known to interact with warfarin, evidence of bleeding or other side effects, and of non-compliance or intercurrent illness. Anticoagulant control was assessed by the average interval between appointments, the proportion of visits on which the levels were in the therapeutic range and the degree of level fluctuation from visit to visit.
Results:
 The pharmacists' role was to counsel the patient and to adjust doses where necessary, to decide on the patient's next appointment date and to dispense a supply of tablets. Guidelines were created to ensure good practice. The doctor's could be called upon if the pharmacist thought it was required. Referral to a doctor was otherwise only every three months for those on short-term therapy and twice yearly for others. Patients in both groups were similar in age, sex, renal and hepatic function, and indication for therapy. Anticoagulation control was also similar; the mean (range) interval between appointments was 1.82 (0.3-4.0) weeks for the jointly-run clinic and 1.81 (0.3-13.0) weeks for the doctor-only clinics. The figures for the proportion of levels that were above the therapeutic range were 19 and 26%, respectively. For the proportion of levels that were below the therapeutic range, the figures were 11 and 7%, respectively. The mean (range) difference in levels between clinic visits were 9.93 (0-58) and 9.88 (0-59),

respectively. The number and type of unwanted effects were similar for doctor and pharmacist-run services. No significant cost benefit was obtained by substituting a pharmacist for a doctor. **Assessment of study: (strength, size of effect, generalisability)**

This was a moderately-sized retrospective study. It avoided introducing bias by retrospective evaluation and by random selection of charts for evaluation. Pharmacists managing anticoagulation with supervision by doctors in a outpatient setting performed as well as doctors managing anticoagulation alone. Although it was a retrospective study, there were no data availability problems. The results are not generalisable.

414. Radley AS and Hall J. The establishment and evaluation of a pharmacist-developed anticoagulation clinic. *Pharm J* 1994;252:91-2.

Descriptive study:

The authors described the setting up of a pharmacy-run anticoagulant clinic at a single general hospital. Protocols were developed and the idea was sold to the doctors in the hospital. Doctors were involved in the initial assessment of patients and then their continuing care was the responsibility of the pharmacist. The authors described several practical issues, such as organisational and phlebotomy issues. They undertook an audit of the clinic at the end of the first year during which 1492 INRs (international normalised ratios) had been performed on 241 patients. This represented an average of 6.2 INR/patient and a visit interval of 1.9 months. The INR achieved by the pharmacist was compared to that in the standards; 6.8% were above the range and 7.2% below it, 1.2% were in the toxic range and 2% were below the accepted lower end of the therapeutic range. None of the results that were in the toxic level were due to inappropriate dosage changes in the clinic and only one case of grossly subtherapeutic dosing was attributable to a pharmacist. An audit of the counselling program was conducted using a knowledge-based questionnaire that was completed by an interviewer speaking with 100 patients. Most patients had a basic understanding of their therapy. Patients usually knew the name of the drug (98%), the dose (82%), the action of the drug (95%), the time of dosing (93%), the diagnosis requiring warfarin (78%), actions on side effects or missed doses (89%) and the effects of alcohol (80%), diet (73%) and other drugs (69%) but few knew the meaning of INR (39%). The authors advocated the involvement of pharmacists in anticoagulation clinics and suggested standards for use in these clinics. The clinic's success had been reinforced by a request for a similar service at a nearby hospital.

415. Oakley PA and Reeves E. The value of a centralised reconstitution service. *Pharm J* 1984;232:391-2.

Descriptive study:

This described the value of a centralised service for cytotoxic reconstitution in a district health authority. The service could reduce wastage of expensive products and increase safety for staff and patients. A one year study was carried out at two hospitals in the district. Problems with the current system, where specific nurses reconstituted cytotoxics, were elicited from medical and nursing staff and a range of literature and other sources were drawn upon to provide information on stability and safety issues. Subsequently a pharmacy reconstitution service was set up for 4 weeks at one site and 10 weeks at another. The nurse reconstitution service was only used outside of pharmacy opening hours. The pharmacy reconstitution service was described. The average weekly workload was 179 dose units at one hospital and 48 at the other and, on average, three doses were reconstituted by nurses each week. They estimated that

annual savings on drugs would be £17,000. Greater pharmacy control of stocks would provide an additional saving of £16,000 per annum. These savings were stated to exceed the cost of providing the service (staff, drugs and equipment) but the method of calculating savings and costs was not given.

416. Anderson M, Brassington D and Bolger J. Development and operation of a pharmacy-based intravenous cytotoxic reconstitution service. *Br Med J* 1983;286:32-6.

Descriptive study:

The background to, and development of, an intravenous cytotoxic therapy reconstitution service at the London Hospital was described. The preparation facilities and methods were described. The authors claimed that the hazards to patients and staff, and the wastage of drugs, had been reduced since the pharmacy took over responsibility for the reconstitution of cytotoxic therapy from medical staff. This was not an evaluation but the authors estimated that £5000 (from an annual bill of £47500) had been saved due to the more efficient dispensing method.

417. Clark CM, Bailie GR, Whitaker AM and Goldberg LA. Parenteral drug delivery - value for money? *Pharm J* 1986;236:453-5.

Descriptive study:

The authors set out to evaluate the quality and cost of the hospital's current parenteral drug delivery system. They quantified the potential for error in drug and dose, and rate method and timing of administration, and the cost of the service. At the outset, a pharmacist interviewed nursing and medical staff on each ward and department to elicit current practice for preparing parenteral drugs. Two representative wards were then chosen and, for seven days, every parenteral drug preparation was observed by a member of the multidisciplinary project team. The observer noted 27 items of quality or cost information for each reconstitution that was observed. Average staff, drug and consumable costs were calculated. Two hundred and twenty four parenteral doses were observed. These included 83 intravenous (IV), 124 intramuscular (IM) and 17 subcutaneous (SC) administrations. Most (81%) were prepared by nurses and the remainder by doctors. From the quality perspective, 7% of IV prescriptions had to be checked for clarity with the prescriber prior to reconstitution. In 22% of cases the nurse or doctor was disturbed during the reconstitution process and in 28% of cases the preparation was not checked prior to administration. Seven errors were made (3.1%) in drug selection and dose, 2 of which were detected by the pharmacist. Errors on IV drug were highest (6%). Overall, 13 errors were made in drug, dose, route, diluent or (failure of) administration; most (11, 13.3%) were on IV drugs. Eighty two percent of all errors were not picked up in the normal checking processes. Forty nine percent of drugs were administered more than one hour before, or after, the correct time; 19% were administered more than two hours from the prescribed time. Aseptic procedures were deficient in many cases. The annual cost to the district health authority (overheads, pharmacy labour, consumables, nursing and medical labour, dose error, drug waste and drugs) for IV, IM and SC drug administration was £1.27m, £0.38m and £0.10m respectively with the greatest cost per dose being attributed to IV drugs (£4.94/dose). The team suggested that a pharmacy-run central intravenous additives service might be safer and more cost-effective than the current reconstitution practices.

418. Cousins DH, Lee M, Stanaway M and Neary C. Implementation and evaluation of a centralised IV additive service for antibiotic injection. *Pharm J* 1989;242:HS14-16.
- Descriptive study:**
- The study compared the cost and quality of a pharmacy-based IVA service with those of a traditional service (investigated by Clarke CM et al, 1986). The hospital produced 70-80% of all regular intravenous therapy in a centralised pharmacy facility. This facility and the service were described. Using the costing method of Clarke and co-workers (1986), independent researchers costed the provision of intravenous doses at this hospital. The administration of 100 IV doses was observed on 9 wards over 10 days and the reconstitution of 320 doses and 9 batches of drugs was observed in the pharmacy. The costing included staff time, drugs, disposables, waste and error data but excluded overheads (taken to be fixed and difficult to measure) and quality assurance (which would continue in any case due to the provision of parenteral nutrition and cytotoxic services). The costs from the study by Clarke CM et al (1986) were adjusted to present day costs and were adjusted for differences in medical and nursing practices that affected IV administration at the author's hospital. From the quality perspective, the provision of CIVAs permitted all doses to be administered according to the manufacturers instructions of administration over three minutes compared to 78% being administered in one minute in the Salford study. Most (90%) doses were administered within 1 hour of the prescribed time compare to 51% in the Salford study. The error rate in drug selection and administration fell from 9.7% to 1%. Drug wastage fell from 7.9% to 4%. Nursing time per dose fell from 10.5 minutes (assumed 3 minutes administration time) to 5.3 minutes. The average cost per dose was £5.17 for the traditional system (Salford) and £5.13 for the CIVAs system. This was a partial evaluation that ignored several important costs. The authors validated the Salford data to a very limited extent (15 non-CIVAs doses on 2 wards and presentation of Salford data to ward staff). The study indicated that quality factors were improved by the CIVAs service (although this was mainly compared to another hospital's practices).
419. Wilson M. An evaluation of the cost effectiveness of a centralised intravenous admixture service. *Proceedings of the Guild* 1990;27:3-11.
- Objective:**
- To assess the effect of a central intravenous additives service (CIVAs) on the quality of medication provision, workload and costs compared to a traditional nurse-reconstitution service at a large general hospital.
- Methods:**
- Work sampling methods were used to measure IV preparation time. Every IV dose preparation and administration was observed and timed for one week on two wards. An additional week was spent in the pharmacy carrying out the time measurements for preparation there. The potential for microbial contamination of solutions was assessed by judging adherence to aseptic technique. Other quality indicators were administration time in relation to prescription time, accuracy in drug, dose diluent and route selection, rate of administration and the performance of expiry data checks. Costs were calculated from workload data, consumables and drug wastage. A work study specialist, a pharmacist and a nurse were involved in the measurements.
- Results:**
- Observations were made of the preparation of 68 CIVAs doses in the pharmacy, 11 nurse

preparations of doses that could have been prepared by pharmacy, and 84 other doses (non-CIVAs). The 83 ward administration observations from the Salford study were also used (Clarke CM et al, 1986). Differences between the Salford data and the data gathered at the hospital on nurse preparation and administration were large and the Salford data, although presented by the author, will not be reported here. Quality of service was higher for the CIVAs service. When CIVAs were used there was greater adherence to handwashing (90%) and correct aseptic technique in preparing (100%) and administering (75%) the drugs than when nurses (91%, 82% and 36% respectively) or other groups (81%, 87% and 61%, respectively) prepared them. When nurses prepared IVs they were more likely to check the expiry dates (85%) than when CIVAs were used (78%) or when others prepared the IV (47%). Differences in errors in selecting the correct drug, dose, diluent and route and in the number of interruptions were small. The mean difference in administration time (with respect to prescription time) was 46 minutes for CIVAs, 84 minutes for nurse-prepared IVs and 51 minutes for those prepared by others. Seventy seven percent of CIVAs were administered within 1 hour of the prescription time compared with 45% of nurse-prepared IVs and 73% of those prepared by others. CIVAs were administered in a mean of 17.9 minutes (all administered in more than 3 minutes); other IVs were administered in a mean of 1.6 minutes (only 13% administered in more than 3 minutes). There was a mean saving of 3.96 minutes of nursing time per dose when CIVAs were used but the total cost of preparing a CIVAs dose was more (£2.10) than nurse-prepared IVs (£1.41), mainly due to the higher cost of minibags for CIVAs products.

Assessment of study: (strength, size of effect, generalisability)

Although this could have been a cost-effectiveness evaluation, several components of a sound economic evaluation were absent. The main problem was that this was a partial evaluation; capital investment costs were not included nor were the benefits of the increased quality of service. In addition, no link was established between the quality improvements in the CIVAs service and improved patient care. The study was carried out at one hospital and was otherwise well-performed but the results are not generalisable (as amply shown by comparison with the Salford data).

420. Whiting B, Kelman AW, Bryson SM, Derkx FHM, Thompson AH, Fotheringham GH and Joel SE. Clinical pharmacokinetics: a comprehensive system for therapeutic drug monitoring and prescribing. *Br Med J* 1984;288:541-5.

Descriptive study:

The authors described the setting up and impact of a laboratory service to monitor drug levels of several drugs, including digoxin, theophylline and phenytoin, in a Scottish hospital. The service was available to other hospitals and general practitioners in the area. Extensive details of the assay methods were provided and the service used nomographic and computer predictions of levels. On average, 330 requests for assay measurements were received each month. Of 235 samples for digoxin levels, 88 (35%) were in the therapeutic range. Repeat samples for digoxin levels, obtained 2-4 weeks after issuing a laboratory report that included interpretation of the level obtained and, where necessary, recommendations for dose change, were more often in the therapeutic range (66%) than initial samples. A similar improvement was seen for theophylline levels (n=145); 29% were in the therapeutic range initially and 70% were in the therapeutic range following the provision of interpretations of the levels and recommendations for changes in doses. The results for phenytoin (n=107) followed a similar

pattern; 19% were in the therapeutic range initially and this increased to 45% following monitoring and interpretation. The authors claimed that the service improved the use of these drugs but the study was not an evaluation. Although the change in output (proportion of patients whose drug levels were in the therapeutic range) was likely to have been associated with the service, the study was uncontrolled and insufficient data were presented on causality. In addition, no data were presented on patient outcome or economic factors.

421. Cope JH, Farrell JP, Hetzel MR and Noyce PR. No TDM...No comment. *Pharm J* 1985;235:599.

Descriptive study:

The authors described a pharmacy-run TDM service for theophylline. In five months 108 patients levels were reported. Twenty two levels were performed on those receiving the drug intravenously. Forty one percent were in the therapeutic range. Of the 32 and 44 drug levels that were measured for patients with chronic obstructive airways disease and asthma, 47% and 36%, respectively, were in the therapeutic range. Of the 22 patients on whom reports were made, only two remained outside the therapeutic range on rechecking levels. Case vignettes were cited in support of the value of the service.

422. Lowen NP, Moxham J, Bunn RJ and Hodges M. A "rapid result" pharmacy-based theophylline monitoring service. *Pharm J* 1987;239:45-8.

Descriptive study:

The authors described a therapeutic drug monitoring (TDM) service for theophylline at a general hospital and discussed its impact on patient care. 250 in-patients, under the care of a chest physician and receiving theophylline or aminophylline products, were monitored over 18 months. Pharmacists carried out the drug level analyses and the interpretation of levels was facilitated by a computer program. Of the 250 initial levels, which were measured 6-12 hours post-dose, 103 were in the therapeutic range, 18 were toxic and 129 were subtherapeutic. The computer program was used to predict a 24 hour theophylline profile for each patient. Of the 250 patients, 42 of the 103 with measured levels in the therapeutic range had profiles where the level fell outside that range for some time. Dose recommendations were made for all patients whose predicted 24 hour profile was inadequate. The 18 patients with toxic measured levels were brought within the therapeutic range. Of the 171 patients with computer predicted subtherapeutic profiles, 87 had their levels re-measured after dose changes and the re-measured levels were in the therapeutic range (the remainder were discharged and not followed up or stopped receiving theophylline). Four case studies were provided to illustrate the dose adjustment methods. The authors claimed that the service increased the proportion of patients whose levels were in the therapeutic range. This study was not an evaluation. It was uncontrolled, open to confounding and many patients were lost to follow-up (about 50%). No economic or patient outcome data were provided.

423. Fitzpatrick RW and Moss-Barclay C. The effectiveness of drug level monitoring and pharmacokinetics in individualising theophylline therapy. *J Clin Hosp Pharm* 1985;10:279-87.

Objective:

To evaluate a service that adjusts theophylline levels based on pharmacokinetic monitoring.

Methods:

A randomised controlled trial was performed on 56 patients. Equal numbers (n=29) were

allocated to control and test groups. In the test group drug levels were taken and pharmacokinetic calculations were performed to individualise the dose. Controls were selected randomly prior to the setting up the study from patients in the hospital receiving slow-release preparations of theophylline or aminophylline. Levels were taken and analyzed retrospectively so as not to affect the prescribing patterns of doctors. Test patients were selected from those admitted to hospital with respiratory problems and identified by their doctor as needing theophylline or aminophylline therapy. Patients had a pre-dose blood sample taken and were commenced on therapy. Pharmacokinetic calculations guided therapy for each test patient. Levels were re-measured at steady state.

Results:

Patients in the control and test groups were similar in terms of age, weight, sex and severity of congestive cardiac failure. The mean steady state theophylline level was well within the therapeutic range with a narrow standard deviation in the test group (mean 13.44, sd 3.3 mg/l). In the control group the mean level was 10.7 (sd=7.9 mg/l). The difference between the groups was not statistically significant. Most (88%) test patients had levels in the therapeutic range whilst only 34% of controls had levels in the therapeutic range. No test patient, but 14% of controls, had toxic levels.

Assessment of study: (strength, size of effect, generalisability)

This study was small but well-performed. Precautions were taken to reduce the risk of bias and confounding. The size of the effect was small and the results are not generalisable. In addition, only output was measured; economic factors and patient outcomes were not measured.

424. Barlow TJG, Graham P, Harris JM, Hartley JPR and Turton CWG. A double-blind, placebo controlled comparison of the efficacy of standard and individually titrated doses of theophylline in patients with chronic asthma. *Br J Dis Chest* 1988;82:251-61.

Objective:

To compare the effect of giving theophylline as a standard or as an individually-titrated dose to assess the value of dose titration for patient function.

Methods:

This was a three months prospective double blind placebo controlled trial with a crossover phase. Fifty four patients with chronic asthma were recruited. They were given placebo, standard therapy (300 mg of a theophylline preparation twice daily), or had their dose adjusted individually. The study was preceded by a run-in phase to determine the exact dose that each patient needed to achieve levels in the therapeutic range. Levels were taken at steady state and patients were not permitted to take drugs that can interfere with theophylline levels. In the study, patients recorded their peak flow rates and symptom control each day and were seen monthly to assess their lung function, to check serum theophylline levels and to change treatments (which were given in random order). The investigators and patients were unaware of the randomisation. Precautions were taken to maintain blinding. Only results in weeks 3 and 4 were used to reduce any potential carry-over effects of each phase.

Results:

Forty patients completed the trial; 7 were rejected in the run in phase due to side effects(6) or uncontrolled asthma (1), 5 withdrew during the study due to side effects (1), because of the demands of the study (2) and due to a severe asthmatic attack (3) and two died (asthma-related; subsequently found that they had been on placebo). After the run-in phase, the mean dose of theophylline required to maintain 21/40 patients in the therapeutic range was 479 mg twice

daily. This exceeded the standard dose recommended by the manufacturer (300 mg bd). Patients whose theophylline dosage was controlled using TDM had improved asthmatic control in comparison with controls and those on standard therapy. FEV¹ was significantly higher for patients after standard (2.11 litres), titrated (2.15 litres) in comparison to and placebo (1.89 litres), but in the sub-group who needed more than the standard 300 mg bd dose FEV₁ improved only upon dose titration. The results for PEF, FVC and home peak flow measurements showed similar differences. Other factors, such as the use of inhaled bronchodilators, wheeze and cough and subjective physician assessment, showed a consistent trend supporting the argument that the use of titrated doses significantly improved patients' lung function.

Assessment of study: (strength, size of effect, generalisability)

This was a small, well-performed, medium term study that showed a moderate effect of titrating theophylline dosing using TDM. It was carried out using out-patients hence compliance cannot be assumed. Nevertheless it successfully linked use of titrated doses to patient health status measures. Its results are likely to be generalisable to patients who are similar to those in the study, that is adult, non-smoking, chronic asthmatics of both sexes who do not have uncontrolled cardiac failure, abnormal liver function tests or peptic ulcer and are not pregnant.

425. Sewell GJ, Bradford E and Rowlands CG. Home-based cancer therapy by continuous infusion. *Pharm J* 1989;243:139-41.

Descriptive study:

This paper described a cytotoxic therapy programme that allowed suitable patients to receive their chemotherapy at home by continuous intravenous infusion. This was felt to reduce side effects and may improve quality of life. The relative costs of the service were thought to be less than those associated with in-hospital therapy.

426. Rowland CG. Home continuous infusion chemotherapy. *Practitioner* 1985;229:889-92.

Descriptive study:

This paper described the creation and implementation of a policy for providing patients with home chemotherapy.

427. Haines J and Bradley M. Pharmaceutical services to residential homes: present and future. *Br J Pharmaceutical Practice* 1990;12:326-8,334.

Descriptive study:

An interview survey of residential home owners or managers in 4 health authorities was undertaken by a community services pharmacist. In the 30 homes surveyed (17 privately-owned and 13 local authority) a variety of services were provided by community pharmacists. Of the homes that expressed an interest in regular visits from their supplying pharmacist, the main services requested were staff training, explanation of drug use and side effects, and information on drug colour changes when generics were used. When the interviewer directly asked interviewees about specific services, many owners requested advice on drug storage (19), checks for drug interactions or overdose (18), a delivery service (18), the destruction of unwanted medicines (15), medication profiles and records (14) and assessment of residents for self-medication (4).

428. Narula N, Shulman S and Sheridan J. Medication related problems in residential homes for the elderly. *Pharm J* 1992;248:623-5.

Descriptive study:

A community services pharmacist assessed clinical pharmacy needs in two residential homes in a health district in London by analysis of the problems that were encountered during monthly visits to these institutions over 16 months. The number of problems encountered fluctuated greatly during the first 9 months but decreased rapidly thereafter. The study identified several needs, including the need for the provision of specific educational and information to staff in such homes. The results were used to create forms that a community pharmacist could use in subsequent visits but the pharmacy service was not evaluated.

429. Humfress A and Timbrell H. Home choice - A care scheme with a domiciliary pharmacy service. *Pharm J* 1992;249:686-7.

Descriptive study:

This paper described a project involving several professionals that attempted to evaluate the feasibility of caring for elderly people in their homes as opposed to in a nursing home or in community hospital care. The community services pharmacist co-ordinated pharmaceutical services for the scheme and liaised with the care and training managers, nurses and other professionals involved. The role of the community services pharmacist was to perform a medicines assessment. This consisted of taking a drug history and assessing the client's ability to handle and administer their medication. Compliance aids were considered where necessary. Arrangements for the supply of medicines by the local community pharmacist were then made and the local GP was visited to ensure that he had complete records of the medication. Training was provided also for carers to enable them to help in medicine administration. At a later stage medication review might be performed by the pharmacist. It was thought that much of this work could be devolved to community pharmacists in the future.

430. Barber L and Taylor B. Community services pharmacy - a developing role. *Br J Pharmaceutical Practice* 1988;10:368-71.

Descriptive paper:

This paper described the role of the community services pharmacist. This role included the provision of drug information to health professionals and institutions in primary care and the creation of networks for the safe transfer of patients from secondary care institutions to primary care.

431. Taylor E. CSPs - What of the future? *Pharm J* 1990;245:HS1.

Opinion paper:

This paper provided a view of the future role of the community services pharmacist after the NHS changes. This role would depend on customer demand and the results of reorganisation of responsibilities for community care. It was thought that the role could include the development and monitoring of policies for medicine use, the provision of clinical advice to nursing and medical staff, staff training (particularly of support staff) and liaison with community pharmacists. It was thought that services may, in future, be provided within contracts which may be sold to service managers, social services inspectorates, commissioning units and others.

432. Welsby P. Pharmaceutical advisers. *Pharm J* 1992;249:490.
Opinion paper:
This paper described the role of pharmaceutical advisors to Family Health Service Authorities (FHSA). Some held joint FHSA/hospital appointments. Joint appointments were thought to enhance the links between primary and secondary care, to facilitate the creation of joint prescribing protocols and to help provide community care to patients. It was thought that establishing joint formularies could help reduce differences in the use of drugs in primary and secondary care. Pharmaceutical advisors provided several services, such as helping to reduce prescribing costs, providing pharmaceutical advice and advice on drug therapy, and acting as facilitators between various agencies in primary care. The changing role of the FHSA pharmaceutical advisor had prompted them to establish training and self-help groups to ensure a consistent approach was maintained in addressing community drug use issues.
433. Ascough G and Stanford D. The community services pharmacist: a varied role. *Pharm J* 1990;245:HS21.
Descriptive report:
This paper described the varied duties of community services pharmacists (CSPs). Their roles varied depending on the local situation and involved contact with several other professionals such as chiropodists, nurses, midwives, child health specialists and dentists. CSPs may carry out hospital pharmacy tasks also. The services that could be provided included the provision of pharmaceutical services to health centres and their staff. This entailed liaison between hospitals and the community staff to ensure the correct, safe and economic use of medicines, the provision of drug information and advice on drug use in a variety of situations, the provision of education both formally and informally, the development of drug use policies, the supply of stock items to health centres and clinics, the supply of vaccines and other products, and the inspection and monitoring of premises and drug handling in the community care centres where drugs are stored. Wider roles included health promotion, the provision of support to carers in the community, and liaison with drug abuse teams and community psychiatric nurses.
434. Cochrane RA, Mandal AR, Ledger-Scott M and Walker R. Changes in drug treatment after discharge from hospital in geriatric patients. *Br Med J* 1990;305:694-6.
Descriptive study:
This paper examined the changes in the drug regimens of 50 elderly patients who were followed up for 12 months after discharge from a general hospital. At 6 to 14 days, 45/50 patients had had their regimen changed; 11 were taking a different dose, 10 had stopped the drugs and 20 were taking new drugs. Forty six patients did not remember being told when to take their drugs on discharge. Many changes were potentially detrimental to the patients. The authors claimed that the lack of communication between hospital and community health care staff, including pharmacists, may be contributing to unnecessary and potentially harmful alterations in patients' drug regimens soon after discharge from UK hospitals.
435. Osborne A and Dodds L. Pharmacy care for medical patients at discharge: which way forward? *Pharm J* 1993;251:HS14-5.
Descriptive study:
This paper described an investigation into the contribution that a pharmacist can make in the discharge process for acute general medical patients. A questionnaire survey of patients'

satisfaction with the amount and quality of medicine-related information found that there were few problems with labels or containers. Patients often did not ask for more information because they felt that they would be unnecessarily bothering very busy staff. The authors felt that ward pharmacists could circumvent this problem by pro-actively offering information. GPs' and community pharmacists' opinions were elicited using a postal questionnaire survey. Both groups felt that a weeks' supply of take home medicines did not permit sufficient time to organise a re-supply in primary care and recommended the provision of 14 days therapy on discharge. A representative group of patients were interviewed at home one week after discharge to investigate unintentional changes to therapy, compliance and other drug-related problems. It was found that patients frequently forgot the information provided to them. To counteract this, a written instruction card could be issued with the medicines. Since patients often (68%) used different community pharmacies, pharmaceutical discharge as advocated by the Pharmaceutical Society would not necessarily work. The authors said that they would now investigate various methods of improving the discharge process.

436. Dobrzanski S and Reidy F. The pharmacist as a discharge medication planner in surgical patients. *Pharm J* 1993;250:HS53-6.

Descriptive study:

This paper described the organisation and benefits of a system where patients' own medicines are used, where possible, in hospital. The pharmacist on a surgical unit interviewed patients, took a medication history and examined the quality of any of the patients' medicines that had been brought into the hospital. This enabled the pharmacist to explore the patients' information needs, the appropriateness of the prescription written by the surgical junior doctors (taking the information provided by the patient into account) and the medication supply needs of the patient. Attendance, by the pharmacist, on the surgical ward rounds and the use of protocols enabled the pharmacist to predict patients' medication needs whilst in hospital and at discharge as well as the expected discharge date. Patients' own drug supplies could be used, new supplies organised, self-medication organised, patient counselling provided on an ongoing basis rather than as a single session at discharge, and pharmacy staff time could be used more effectively. Over one month, 240 patients were seen by the pharmacist. Forty percent of patients were unsure about taking routine medication prior to admission or surgery and many had missed doses of necessary medicines as a result. Most (90%) patients thought that self-medication using their own drug supplies would be desirable. One hundred and forty one patients brought their own medicines into hospital; 21 left all their medicines at home and 78 were not taking any medicines. Of the 442 items brought into hospital by patients (worth £714) 73 were not used or discarded and supplies of a further 32 items had almost run out. Excluding inhalers, 159 items were not held as stock on the wards. Of these, 63 were suitable for use. One hundred and seventy six discharge medication lists were written by the pharmacist (for signature by the doctor). For 23 patients, nothing new needed to be dispensed. Three hundred and thirty seven items were returned to patients on discharge resulting in drug cost savings of £616 in addition to uncosted dispensary pharmacist time. The clinical pharmacist spent 37 minutes/week on average interviewing patients, an unspecified amount of time counselling them and 45 minutes/30 beds/day on ward rounds (uncosted). The cost for pharmacy provision of the service was not supplied.

437. Anon. Society produces checklist for hospital admission and discharge. *Pharm J* 1993;250:145.

Descriptive report:

This paper reported the production of a form that could facilitate the movement of patients between primary and secondary care. It would be used by pharmacist in both care settings to facilitate the provision of seamless pharmaceutical care. It was thought to be especially useful for the elderly, mentally-ill, those with learning difficulties, and those with complex medication needs.

438. Jackson C, Rowe P and Lea R. Pharmaceutical discharge - A professional necessity of the 1990s. *Pharm J* 1993;250:58-9.

Descriptive study:

This report introduced the concept of pharmaceutical discharge of patients when they move from one health care environment to another. It was designed to ensure that all pharmaceutical requirements, including information, could be communicated easily and safely between practitioners in different health care sectors. It was seen as a useful contribution that pharmacists could make to patient care following the introduction of the purchaser/provider split and the increasing emphasis on the provision of care in the community.

439. Bennett E. Prescribing at the hospital community interface; the role of the pharmacist facilitator. *Pharm J* 1994;252:443-8.

Descriptive study:

This paper described the efforts of a pharmaceutical facilitator at a general hospital to resolve prescribing problems at the hospital/community interface. Inquiries were made of all consultants and GPs in the authority regarding such problems. Eleven of 33 consultants replied and 24/100 GPs. Nine consultants and 23 GPs reported problems; further problems were highlighted during the first year of the facilitator's job. Many problems concerned consultants requesting GPs to prescribe expensive unfamiliar drugs (3 consultants and 11 GPs), and the initiation of therapy using drugs that were cheap in the hospital but expensive in the community (9 GPs). Other problems were the supply of insufficient quantities of drugs on discharge or at outpatient clinics (3 consultants and GPs). Various recommendation were made, such as the supply of 14 days therapy where a specialist felt that this was necessary and, for outpatients, the provision of 7 days' therapy on A&E prescriptions or a full course of antibiotics, and the provision of 10 days' therapy on discharge. Patients' own drugs were to be returned to them. An improvement in communications between the hospital and community pharmacists was identified as remaining a target.

440. Malone M. Evaluation of an information booklet for general practitioners with patients on home parenteral nutrition. *J Clin Pharm Ther* 1988;13:391-4.

Descriptive study:

This paper described the development and assessment of an information package on home total parenteral nutrition (HTPN) for general practitioners (GPs). The information booklet included a background information section plus sections on HTPN training, complications, arrangements for supply and hospital management. Thirty booklets were distributed to GPs who had patients that were initially started on HTPN in a single hospital. A questionnaire was sent also to these GPs to assess their views on the booklet. Twenty three questionnaires were returned (76.7%). Most GPs found the booklet easy to read and about the right length (21), interesting (16) and

provided some useful information (22). There were criticisms of the printing and presentation (4) styles. The personalised section on each patient was found to be of some help (11) or very helpful (12). Fewer GPs whose patients had been on TPN for more than a year found the information very useful (36%) in comparison with those GPs whose patients were on TPN for less than one year (78%).

441. Mawhinney WM, McMullen AT and Mulgrew PJ. Pharmaceutical input to CAPD service = safety, efficiency and economy. *Proceedings of the Guild* 1990;27:60-4.

Objective:

To provide a CAPD (continuous ambulatory peritoneal dialysis) fluid delivery service and to assess patients' and health professionals' satisfaction with the pharmacy managed CAPD supply service to patients in their homes. The service included pharmacy purchase of fluids. Pharmacy also made the arrangements for the delivery of the fluids (by a contractor), counselled patients, provided information to doctors and nurses, and monitored expenditure on CAPD fluids.

Methods:

Satisfaction surveys were sent to patients and professionals. The questionnaire asked about their satisfaction with the new, as opposed to the old, service. An analysis of costs was carried out over 12 months.

Results:

All patients responded to the survey. Patients were more satisfied with the pharmacy-run service than they had been with the previous non-pharmacy service. Fifty six percent of patients found the monthly meetings with the pharmacist beneficial or essential, 61% found the home visits beneficial, 66% thought that the service had increased their knowledge of their drug regimen and 70% thought that the service had increased their knowledge of why they should be taking their drugs. Health professionals (3 consultants, 5 junior doctors, 10 nurses, 1 social worker and 1 dietician) found the service very satisfactory and the pharmacist was considered to be a source of information and advice, and they were thought to be of help with research. The service resulted in savings of £52,300 in 1988/89. This far exceeded the cost of the pharmacist employed and the expense of providing the service (15,200).

Assessment of study: (strength, size of effect, generalisability)

The design of this study did not preclude bias since survey respondents were not blinded. In addition, some results may be inaccurate since some costings relied on nurses' opinions of time saved. The service now employs a second pharmacist, however, which may suggest that savings had been made and have been sustained (Personal communication, WM Mawhinney 1993). Most costings were carried out appropriately hence the savings made are probably real. It was not a full economic analysis. It proved that the service saved money by improving the process of care but only suggested that patients and health care professionals benefited as a result. The results are not generalisable.

442. Pattinson S and Garforth H. Re-issue of patients' own medicines on discharge from hospital. *Proceedings of the Guild* 1979;6:30-36.

Descriptive study:

This paper described a scheme where patients own drugs (PODs) that were brought into hospital were re-issued to them on discharge if they were suitable for re-issue. The study was carried out in two hospitals over three months and was well-accepted by patients and professionals. At one hospital the scheme resulted in the re-issue of 3% of PODs. There was a

large variation in the proportion of PODs that were re-issued depending on the type of ward under study. The savings per patient, of £1.08 for males and £0.75 for females, were felt to be disappointingly low. The potential problems in running such a scheme were discussed. These included small amounts of drugs arriving in pharmacy, possibly because of a lack of nurse and patient awareness of the scheme, problems with record-keeping and failure of the ward pharmacists to mark the discharge prescription appropriately.

443. Macmanus E and Marshall NM. Patients own medicines (letter). *Pharm J* 1988;240:325.

Descriptive report:

This letter described a scheme where patients' own drugs (PODs) were re-issued to them on discharge from hospital if they were suitable. The system had been in operation for 6 years in a single hospital and the estimated savings were £8,000 per annum in 1981.

444. Cutts C and Athey S. The control of medicines brought into hospital by patients. *Pharm J* 1992;249:HS10-11.

Descriptive report:

This paper described a scheme where patients' own drugs (PODs) were re-issued to them on discharge from hospital if they were suitable for re-issue. The system had been in operation in a single hospital for 8 years. A 4 week survey was carried out on 20 wards to assess the scheme. Seven hundred and forty seven items of PODs were received of which 27% were returned, 30% destroyed at discharge and 43% destroyed in error by ward (40%) or pharmacy (3%) staff. PODs formed 15.6% of the total discharge items. Fifty seven percent of PODs were handled correctly. To improve the effectiveness of the system, the policy was changed and staff were re-educated. The estimated annual savings were £7,400 and pharmacy costs were about £1,000.

445. Cotter S, McKee M and Barber N. Pharmacists and prescribing: an unrecorded influence (editorial). *Quality in Health Care* 1993;2:75-6.

Opinion paper:

The authors suggested that hospital pharmacists frequently influence therapeutic decisions but their input was rarely recorded where it could be seen clearly by others, such as in the medical notes. They postulated that the absence of records of pharmacists' influence (from the medical notes) had several negative consequences for the processes that examined the quality of care. Given the evidence that doctors would not object to pharmacists' records in the notes, they proposed that immediate action should be taken to ensure that all those who influence therapy record their input in the medical notes. This, they said, would establish accountability and help in the assurance of the quality of medical care.



Survey of clinical pharmacy services in United Kingdom National Health Service hospitals

SIOBHAN M. COTTER, NICHOLAS D. BARBER, AND MARTIN MCKEE

Abstract: The extent to which clinical pharmacy services are provided in National Health Service (NHS) hospitals in the United Kingdom was studied by means of a questionnaire.

Questionnaires inquiring whether and to what extent certain clinical pharmacy services were provided were mailed to all NHS hospital pharmacies in 1992. The questionnaires also requested information about the hospital and the number and qualifications of pharmacists employed. The results were compared with those of a sur-

vey of pharmaceutical services in the United States.

Of 508 questionnaires mailed, 416 usable responses were returned. Services commonly provided were inpatient drug therapy monitoring (96%), clinical trials support (92%), formulary management (89%), participation in drug and therapeutic committees (97%), and an on-site drug information center (60%). Services infrequently provided were therapeutic drug monitoring (21%), medication history-taking (16%), and a 24-hour on-site phar-

macist (10%). Several services were associated with pharmacies that employed many pharmacists, pharmacists with advanced education, or specialist clinical pharmacists and pharmacies located in medical school teaching hospitals. U.K. hospital pharmacies provided fewer patient-oriented services and more drug information, therapy monitoring, and pharmacist education services than U.S. hospital pharmacies.

Provision of clinical pharmacy services in the United Kingdom was associated with employment of many phar-

macists, pharmacy clinical specialists, and pharmacists with advanced education.

Index terms: Administration; Clinical pharmacy; Clinical studies; Data collection; Drug information centers; Formularies; National Health Service (Great Britain); Patient education; Pharmaceutical services; Pharmacists, hospital; Pharmacy and therapeutics committee; Pharmacy, institutional, hospital; United Kingdom

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In the United Kingdom (U.K.), clinical pharmacy has developed over the past 25 years, primarily in National Health Service (NHS) hospitals. These are publicly funded, account for most U.K. hospitals, and provide health services for their local population within broad contracts. In 1988 the Department of Health recommended (but did not require) that hospitals provide clinical pharmacy services, such as monitoring and modification of drug therapy, discharge counseling, and clinical trials support.¹ Similar recommendations were made by several pharmacy organizations and in an independent report in 1986.^{2,3,a,b} The effect of these recommendations on the provision of clinical pharmacy services is unknown.

We conducted a survey to determine the nature and extent of clinical pharmacy services in U.K. NHS hospitals and to examine the effects of resources and hospital and staffing factors on those services. The survey was carried out during the NHS reforms, which were intend-

ed to encourage greater accountability and efficiency in the health service by creating a managed health care market.⁴

Before 1989 all NHS hospitals were directly managed units in a vertical management structure. Hospitals were the lowest of several tiers and provided services according to decisions reached at higher tiers, namely District Health Authorities (which are responsible for the health care of residents in their geographical area), Regional Health Authorities, and the Department of Health in England. There were slight variations in this structure in Wales, Scotland, and Northern Ireland, and a small number of Special Health Authorities were directly responsible to the Department of Health. The 1989 NHS reforms allowed the hospitals to become self-governing NHS trusts, which sell services to purchasers of health care, namely primary care physicians and district health authorities. Although the hospitals remain in the NHS, they now have greater autonomy in

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providing and developing services within government health policy. In this marketplace, hospitals changed from directly managed units to self-governing NHS trusts. Health care resources are being redirected toward primary and ambulatory care.⁵ These changes have implications for existing hospital clinical pharmacy services and for the development of new services.

This report provides the first comprehensive measure of clinical pharmacy services in the United Kingdom. It provides a baseline for planning and monitoring future service developments and allows for international comparison of clinical pharmacy services. Before reporting the survey, we will briefly describe a typical NHS hospital pharmacy service and the nature of pharmacy education in the United Kingdom.

U.K. NHS hospital pharmacies usually provide all services from a single location, although they may serve more than one site or hospital. Pharmacies supply medicines to wards using stock and nonstock dispensing. Stock drugs (those in frequent use) are provided by distribution services, often staffed by technicians and assistants.^c Ward pharmacists usually visit the wards daily on weekdays to initiate the supply of nonstock drugs. Several days' supply of these drugs are provided for individual inpatients, following the ward pharmacist's visit or on production of the patient's medication chart in the pharmacy. Patients have individual medication charts containing prescriptions and records of drug administration. Pharmacies in some parts of the United Kingdom dispense drugs for ambulatory care patients. Computers are widely used for stock control and labeling and, increasingly, for creating financial and drug-use reports. In the past, the drug budget has been held by the chief pharmacist, but clinical directors^d now hold it in some hospitals. All pharmacy staff are managed by the chief pharmacist, who is usually responsible to a hospital manager.

Membership in the Royal Pharmaceutical Society of Great Britain, a prerequisite for practice as a pharmacist in the United Kingdom, is gained after a three-year degree course and one year's preregistration training. Postgraduate education is voluntary. Most formal courses result in an M.Sc. degree or a diploma, generally in clinical or hospital pharmacy or in clinical pharmacology.⁶ An M.Sc. degree typically requires one year of full-time study or the equivalent and is similar to a Pharm.D. degree. A diploma requires about half the time that an M.Sc. requires. M.Phil. and Ph.D. degrees are attained after a period of research on a specialized topic.

Methods

Data collection. In May 1992, 508 questionnaires were mailed to all U.K. NHS hospital pharmacies that provided comprehensive pharmacy services. To be included, a pharmacist had to be present in the pharmacy during usual working hours, and services beyond drug supply had to be provided. We excluded hospitals that

did not have an on-site pharmacy (receiving a visiting pharmacy service or operating as a satellite) and those served by a pharmacy located at a site already included in the survey. Respondents had been identified by all District Pharmaceutical Officers in England and their equivalents in the rest of the United Kingdom; these individuals are responsible for services in their geographical areas, which may contain several hospitals. Where apparent gaps were noted, these individuals were asked to clarify the number of hospital pharmacies that existed in their area and the source of pharmaceutical services for hospitals without a pharmacy. These were usually institutions providing long-term care for elderly, mentally ill, or mentally handicapped patients but retaining the title "hospital" for historical reasons.

The questionnaire was pretested among a panel of clinical pharmacists throughout England and Wales. It inquired about all aspects of hospital clinical pharmacy services, the hospital (size, medical school affiliation, management), and the pharmacy (number and qualifications of pharmacists). Most questions had a closed section, with a choice of two (yes or no) or four responses (none, very little, a moderate amount, or lots), and an open section. With regard to provision of a clinical service, "lots" was defined as two or more hours per week, on average, over the year. Open questions were used where appropriate. Nonrespondents were mailed reminders after six weeks and telephoned one month later.

Data analysis. Data were entered on a dBaseIV database (Borland Inc., Scotts Valley, CA) and analyzed by using the Statistical Package for the Social Sciences (SPSS/PC+, SPSS Inc., Gornichem, Netherlands) and Epi Info (version 5, Centers for Disease Control and Prevention, Atlanta, GA⁷). Information from ordinal categorical variables was collapsed to form binary data ("none" and "very little" were changed to "not provided," and a "moderate amount" and "lots" were changed to "provided") and described by using frequencies. A priori hypotheses exploring the relationship between clinical pharmacy services (dependent variables) and demographic and resource variables (independent variables) were tested. For this purpose, data on service provision were grouped according to the value of the independent variable, and the proportions of pharmacies providing service in these groups were compared. We report between-group differences greater than 20% or a factor of 3.

Historically, hospital pharmacy services have been managed differently in each of the five NHS sections (England, Scotland, Wales, Northern Ireland and the Special Health Authorities). Special Health Authorities are highly specialized national referral centers with separate funding arrangements and are linked to postgraduate medical schools. Preliminary research suggested that this division influenced the development of clinical pharmacy services because of variations in the

nature and implementation of Department of Health policy. Hypotheses were created to examine the effects of the Department of Health¹ and Nuffield Report³ recommendations to develop clinical pharmacy services; preliminary research indicated that some pharmacists thought these documents had aided the development of services. We inquired if pharmacists thought that either document had resulted in increased resources for clinical pharmacy services.

Data on clinical pharmacy services were then examined for associations with perceived increased resources. We hypothesized that location of pharmacies in trust and teaching hospitals could affect the provision of clinical pharmacy services. The attainment of trust status might be associated with a more proactive style of hospital management, and the greater demands made on pharmacies in teaching hospitals may have stimulated clinical pharmacy service development. It was thought that the presence of specialist clinical pharmacists (who spend 50% or more of their time on a clinical pharmacy specialty), pharmacists with higher qualifications (diploma, M.Sc., M.Phil., or Ph.D.), or larger numbers of pharmacists would facilitate the provision of clinical pharmacy services. The results were census data; hence most statistical tests were inappropriate, but data were treated as a sample in time (as pharmacist numbers may change over time) to test for associations between number of pharmacists and the provision of services. The number of pharmacists employed was categorized into ranges and a chi-square test for trend⁸ (a priori level of significance, 0.05) was used to establish if the proportion of pharmacies providing a clinical service varied with increasing numbers of pharmacists. The null hypothesis was that there was no difference in provision of clinical services among groups (1-3, 4-6, 7-9, 10-12, 13-15, or ≥ 16 pharmacists).

Results

Response rate. Of the 508 questionnaires mailed, 45 responses were excluded: 30 from ineligible sites and 15 from sites that had received two questionnaires. Of the corrected initial sample (463), 416 (90%) questionnaires were returned. The response rate varied from 61% (14/23) in Northern Ireland to 96% (23/24) in Wales. There had been total coverage of eligible pharmacies and a high response rate, and the results were treated as census data. Nonresponding and responding pharmacies were similar in terms of location in teaching hospitals (24% and 23%, respectively). All four nonresponders in Scotland and six of the nine nonresponders in Northern Ireland were located in nonteaching hospitals.

Validity and reliability. Face and content validity were ensured by pretesting. The nature of the questionnaire precluded testing for criterion-related and construct validity. It was impossible to check for test-retest reliability in a single mailed questionnaire but we

tested for inter-rater and parallel-forms reliability. At 15 sites, two questionnaires were completed by different pharmacists and were returned separately at intervals in excess of two weeks, so it was assumed that they had been completed independently. Within-site replies to closed questions were identical, demonstrating inter-rater reliability. Our data on staffing were comparable to contemporaneous data collected by an English regional health authority, which showed parallel-forms reliability.^e

Demographics, staffing, and operating hours.

Few responding pharmacies (105/389, 27%) were located in teaching hospitals in the United Kingdom as a whole, but a higher proportion were located in such hospitals in Scotland (19/41, 46%) and Northern Ireland (7/14, 50%). This is consistent with the presence of relatively high numbers of medical schools in Scotland and a bias toward responders being located at such sites in both parts. Some pharmacies (118/402, 29%) were in self-governing NHS trusts.

The median number of hospital beds served was 545 ($n = 409$). The interquartile range (IQR) was large (522 beds), and the frequency distribution was highly skewed, with a long right tail. The median numbers of beds served by pharmacies in Special Health Authorities (174) and Northern Ireland (308) were lower.

The median number of pharmacists employed was seven (IQR = 9 pharmacists, $n = 389$). The median number of full-time equivalents (FTEs) was also seven (IQR = 8.5 FTE, $n = 375$), indicating that most pharmacists held full-time positions. Both frequency distributions were skewed to the left. The Special Health Authorities employed relatively more pharmacists (3.5/100 beds), and Northern Ireland relatively fewer (1.2/100 beds), compared with the United Kingdom (1.5/100 beds), with similar results for FTE-adjusted figures.

Many pharmacies (185/410, 45%) employed specialist clinical pharmacists, with a median of two (IQR = 2 pharmacists). Pharmacists with advanced pharmacy education were employed in 305 (74%) of 410 hospitals; 45% of the 410 hospitals had pharmacists with a diploma, 53% had pharmacists with an M.Sc. degree, 6% had pharmacists with an M.Phil. degree, and 15% had pharmacists with a Ph.D. degree. Hospitals employed a median of two pharmacists with advanced education (IQR = 3 pharmacists). The employment of pharmacists with M.Sc. degrees by more Scottish hospitals (29/44, 66%) and pharmacists with diplomas by more Welsh hospitals (14/23, 61%) probably reflects the availability of the courses in 1992.

Pharmacies operated for a median of 8.5 hours daily (IQR = 0.5 hour) on weekdays. Most opened on Saturdays and public holidays (305/414, 74%) and remained closed on Sundays (374/414, 90%). Hours were restricted to a median of three on Saturdays, Sundays, and bank holidays (IQR = 0.5, 2, and 1 hours, respectively). When closed, pharmaceutical services typically consist-

ed of a pharmacist on call from home, providing advice and available to arrange drug supply; more rarely, a residency service was provided, where a sole on-site pharmacist provided emergency pharmacy supply and advisory services (Table 1). Residency service was more common in teaching hospitals (Table 2) and where specialist clinical pharmacists were employed (Table 3).

Drug therapy monitoring. Monitoring therapy for short-term (acute) patients involves a pharmacist looking at the prescription and considering whether the therapy is appropriate. Most pharmacies monitored short-term (acute) and long-term inpatient drug therapy on the ward (367/393, 93%), confirming that ward pharmacy was standard practice. Monitoring was typically provided for short-term patients daily on weekdays (351/392, 90%) but rarely on weekends (51/393,

13%); for long-term patients it was at least weekly (245/335, 73%) in most hospitals that served these patients. Drug therapy monitoring was associated with increasing numbers of pharmacists (Table 4). The median number of pharmacists working on the wards in each hospital was six (IQR = 7 pharmacists), which, in comparison with the median number employed (eight), indicates that most pharmacists worked on the wards.

Participation in ward rounds. Pharmacists participated in ward rounds conducted by medical staff and contributed to treatment decisions in many hospitals, especially in those with more pharmacists (Table 4), clinical pharmacy specialists (Table 3), or pharmacists with advanced qualifications (Table 5). In most hospitals (288) some pharmacists attended ward rounds, but all pharmacists attended rounds in few hospitals (33).

Table 1.
Clinical Pharmacy Services in United Kingdom National Health Service Hospitals

Service	No. (%) of Pharmacies Providing Service
Monitoring drug therapy for acute inpatients	394/409 (96)
Monitoring drug therapy for long-term patients ^a	313/335 (93)
After-hours service	
Pharmacist in-house (residency) ^b	39/412 (9)
Pharmacist on call from home	363/412 (88)
Participating in medical ward rounds	321/414 (78)
Participating on drug and therapeutic committee	329/341 (96)
Enforcement of formulary system ^c	295/333 (89)
Providing advice to clinical directorates	181/279 (65)
Providing financial information on drug use	360/397 (91)
Providing information used in creating prescribing policies	296/397 (75)
Providing information used in making formulary decisions	288/397 (73)
Providing information used in new product evaluations	237/397 (60)
Participating in infection control services ^d	24/391 (6)
On-site drug information center	245/411 (60)
Providing education for pharmacy staff	281/413 (68)
Providing education for nurses and student nurses	267/416 (64)
Providing education for physicians	27/416 (6)
Providing education for medical students	17/416 (4)
Providing education for other hospital health professionals	64/416 (15)
Conducting practice research	170/412 (41)
Contributing to medical audit ^e	204/410 (50)
Performing pharmacy audit ^e	108/404 (27)
Participating in clinical audit ^e	29/404 (7)
Providing support for clinical trials	380/413 (92)
Participating on total parenteral nutrition teams	147/401 (37)
Participating on cytotoxic chemotherapy teams	92/399 (23)
Participating on patient-controlled analgesia teams	60/388 (15)
Therapeutic drug monitoring	83/394 (21)
Anticoagulation control	18/377 (5)
Providing advice on wound care	66/404 (16)
Taking patients' medication history	67/409 (16)
Helping patients with self-medication schemes ^f	204/407 (50)
Counseling patients about their medication	245/406 (60)
Providing patient education for all patients	102/401 (25)
Operating CSM ADR monitoring scheme ^g	187/407 (46)
Operating an additional ADR monitoring scheme	46/367 (13)

^aNot all hospitals had long-term patients.

^bResident pharmacists usually provide on-site emergency pharmacy supply and advisory service. They work alone but may be supported and advised by pharmacy staff at home.

342/415 (82%) of hospitals had a formulary. Enforcement of the formulary meant that fewer than 100% of requests for nonformulary products were acceded to by pharmacy.

^cThese would be understood by respondents to include assistance with the creation of infection control policies and provision of advice about them.

^dQuality assurance activity led by and predominantly involving, doctors (medical audit), pharmacists (pharmacy audit), or multiple disciplines (clinical audit).

^eAlso known as self-administration schemes.

^gCSM = Committee of Safety of Medicines. ADR = adverse drug reaction.

Table 2.
Variation in Provision of Selected Pharmacy Services in United Kingdom National Health Service Hospitals with Location in Medical School Teaching Hospitals

Service	No. (%) Pharmacies Providing Service	
	Nonteaching Hospitals	Teaching Hospitals
In-house after-hours pharmacy services ^a (<i>n</i> = 387)	9 282 (3)	29/105 (28)
Practice research (<i>n</i> = 385)	91/281 (32)	68/104 (65)
Participation on TPN teams ^b (<i>n</i> = 374)	83/270 (31)	58/104 (56)
Participation on cytotoxic-therapy teams (<i>n</i> = 372)	47 268 (18)	40 104 (38)

^aCalled 'residency services' in the United Kingdom. Resident pharmacists usually provide on-site emergency pharmacy supply and advisory service. They work alone but may be supported and advised by pharmacy staff at home.

^bTPN = Total parenteral nutrition.

Table 3.
Variation in Provision of Selected Pharmaceutical Services in United Kingdom National Health Service Hospitals with the Presence of Specialist Clinical Pharmacists^a

Service	No. (%) Pharmacies Providing Service	
	Specialist Clinical Pharmacists Not Present	Specialist Clinical Pharmacists Present
In-house after-hours pharmacy services ^b (<i>n</i> = 409)	11/225 (5)	28/184 (15)
Participating in medical ward rounds (<i>n</i> = 409)	146/224 (65)	171 185 (92)
Providing education for pharmacists (<i>n</i> = 408)	131/224 (58)	148/184 (80)
Providing education for nurses (<i>n</i> = 410)	125/225 (56)	140/185 (76)
Conducting practice research (<i>n</i> = 407)	60/222 (27)	110/185 (59)
Contributing to medical audit ^c (<i>n</i> = 405)	90/221 (41)	112/184 (61)
Participating on TPN teams ^d (<i>n</i> = 396)	55/215 (26)	91/181 (50)
Participating on cytotoxic therapy teams (<i>n</i> = 394)	25 214 (12)	66/180 (37)
Taking medication histories (<i>n</i> = 404)	19 221 (9)	48/183 (26)
Operating additional ADR scheme ^e (<i>n</i> = 362)	10/194 (5)	36/168 (21)

^aPharmacists who spend 50% or more of their time on a clinical pharmacy specialty.

^bCalled 'residency services' in the United Kingdom. Resident pharmacists usually provide on-site emergency pharmacy supply and advisory service. They work alone but may be supported and advised by pharmacy staff at home.

^cA quality assurance activity led by, and predominantly involving, physicians.

^dTPN = total parenteral nutrition.

^eADR = adverse drug reaction. "Additional" means in addition to the Committee of Safety of Medicines ADR monitoring scheme.

Participation in hospital policymaking groups. Drug and therapeutic committees (DTCs) existed in 87% of hospitals.^d Pharmacists typically participated in DTC meetings, more so in hospitals with greater numbers of pharmacists. Formularies existed in 82% of U.K. hospitals and were enforced to some degree (i.e., some nonformulary requests were not approved) in most of these. Some Special Health Authorities (3/9) had a formulary, but only one enforced it. This may reflect the high proportion of senior specialist medical staff in Special Health Authorities, impeding agreement on drug policies. Formulary enforcement was associated with increasing numbers of pharmacists. Few pharmacies were involved in infection control, including creating and providing advice on infection control policies, possibly because of increasing involvement of nurses in this area.

In most hospitals with clinical directorates (279/416, 67%), advice on drug use was provided to the clinical directorate by pharmacy. This service was associated with increasing numbers of pharmacists and employment of pharmacists with advanced education. Irre-

spective of the existence of the directorate structure, most pharmacies provided financial information on drug use and information used in the creation of prescribing policies, in making formulary decisions, and in evaluating new medicinal products.

Drug information and educational services. Many hospitals (245) had an on-site pharmacy drug information center, and 236 (96%) of these contained designated pharmacists. On-site drug information centers were associated with increasing numbers of pharmacists and pharmacists with advanced education. In the absence of an on-site drug information center, information was often obtained from other drug information centers.

Education was provided for pharmacists in 281 hospitals, often as part of an M.Sc. (31% of providing hospitals) or diploma (77% of providing hospitals) course. Most such courses in 1991-92 focused on clinical pharmacy⁶; this is consistent with our observation that more hospitals in Northern Ireland (3/7, 43%) and Scotland (18/27, 67%) provided education for M.Sc. courses (compared with 31% in the United Kingdom)

Table 4.
Variation in Provision of Selected Pharmaceutical Services in United Kingdom National Health Service Hospitals with the Number of Pharmacists Employed

Service ^a	Odds Ratios for Number of Pharmacists ^b				
	4-6	7-9	10-12	13-15	16+
Monitoring acute inpatients	2.55	4.30	ND ^c	3.40	ND
Monitoring long-term patient therapy	3.42	1.93	4.10	2.02	2.64
Participating in medical ward rounds	5.29	8.69	7.12	22.42	25.85
Participating in DTC ^d	4.45	4.19	6.98	8.37	14.30
Enforcing formulary system ^e	1.29	1.30	1.68	3.54	3.21
Providing advice to clinical directorates	2.37	4.08	4.45	5.38	17.44
On-site drug information center	2.56	9.15	11.93	12.11	111.3
Providing education for pharmacists	5.58	13.58	13.54	31.80	ND
Providing education for nurses and nursing students	5.21	6.86	7.25	7.18	50.76
Providing education for health professionals ^f	1.26	1.27	2.18	3.85	4.32
Conducting pharmacy practice research	1.82	6.29	8.53	10.22	36.57
Participating in medical audit ^g	1.72	2.72	3.06	4.08	4.71
Participating in pharmacy audit ^h	2.16	4.16	4.22	3.70	10.84
Participating on TPN teams	2.30	6.09	5.02	18.28	15.17
Participating on cytotoxic therapy teams	3.14	14.78	7.97	6.02	24.44
Participating on PCA ⁱ teams	1.25	6.75	5.19	5.10	12.50
Therapeutic drug monitoring	2.66	2.42	2.10	3.25	7.46
Taking medication histories	0.76	0.94	1.10	0.64	3.02
Helping patients with self-medication schemes ^k	1.73	1.32	1.72	3.07	5.59
Patient counseling	1.95	2.70	3.20	3.65	4.73
Providing patient education	5.30	6.48	4.19	5.58	5.98
Assisting with CSM ADR scheme ^l	1.18	1.31	1.44	2.31	2.71

^an = 318 for each service.

^bProbability of service provision in each range compared with a probability of 1 when 1-3 pharmacists are employed. Chi-square analysis showed significant differences (<0.05) among odds ratios for all services.

^cND = no data.

^dDrug and therapeutics committee.

^eLess than 100% of nonformulary requests were acceded to by pharmacy.

^fOther than doctors, nurses, medical students, and pharmacy staff.

^gQuality assurance activity led by, and predominantly involving, physicians.

^hQuality assurance activity led by, and predominantly involving, pharmacists.

ⁱTPN = total parenteral nutrition.

^jPCA = patient-controlled analgesia.

^kAlso called self-administration schemes.

^lCSM = Committee of Safety of Medicines, ADR = adverse drug reaction.

and more hospitals in Wales (16/17, 94%) and Special Health Authorities (5/5, 100%) provided education for diplomas (compared with 77% in the United Kingdom). Provision of education was associated with increasing numbers of pharmacists, specialist clinical pharmacists, and pharmacists with advanced education. Education was more frequently provided where pharmacy resources were thought to have increased as a result of the Department of Health recommendation HC(88)54¹ (148/173, 86%) or the Nuffield Report³ (68/77, 88%) than where resources were thought to have been unaffected (124/227, 55%, and 188/302, 62%, respectively).

Many pharmacies provided education for hospital nurses; few provided it for physicians, medical students, or other groups of nonpharmacist health care professionals and workers. Education of nurses was associated with the presence of specialist clinical pharmacists or pharmacists with advanced education. For nurses and other health care professionals, training was associated with increasing numbers of pharmacists.

Involvement in research, audit, and clinical

trials. Some pharmacies undertook practice research and 127 of 155 (82%) indicated that researchers were performing it as part of advanced education, mainly toward master's degrees (68) and diplomas (64). Practice research was associated with location in teaching hospitals, increasing numbers of pharmacists, specialist clinical pharmacists (Table 3), and pharmacists with advanced education. It was more common where resources were thought to have increased because of HC(88)54 (94/174, 54%) than at other sites (71/225, 32%). Pharmacies typically provided support services for in-house and pharmaceutical company-sponsored clinical trials.

Some pharmacies participated in medical audit, but fewer were involved in pharmacy or clinical audit (Table 1).⁸ Contributions to medical audits included provision of financial information on drug use (169/197, 86%), help with devising prescribing policies (134/188, 71%), feedback on adherence to policies (115/186, 62%) and information on prescribing problems (86/180, 48%). Pharmacy audits examined interventions, specific clinical pharmacy services, errors, and response time. Clin-

Table 5. Variation in Provision of Selected Pharmacy Services in United Kingdom National Health Service Hospitals with the Presence of Pharmacists with Advanced Qualifications^a

Service	No. (%) Pharmacies Providing Service	
	Pharmacists with Advanced Qualifications Not Present	Pharmacists with Advanced Qualifications Present
Participating in medical ward rounds (<i>n</i> = 409)	63/105 (60)	254/304 (84)
Advising clinical directorates (<i>n</i> = 276)	29/65 (45)	150/211 (71)
On-site drug information center (<i>n</i> = 406)	36/104 (35)	208/302 (69)
Providing education for pharmacists (<i>n</i> = 408)	52/104 (50)	227/304 (75)
Providing education for nurses (<i>n</i> = 410)	52/105 (50)	213/305 (70)
Conducting practice research (<i>n</i> = 407)	18/103 (17)	152/304 (50)
Performing pharmacy audit ^b (<i>n</i> = 400)	13/102 (13)	95/298 (32)
Participating on TPN teams ^c (<i>n</i> = 396)	18/97 (19)	128/299 (43)
Patient counseling (<i>n</i> = 401)	44/99 (44)	200/302 (66)

^aPharmacists who possess a diploma, M.Sc., M.Phil., or Ph.D.

^bQuality assurance activity led by, and predominantly involving, pharmacists.

^cTPN = total parenteral nutrition.

ical audits included multidisciplinary audit of departments and of other hospitals or their departments. Contribution to medical audits was associated with the presence of specialist clinical pharmacists, and contribution to pharmacy audits was associated with the presence of pharmacists with advanced education. Involvement in both activities increased with increasing pharmacist numbers.

Specialist clinical pharmacy services. Many pharmacies contributed to multidisciplinary teams. Participation on total parenteral nutrition (TPN), cytotoxic therapy, and patient-controlled analgesia (PCA) teams was associated with increasing numbers of pharmacists. Participation on TPN and cytotoxic-therapy teams was associated with location in teaching hospitals and the presence of specialist clinical pharmacists, and participation on TPN teams was associated with pharmacists with advanced education. Provision of a therapeutic drug monitoring service was associated with increasing numbers of pharmacists. Anticoagulation services and wound care advice were rarely provided by pharmacists.

Services provided directly to patients. Few pharmacies took patients' medication histories, except in Scotland (16/45, 36%). This was done mainly for inpatients (56/66, 85%). Assistance in formal programs enabling patients to self-administer medications was provided in 50% of all pharmacies; this service was provided less frequently in Northern Ireland (4/13, 31%) and Special Health Authorities (3/9, 33%). Patient counseling was frequently provided for both inpatients (167/238, 70%) and outpatients (151/238, 63%).^f Counseling was provided least frequently in Special Health Authorities (3/9, 33%) and most frequently in Scotland (32/43, 74%) and Wales (16/22, 73%). Patient education was provided less often in Northern Ireland (1/13, 7%) than elsewhere. Throughout the United Kingdom, patient education was provided mainly for outpatients

(59/98, 60%). The provision of these services was associated with increasing numbers of pharmacists. Medication history-taking was associated with specialist clinical pharmacists, and patient counseling was associated with pharmacists with advanced education.

Adverse drug reaction (ADR) monitoring. Some pharmacies assisted in the operation of the Committee of Safety of Medicines ADR monitoring scheme. (The Committee of Safety of Medicines advises the Licensing Authority on questions of the safety, quality, and efficacy of new medicines for human use. It is also responsible for encouraging the collection and investigation of reports of suspected ADRs.) Provision of additional ADR monitoring schemes was associated with specialist clinical pharmacists. Both services were available to all inpatients and to about half of all day patients and outpatients.

Discussion

This study reports the extent of clinical pharmacy services in U.K. NHS hospitals in 1992. Some services were frequently provided, such as drug therapy monitoring on wards (ward pharmacy), drug-use control (financial information and formulary and DTC activities), and clinical trials support. Others were rare, such as education for some health professionals, advice about wound care and infection control, participation in clinical audit and PCA teams, pharmacist-run anticoagulation control, medication history-taking, some ADR monitoring, and after-hours residency services.

The results strongly support the existence of associations between the provision of services and increased numbers of pharmacists, specialist clinical pharmacists, and those with advanced education. Weaker associations were noted with location in teaching hospitals, location in certain parts of the United Kingdom, and perceptions of increased resources. Increased clinical pharmacy services in teaching hospitals may be

attributable to greater innovation and development of all services and a greater need for pharmacy support services. The failure of Special Health Authority pharmacies to provide some services may be related to a dominant medical profession inhibiting clinical pharmacy development, and the greater development of patient-oriented services in Scotland may be a regional factor. Associations with increasing numbers of pharmacists may illustrate the need for a critical mass of pharmacists to provide many services. Pharmacists with advanced education or specialists may have greater confidence and expertise, facilitating service development. Service provision in 1992 seemed to have been unaffected by the creation of NHS trusts, but most hospitals were not yet trusts. Increasing attainment of trust status and market forces in the NHS may reduce the number of pharmacists employed or adversely affect education, with potentially negative effects on clinical pharmacy services.

Comparison of services provided in the United Kingdom and the United States. We recognize that there are dissimilarities in the nature of clinical pharmacy services provided in U.S. and U.K. hospitals, partly because of different definitions of clinical pharmacy. We also recognize that there are differences in the health care systems and in survey methods. Still, broad comparisons of hospital pharmacy services in the United Kingdom and the United States remain possible. Data were compared with those cited for U.S. community hospitals in 1992.⁹ The case mix in the hospitals in both surveys was broadly comparable. We cannot explain the differences that we noted, but standards required by the Joint Commission on Accreditation of Healthcare Organizations may have influenced the provision of certain services in the United States. No such organization exists in the United Kingdom.

Hospital pharmacies in the United States are open longer on weekdays (15 hours/day) and weekends (13 hours/day) than those in the United Kingdom. The number of pharmacist FTEs per 100 occupied beds was much lower in the United Kingdom (1.4) than in the United States (6.7). This may be related to the needs of unit dose distribution systems in the United States and the use of well-trained nonpharmacist support staff in U.K. hospitals. Our survey did not examine this topic in detail.

Information and education services were more frequent in the United Kingdom than in the United States, where 12.7% of hospital pharmacies had a drug information center and about one quarter had a formal pharmacist development program. U.S. and U.K. pharmacies were involved to a similar extent in drug policy-making mechanisms. Most U.S. hospitals had a pharmacy and therapeutics committee with pharmacist representation, but data were unavailable on the extent of pharmacist activity on these; fewer U.S. hospitals had a well-controlled formulary. Patient education or

counseling was provided for inpatients by more (69%) U.S. than U.K. pharmacies, but similar proportions provided ADR detection and monitoring programs, took patient medication histories, and provided drug therapy monitoring. There may, however, be substantial differences in the provision of drug therapy monitoring in the two countries; all U.K. patients received the service, albeit not on a daily basis, but it was provided for more than half of all inpatients by only 47% of U.S. pharmacies. Pharmacokinetic consultations for inpatients or ambulatory care patients (57%) were provided by more pharmacies in the United States, but provision of nutritional support consultations was similar (37% in the United States) to that in the United Kingdom. Comparison of quality improvement services was difficult. Pharmacy audit of clinical and nonclinical services was infrequent in the United Kingdom, but contributions were often made to medical audit; in the United States, quality assurance for clinical services was performed in about 30% of hospitals, but data were unavailable on contributions to multidisciplinary audits or quality assurance.

Conclusion

There are a number of differences in the extent of clinical pharmacy services in the United Kingdom and the United States, most notably the greater development of patient-oriented services in the United States and of drug information, therapy monitoring, and pharmacist education in the United Kingdom. Strongly positive associations were found between the provision of clinical pharmacy services and increasing numbers of pharmacists, pharmacy specialists, and pharmacists with advanced education in U.K. NHS hospitals.

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²European Society of Clinical Pharmacy, United Kingdom Clinical Pharmacy Association, and Société Française de Pharmacie Clinique. Clinical pharmacy education and training for pharmacists in the European Economic Community. Netherlands; 1989.

³Pharmacy technicians undergo specific vocational training and provide services such as compounding and dispensing. Assistants usually hold less substantial qualifications.

⁴Clinical directors, often physicians, manage organizational sections (clinical directorates), usually grouped according to medical specialty, in NHS hospitals.

⁵Wilson P. Personal communication. 1993.

⁶Drug and therapeutic committees usually include medical, pharmacy, and other staff. They determine hospital drug policy in consultation with pertinent staff.

⁷Audit is a quality assurance activity. It may be led by, and predominantly involve, physicians (medical audit), pharmacists (pharmacy audit), or multiple disciplines (clinical audit).

⁸Patients receiving noninvasive diagnosis or review of treatment are referred to as outpatients; those undergoing a procedure or other treatment who are not typically admitted are referred to as day patients.

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Establishment of a 900 telephone number at a university-based drug information service

PHILIP O. ANDERSON

Abstract: Effects of converting a free drug information service at a university medical center to a 900 telephone number are described.

Calls to a university medical center drug information service had increased beyond the capacity of staff. A telephone survey to recent users of the service indicated that callers outside the institution would be willing to pay a fee for the service, so a 900 number was instituted for outside calls in January 1993. Staff re-

corded data on all questions they answered; data for 1993 were compared with those from 1992.

Question volume decreased by 48% after the 900 number was instituted, with questions from outside the institution dropping by 55%, questions from outside health care professionals dropping by 72%, and questions from the lay public increasing slightly. One severe impediment to callers from local hospitals was that many hospitals

block access to 900 numbers from their telephone systems. The average length of a call was three minutes and the average cost per call was \$6. Net income during the first year of operation was \$6698. The 900 number provided some income, but it did not completely offset operating costs.

A 900 telephone number is a workable, but imperfect, method of providing drug information to outside callers. Early notification of users be-

fore implementing a 900 number is essential to allow time for them to arrange telephone access.

Index terms: Administration; Costs; Data collection; Drug information centers; Pharmacy, institutional, hospital; Telephone
Am J Hosp Pharm. 1994; 51:2684-7

Several methods of charging for hospital- and university-based drug information services have been reported in the literature, including fixed- or variable-priced contractual arrangements and fee-for-service methods.¹⁻⁴ Although commercial drug information services provide information to the lay public via 900 access,^{5,6} a literature review revealed no reports of such services being provided to health professionals via a 900 telephone number from a drug information service based at a university medical center.

The University of California San Diego (UCSD) Drug Information Service (DIS) was established in 1978. The DIS was made available to all community health profes-

sionals at no charge from the outset. It also handles questions from the lay public regarding the use of medications during breastfeeding. Staffing has varied between 1 and 1.2 pharmacist full-time equivalents (FTEs) plus some pharmacy resident coverage, with one full-time pharmacist (the director) providing most of the staffing. During 1992 and 1993, DIS staffing consisted of 1.2 FTE pharmacists; pharmacy residents accounted for an additional 0.2 FTE in 1992 and 0.3 FTE in 1993. From the first full year of operation in 1980, the number of calls received by the DIS increased almost every year from 1019 in fiscal year 1980 to 3622 in fiscal year 1992 (the university's fiscal year is July to June).

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Hospital pharmacists' participation in audit in the United Kingdom

Siobhan Cotter, Martin McKee, Nicholas Barber

Abstract

Objective—To investigate systematically participation in audit of NHS hospital pharmacists in the United Kingdom.

Design—Questionnaire census survey.

Setting—All NHS hospital pharmacies in the UK providing clinical pharmacy services.

Subjects—462 hospital pharmacies.

Main measures—Extent and nature of participation in medical, clinical, and pharmacy audits according to hospital management and teaching status, educational level and specialisation of pharmacists, and perceived availability of resources.

Results—416 questionnaires were returned (response rate 90%). Pharmacists contributed to medical audit in 50% (204/410) of hospitals, pharmacy audit in 27% (108/404), and clinical audit in only 7% (29/404). Many pharmacies (59% (235/399)) were involved in one or more types of audit but few (4%, (15/399)) in all three. Participation increased in medical and pharmacy audits with trust status (medical audit: 57% (65/115) trust hospital v 47% (132/281) non-trust hospital; pharmacy audit: 34% (39/114) v 24% (65/276)) and teaching status (medical audit: 58% (60/104) teaching hospital v 47% (130/279) non-teaching hospital; pharmacy audit 30% (31/104) v 25% (68/273)) and similarly for highly qualified pharmacists (MPhil or PhD, MSc, diplomas) (medical audit: 54% (163/302) with these qualifications v 38% (39/103) without; pharmacy audit: 32% (95/298) v 13% (13/102)) and specialist pharmacists (medical audit: 61% (112/184) specialist v 41% (90/221) non-specialist; pharmacy audit: 37% (67/182) v 19% (41/218)). Pharmacies contributing to medical audit commonly provided financial information on drug use (86% 169/197). Pharmacy audits often concentrated on audit of clinical pharmacy services.

Conclusion—Pharmacists are beginning to participate in the critical evaluation of health care, mainly in medical audit.

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Introduction

Since the 1989 NHS review¹ medical audit, with doctors assessing the quality of their own work, has been the major focus of attention and funding in the United Kingdom (UK).²

This is changing: there is a growing emphasis on audit carried out by other professional groups, either alone or with others. Pharmacists have much to contribute to the audit process, not least because they frequently maintain records of their contributions to good prescribing practices.³ Also involving experts on medicines in audit of a health care process that includes the use of drugs has obvious benefits, such as help in improving prescribing and drug administration processes.

A few papers have reported the experiences of pharmacists auditing their own activities⁴⁻⁵ or participating with others in audit,⁶⁻¹⁰ but one study suggests that the extent to which this is happening is limited.⁹ Until now the extent to which pharmacists throughout the UK are involved in audit has not been systematically investigated. We report the results of a study that examined the nature and extent of hospital pharmacists' participation in medical, pharmacy, and clinical audit activities within the NHS. This information identifies examples of current audit activities, explores the determinants of involvement in audit, provides a baseline against which future initiatives can be evaluated, and suggests areas where such initiatives might be directed.

Methods

In March 1992 a postal questionnaire was sent to all NHS hospital pharmacies that provided clinical pharmacy services (that is, pharmacies where a pharmacist was present during normal working hours and where services in addition to supplying drugs were provided). These pharmacies had been identified by prior communication with district pharmaceutical officers in England, chief administrative pharmaceutical officers in Scotland and Wales, directors of pharmaceutical services in Northern Ireland, and chief pharmacists in special health authorities. The questionnaire had previously been tested among a panel of clinical pharmacists from throughout England and Wales. It inquired about all aspects of hospital clinical pharmacy services and included a section on pharmacists' participation in audit; their contribution to medical audit, and their involvement in clinical audit (question phrased to exclude contribution to medical audit) and pharmacy audit. The box shows the definitions of these terms, as used in the questionnaire. Each question had a pre-coded section asking if pharmacy staff routinely participated in the audit activity and

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Definitions of audit

Medical audit	audit of the practices of doctors
Clinical audit	- audit of the practices of health care professionals
Pharmacy audit	- audit of the practices of pharmacists

an open section inviting respondents to specify these activities. The question on medical audit additionally requested information on the extent of provision of different types of help and information for the audit process. Postal reminders were sent after six weeks, and further non-responders were followed up by telephone.

Data were analysed with the statistical package for the social sciences (SPSS/PC+). Information from ordinal categorical variables was collapsed to form binary data (none and very little = not provided; a moderate amount and lots (on average two hours a week or more) = provided) and described using frequencies. Comments volunteered by respondents to open sections of questions were coded with key words.

A priori hypotheses, on relations between participation in audit (dependent variables) and demographic, staffing, and other (independent variables), were tested. Among the independent variables tested were pharmacists' perceptions of increased availability of resources for clinical pharmacy services owing to a Department of Health policy document, HC(88)54¹¹ and the Nuffield report,¹² both of which recommended the development of clinical pharmacy in the hospital sector in the UK. Although the documents pre-date audit, they may have increased pharmacists' involvement in wider aspects of health care, including audit. The data set was a census because of total coverage of UK NHS hospital

pharmacies and a high response rate (see results below). This made most statistical tests inappropriate. To assess the effects of staffing on participation in audit activities, however, the data were treated as a sample in time and χ^2 tests for trend were conducted.

Results

GENERAL RESULTS

The response rate to the questionnaire was 90% (416/462). Within the UK the response rates varied from 61% (14/23) in Northern Ireland to 96% (23/24) in Wales. Except for Scotland, where all non-responders were non-teaching hospital pharmacies, and Northern Ireland, where 67% (six) were non-teaching hospital pharmacies, similar proportions of responding and non-responding pharmacies were located in teaching hospitals (27%, 112 and 23%, 11 respectively).

Pharmacists reported contributing to medical in 50% (204/410) of hospitals, undertaking pharmacy audit in 27% (108/404) and participating in clinical audit in only 7% (29/404). Many pharmacies (59%, 235/399) were involved in one or more types of audit but few (4%, 15/399) in all three types.

EFFECT OF HOSPITAL TYPE

Although half of all pharmacies surveyed reported participation in the medical audit process, a higher proportion of those in NHS trust hospitals and medical school teaching hospitals contributed than those in directly managed units or non-teaching hospitals (table 1). The same observation applied to pharmacies' participation in pharmacy audit; small numbers precluded comments on variations in participation in clinical audit.

EFFECT OF STAFFING FACTORS

The likelihood of pharmacists' participation in medical and pharmacy audit increased significantly with increasing numbers of pharmacy staff ($\chi^2 = 20.8$ and 25.2 respectively, $p < 0.001$). The odds ratio for conduct of pharmacy audit increased twofold when four to six pharmacists were employed and fourfold when more than 10 were employed; the corresponding odds ratios for contribution to medical audit were 1.7 and 3.1 respectively.

The presence of pharmacists with higher qualifications (MPhil or PhD, MSc, or diplomas) or specialist clinical pharmacists (who spend half of their time or more in a clinical pharmacy specialty) was associated with pharmacists' participation in all types of audit (table 2). When pharmacists with higher degrees were employed the proportion of pharmacies conducting pharmacy audit more than doubled, and when specialist clinical pharmacists were present the proportion of pharmacies contributing to medical audit increased by 20%, from 41% (90 pharmacies) to 61% (112).

EFFECT OF PERCEIVED RESOURCE SHIFTS

Some respondents indicated that the health circular HC(88)54¹¹ and the Nuffield report¹² had increased resources for hospital clinical

Table 1 Percentage* (number) of pharmacies participating in audit in NHS hospitals† in the UK, according to hospital management and teaching status

Type of audit activity	Management status		Teaching status‡	
	NHS trust	Directly managed unit	Non-teaching	Teaching
Medical audit	57 (65/115)	47 (132/281)	47 (130/279)	58 (60/104)
Pharmacy audit	34 (39/114)	24 (65/276)	25 (68/273)	30 (31/104)
Clinical audit	11 (13/115)	5 (15/275)	5 (13/275)	13 (13/102)

*Percentages vary slightly from overall results owing to missing data.

†Pharmacies in which a pharmacist was present during normal working hours and services in addition to supplying drugs were provided.

‡Location in medical school teaching hospitals.

Table 2 Percentage* (number) of pharmacies participating in audit in NHS hospitals† in the UK, according to educational level and specialisation of pharmacists

Type of audit activity	Employment of pharmacists with higher qualifications‡		Employment of specialist clinical pharmacists§	
	Not employed	Employed	Not employed	Employed
Medical audit	38 (39/103)	54 (163/302)	41 (90/221)	61 (112/184)
Pharmacy audit	13 (13/102)	32 (95/298)	19 (41/218)	37 (67/182)
Clinical audit	3 (3/103)	9 (26/297)	4 (9/217)	11 (20/183)

*Percentages vary slightly owing to missing data.

†Pharmacies in which a pharmacist was present during normal working hours and services in addition to supplying drugs were provided.

‡MPhil or PhD, MSc, or diplomas

§Spending 50% or more of their time working in a specialist area of pharmacy—for example, an oncology specialist pharmacist

Table 3 Percentage* (number) of pharmacies participating in audit in NHS hospitals† in the UK, according to pharmacist's perceptions of increased availability of resources for clinical pharmacy or mg to HC (88/54 and Nuffield report)

Type of audit activity	HC 88/54		Nuffield report	
	No change	Increased activity	No change	Increased activity
Medical audit	44 (100/227)	59 (101/172)	47 (142/303)	63 (17/75)
Pharmacy audit	19 (43/224)	38 (64/170)	24 (72/300)	38 (28/75)
Clinical audit	7 (16/222)	8 (13/171)	7 (20/299)	8 (6/75)

*Percentages vary slightly owing to missing data.

†Pharmacies in which a pharmacist was present during normal working hours and services in addition to supplying drugs were provided.

Table 4 Nature of the contribution of hospital pharmacies to medical audit in NHS hospitals* in the UK

Contribution†	Percentage (No) pharmacies
Financial information on drug use	86 (169/197)
Help in creation of prescribing policies	71 (134/188)
Information on adherence to agreed prescribing policies	62 (115/186)
Information on problems in prescribing process	48 (86/180)

*Percentages vary slightly owing to missing data.

†Number of respondents to individual questions varied slightly.

pharmacy services. An association was observed between perceived increases in resources, consequent on these reports, and participation in medical and pharmacy audit (table 3). Pharmacies in which resources were considered to have increased as a result of the health circular were more commonly participating in medical audit (59%, 101/172) and pharmacy audit (38%, 64/170) than those in which resources were considered to have been unaffected (44%, 100/227 and 19%, 43/224 respectively). Similarly, pharmacies were more commonly participating in medical audit (63%, 47/75) and pharmacy audit (38%, 28/75) in hospitals in which it was thought that clinical pharmacy resources had increased as a result of the Nuffield report than in those where no effect had been perceived (47%, 142/303 and 24%, 72/300 respectively).

SPECIFIC CONTRIBUTIONS TO AUDIT

Of pharmacists' contributions to medical audit, the commonest was providing financial information on drug use (86%, 169/197) (table 4). Many pharmacies helped to create prescribing policies (71%, 134/188) and fed information on adherence to such policies back to the audit group (62%, 115/186). A smaller proportion (48%, 86/180) supplied information on problems experienced by pharmacists with the process of doctor's prescribing. Some pharmacies volunteered additional information on contributions to medical audit. Of these, 36 stated that they were involved in directly auditing prescribing. Examples given included audit of the prescribing of antibiotics, anti-emetics, and depot neuroleptics.

Those pharmacists who specified the pharmacy audits carried out indicated that activities pursued included the audit of interventions (54 pharmacies), when pharmacists make inquiries (often of a doctor) to satisfy themselves that a prescription is appropriate, often resulting in alteration of the prescription, and audit of specific clinical

pharmacy services such as therapeutic drug monitoring, central intravenous additives services, and drug information services (40 pharmacies), errors in pharmacy processes such as dispensing (16), and service response time (16).

The clinical audit activities pursued varied from multidisciplinary audit of whole departments (25) and of medicine usage (17) to auditing other hospitals or their departments (three). Specific examples included audit of physiotherapy and dietetics departments, audit of laxative and antacid use, and audit of drug supply and distribution at other hospitals.

Discussion

The results of this census survey suggest that pharmacists are beginning to become involved in audit activities, particularly in medical audit. They are starting to evaluate their own activities and services but have rarely, as yet, become involved with other health care professionals in clinical audit. This picture is true for most parts of the UK.

EXPLANATIONS FOR PRESENT LEVEL OF PARTICIPATION IN AUDIT

Pharmacists' involvement in medical audit tended to be based on providing information. This is a traditional and, perhaps, more easily assumed role for pharmacists than that of direct involvement in the prescribing arena and in creating prescribing policies. Pharmacists were less involved in using medical audit as a means of alerting doctors to prescribing problems; fewer than a quarter of pharmacies surveyed did this. Prescribing problems are usually addressed in one to one doctor-pharmacist discussion in the ward or through hospitalwide policies, often linked to formulary management. Yet prescribing problems are common, and research has shown that pharmacy has a unique insight into individual problems in particular medical specialties through its system of ward pharmacy¹³ and because of its use of computerised records of drug usage. Medical audit enables systematic review of prescribing problems and the development of strategies for their future avoidance, all as part of an educational process.

The most common pharmacy audit activities were audit of the ward pharmacy service, of prescription monitoring, and of more specialised services such as therapeutic drug monitoring. The existence of these programmes is encouraging and signifies a desire among some pharmacists to evaluate critically their clinical services. These internal, professional audits also complement external audits currently performed on some sections of pharmacy departments, such as manufacturing units.

The virtual absence of pharmacists' activity in clinical audit may not indicate their lack of interest. Rather, it may simply reflect the limited extent to which clinical audit was performed in NHS hospitals at the time of the survey. The nature of the audits in which

pharmacy was involved may signify, to some extent, the expansion of the pharmacy manager's responsibilities to encompass managerial responsibility for paramedical groups within hospitals.

Pharmacies in teaching hospitals participated more frequently in all audit activities. From evidence gathered in this survey the most likely reason is their greater development of clinical pharmacy services with more highly qualified pharmacists. The same pattern of greater participation was seen in trust hospitals and in hospitals that employed pharmacists with higher degrees and specialist clinical pharmacists; it is not immediately obvious why this should be so. The association between perceived increases in resources for clinical pharmacy services and increased participation in audit may mean that pharmacy managers committed to developing clinical pharmacy used documents such as HC(88)54¹¹ and the Nuffield report¹² to support their efforts. Since neither of these resulted in additional direct government funding the association may be a proxy for a high level of commitment by pharmacy managers and general managers to make services more appropriate.

NEXT STEPS

The variation in the extent to which pharmacists have become involved in audit demonstrates considerable scope for development. By providing examples of what is being done this survey suggests ways in which pharmacies not yet involved in audit might start.

Several factors could contribute to increasing pharmacists involvement in audit. Pharmacists have yet to optimise their contribution to medical audit, becoming team workers not simply providers of information. Doctors would welcome greater involvement by pharmacists in audit,¹⁴ and pharmacists may be raising artificial barriers that limit their participation. The difficulty of undertaking audit in hospital pharmacies with only one or two pharmacists may be overcome by organising programmes with nearby hospitals, possibly using pharmacists with higher degrees to lead the process. This model of audit may also be applicable to community pharmacy where, currently, pharmacists often practice alone. The new regional offices could provide useful leadership and coordination for such schemes. Although audit must be led locally, academic pharmacy practice units could accelerate its development by providing training and by disseminating information on audit methods. This would be an appropriate use of funds for clinical audit. The medical royal colleges have had a key role in promoting medical audit and disseminating guidance on

good practice. Similar activity is needed in pharmacy. The Pharmaceutical Society should assume this initiative. Its recent appointment of an audit fellow, in association with the Department of Health, is but a first step; it is essential that the resulting work is not confined to pharmacy audit but seeks to integrate pharmacists into clinical audit.

Clinical audit has much to gain from greater participation by pharmacists. Hospital pharmacies routinely gather information on several aspects of the process of drug use that could be usefully incorporated into audit cycles. This should facilitate linking health care processes with outcomes and help to enhance both. Such a scenario will necessitate research into aspects of service provision, which audit should stimulate by providing the research questions.¹⁵ With increasing emphasis on multidisciplinary audit, these questions will be addressed by multidisciplinary health services research, to which pharmacists can contribute by promoting increased communication and collaboration between pharmacy and mainstream health services research centres.

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Hospital clinical pharmacy services provided to primary care

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Recent changes in the United Kingdom national health service (NHS) have increased the need for pharmacy services in primary care. Government documents have advocated a role for hospital pharmacists in the provision of clinical pharmacy services to primary care. A census survey was carried out to establish the extent to which hospital pharmacists have become involved in the provision of clinical pharmacy services to primary care patients and health professionals. Questionnaires were sent to district pharmaceutical officers in England (and their equivalents in the rest of the UK). One hundred and ninety-three questionnaires were returned (92 per cent). Hospital pharmacists provided few advisory, educational or information services to patients and primary care health professionals, with the exception of primary care nurses. Pronounced variations in service provision were observed in different parts of the UK. Respondents gave reasons for their limited involvement and indicated that the provision of services is increasing.

The survey shows that government policy on the provision of hospital clinical pharmacy services to patients and health professionals in primary care has not been implemented. The provision of such service is, however, increasing, mainly as a consequence of the NHS reforms and the movement of resources to primary care.

RECENT shifts in the provision of health care to the community¹ have posed challenges for pharmacists who, in common with other health professionals, increasingly seek to provide a "seamless service". Historically, pharmacy service provision in primary and secondary care has been segregated but there are suggestions that this is changing.^{2,3} A government health circular,⁴ and other reports,^{5,6} advocate that hospital clinical pharmacists develop advisory roles in primary care. Although this has many perceived benefits, the extent to which it has happened is unknown.

Clinical pharmacy has been defined by the Department of Health as the application of pharmaceutical skills to "medicine usage both at the policy making level and in the treatment of individual patients".⁴ The aim of this study was to examine and quantify the extent to which hospital pharmacists have become involved in the provision of clinical pharmacy services to health professionals, institutions and patients in the primary care sector. Data were examined for the existence of links between service provision and perceived changes in hospital pharmacy resources.

Methods

In 1992, a postal questionnaire was sent to the professional managers of pharmacy services in each district (or equivalent)* in the UK NHS, namely, district pharmaceutical officers (DPhOs) in England, chief administrative pharmaceutical officers (CAPOs) in Scotland and Wales, directors of pharmaceutical services (DPSs) in Northern Ireland and chief pharmacists in special health authorities (SHAs, providers of specialist

health services). The questionnaire had previously been pre-tested among DPhOs in one English region and by a panel of clinical pharmacists from England and Wales. It explored the extent to which selected advisory, information and educational services were provided, at the time, by hospital pharmacists (including community services pharmacists) to health professionals, institutions and patients in the community. These services had been selected following initial questionnaire pre-tests. Most questions consisted of a closed section, providing a choice of two (yes/no) or four responses (none, very little, a moderate amount and lots), followed by an open section. Postal reminders were sent after six weeks and further non-responders were followed-up by telephone.

Data were entered on dBase IV (Borland Inc, Scotts Valley, California) and analysed using the Statistical Package for the Social Sciences (SPSS PC+, SPSS Inc, Gornichem, The Netherlands). Information from ordinal categorical variables was collapsed to form binary data (none and very little = not provided; a moderate amount and lots = provided) and described using frequencies. These frequencies represent the number of districts in which services were provided by hospital pharmacists to various recipients in primary care. Hypotheses were tested exploring the relationship between the provision of clinical pharmacy services (dependent variable) and perceived changes in hospital pharmacy resources as a consequence of health circular HC(88)54,⁴ the Nuffield Report⁶ and attainment of trust status

* District is used to refer also to health boards (Scotland and Northern Ireland) and health authorities (Wales and special health authorities)

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(independent variables). Comments volunteered by respondents to open sections of questions were coded using key words.

Results

Of the 211 questionnaires originally sent, 193 (92 per cent) were returned. The response rate ranged from 75 per cent (3 out of 4) in Northern Ireland to 93 per cent (165 out of 177) in England. Data were treated as census rather than sample data because of 100 per cent coverage and a high response rate. This obviated the need for tests of statistical significance.

Provision of services Many districts provided information, advice or educational services to primary care nurses but did not provide them to general practitioners (GPs), community pharmacists, other primary care professionals[†], institutions or patients. There were large variations in service provision between the different UK countries and SHAs (Tables 1-6). In general, levels of service provision were higher in Scotland than in England or Wales and some services were not provided by SHA pharmacies. The high levels of service provision in Northern Ireland should be interpreted in the light of the small numbers involved (n = 3).

Drug information was the most commonly-provided service. For information provided independently of drug information centres (DICs), the frequency of provision ranged from 37 per cent for other primary care professionals to 62 per cent for primary care nurses. DICs provided information least frequently to primary care institutions (27 per cent) and most often to GPs (52 per cent). Provision varied throughout the UK.

For GPs, districts often provided drug information from DICs (52 per cent), information on general drug related matters (41 per cent) and advice on prescribing and prescribing policies (36 per cent) but rarely provided education (12 per cent). Service provision to GPs was variable; except for drug information provided by DICs, the frequency of service provision was higher in Scotland and Northern Ireland than in the remainder of the UK (Table 1).

Primary care nurses were provided with high levels of most services. They received information on general drug-related matters in 62 per cent of districts. Services provided to nurses centred on education, drug information and advice on wound care, rather than on more technical patient care services (Table 2). This point is illustrated by the relatively low (34 per cent) provision of advice on analgesia or on equipment used in patient controlled analgesia (PCA). Pharmacies in Northern Ireland did not provide advice on analgesia or on equipment used in PCA, a service which may be perceived as representing greater clinical pharmacy development. Only one of the five SHAs replying to the questionnaire provided pharmacy-run educational services or drug information to nurses.

Counselling was provided for individual patients

[†] These included chiropodists, dentists and other professionals working in primary care

Table 1: Provision of clinical pharmacy services by hospital pharmacies in the UK national health service to general practitioners

Service	Number (%) of districts* providing each service					
	All UK (n=192)	England (n=164)	N Ireland (n=3)	Scotland (n=12)	Wales (n=8)	SHAs [†] (n=5)
Advice on prescribing or on prescribing policies	69 (36)	57 (35)	2 (67)	8 (67)	2 (25)	0 (0)
Advice on financial aspects of drug use	37 (19)	29 (18)	2 (67)	6 (50)	0 (0)	0 (0)
Information on general drug-related matters	78 (41)	66 (40)	2 (67)	8 (67)	2 (25)	0 (0)
Drug information from drug information centres	99 (52)	86 (52)	1 (33)	4 (33)	8 (100)	0 (0)
Educational services	23 (12)	19 (12)	0 (0)	3 (25)	1 (13)	0 (0)

* Includes district health authorities (England), health boards (Scotland and Northern Ireland) and health authorities (Wales and special health authorities)

[†] Special health authorities

Table 2: Provision of clinical pharmacy services by hospital pharmacies in the UK national health service to primary care nurses

Service	Number (%) of districts* providing each service					
	All UK (n=193)	England (n=165)	N Ireland (n=3)	Scotland (n=12)	Wales (n=8)	SHAs [†] (n=5)
Advice on wound care	102 (53)	87 (53)	1 (33)	8 (67)	6 (75)	0 (0)
Advice on analgesia/ equipment used in patient controlled analgesia	66 (34)	60 (36)	0 (0)	3 (25)	3 (38)	0 (0)
Information on general drug-related matters	120 (62)	102 (62)	2 (67)	8 (67)	7 (88)	1 (20)
Drug information from drug information centres	96 (50)	81 (49)	0 (0)	6 (50)	8 (100)	1 (20)
Educational services	102 (53)	89 (54)	2 (67)	5 (42)	5 (63)	1 (20)

* Includes district health authorities (England), health boards (Scotland and Northern Ireland) and health authorities (Wales and special health authorities)

[†] Special health authorities

Table 3: Provision of clinical pharmacy services by hospital pharmacies in the UK national health service to patients and persons in the community

Service	Number (%) of districts* providing each service					
	All UK (n=192)	England (n=164)	N Ireland (n=3)	Scotland (n=12)	Wales (n=8)	SHAs [†] (n=5)
Individual counselling for patients with specific drug-related needs (eg, patients receiving total parenteral nutrition or patient controlled analgesia) [‡]	47 (25)	35 (21)	1 (33)	6 (50)	4 (50)	1 (20)
Group education for patients	24 (13)	23 (14)	0 (0)	1 (8)	0 (0)	0 (0)
Group education for persons in the community	28 (15)	28 (17)	0 (0)	0 (0)	0 (0)	0 (0)

* Includes district health authorities (England), health boards (Scotland and Northern Ireland) and health authorities (Wales and special health authorities)

[†] Special health authorities

[‡] This could include domiciliary visits or counselling of patients in primary care institutions

in primary care in 25 per cent of districts but educational services were less frequently provided for groups of patients (13 per cent) or other groups in the community (15 per cent). The frequency of provision of individual counselling was highest in Scotland and Wales; education was provided to groups of people in the community only in England (Table 3).

Community pharmacists were provided with drug information from hospital pharmacy DICs in just under half of all districts (Table 4). The more advanced clinical services, namely, advice on analgesia and total parenteral nutrition (TPN) or on equipment used in PCA and TPN, were rarely

provided (Table 4). Communication between hospital pharmacists and their colleagues in the community about patients with specific drug-related needs being discharged from hospital was uncommon (22 per cent) and community pharmacists rarely received educational services from hospital pharmacies (16 per cent).

Primary care health professionals (other than doctors, nurses and community pharmacists), were provided with information on drugs in about a third of districts and with educational services in under one fifth (Table 5). Service provision in Wales was higher than in the rest of the UK. Services were not provided in SHAs (Table 5).

Information on general drug-related matters was often (48 per cent) provided to primary care institutions. This included residential homes, hospices and nursing homes. Many districts provided education for staff in these institutions (32 per cent) and advice on wound care (30 per cent) but few provided advice on sedation (15 per cent) and PCA (18 per cent). No services were provided in SHAs. Health boards in Northern Ireland provided only general drug information and education. Advice on wound care was provided more commonly in Scotland and Wales than in England (Table 6).

Changes in resources Respondents were asked about the effects of certain documents on hospital pharmacy resources. HC(88)54⁴ was considered to have increased pharmacy resources by 49 per cent (94/192) of respondents overall in the UK, but by more respondents in Scotland (9/11) and Wales (6/8). Although few UK respondents overall (16 per cent, 30/185) thought that the Nuffield report⁶ had increased pharmacy resources, four of seven Welsh respondents thought that it had done so.

Trust status had been attained by one or more hospitals in 58 per cent (106/183) of districts. No SHA, and fewer Scottish (2/10) and Welsh (3/8) than English (100/158) districts contained trust hospitals. In the 106 districts where trust hospitals existed, 22 (21 per cent) of respondents thought that pharmacy resources had altered as a result.

Possible explanations for levels of service provision It had been hypothesised that positive shifts in hospital pharmacy resources would increase the provision of clinical pharmacy services to primary care. Increased resources as a result of HC(88)54⁴ or the Nuffield report⁶ had a greater effect on the provision of clinical pharmacy services to primary care than trust status. The provision of 20 of the 27 services inquired about in the questionnaire was higher (by ≥ 10 per cent or, for infrequently provided services, by a factor of two) in districts where resources were thought to have increased as a result of HC(88)54. Where the Nuffield report was thought to have increased resources, 21 services were more commonly provided. Three services were more frequently provided, and one less frequently provided, where hospitals had attained trust status. Perceptions of changes in resources due to attainment of trust status were associated with the increased provision of nine services.

The comments volunteered (by 133 respondents)

Table 4: Provision of clinical pharmacy services by hospital pharmacies in the UK national health service to community pharmacists

Service	Number (%) of districts* providing each service						
	All UK (n=193)	England (n=165)	N Ireland (n=3)	Scotland (n=12)	Wales (n=8)	SHAs† (n=5)	
Advice on analgesia equipment used in patient controlled analgesia	7 (4)	5 (3)	0 (0)	0 (0)	2 (25)	0 (0)	0 (0)
Advice on parenteral nutrition equipment used in total parenteral nutrition	4 (2)	4 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Advice on discharge of patients with specific drug needs	42 (22)	32 (19)	1 (33)	3 (25)	4 (50)	2 (40)	0 (0)
Drug information from drug information centres	80 (42)	63 (38)	1 (33)	7 (58)	8 (100)	1 (20)	0 (0)
Educational services	30 (16)	23 (14)	1 (33)	4 (33)	1 (13)	1 (20)	0 (0)

* Includes district health authorities (England), health boards (Scotland and Northern Ireland) and health authorities (Wales and special health authorities)

† Special health authorities

Table 5: Provision of clinical pharmacy services by hospital pharmacies in the UK national health service to other primary care health professionals*

Service	Number (%) of districts† providing each service					
	All UK (n=192)	England (n=164)	N Ireland (n=3)	Scotland (n=12)	Wales (n=8)	SHAs‡ (n=5)
Information on general drug-related matters	70 (36)	61 (37)	1 (33)	4 (33)	4 (50)	0 (0)
Drug information from drug information centres	64 (33)	54 (33)	1 (33)	4 (33)	5 (63)	0 (0)
Educational services	33 (17)	28 (17)	1 (33)	2 (17)	2 (25)	0 (0)

* Not including GPs, primary care nurses or community pharmacists
† Includes district health authorities (England), health boards (Scotland and Northern Ireland) and health authorities (Wales and special health authorities)

‡ Special health authorities

Table 6: Provision of clinical pharmacy services by hospital pharmacies in the UK national health service to primary care institutions*

Service	Number (%) of districts† providing each service					
	All UK (n=193)	England (n=165)	N Ireland (n=3)	Scotland (n=12)	Wales (n=8)	SHAs‡ (n=5)
Advice on wound care	58 (30)	48 (29)	0 (0)	5 (42)	5 (63)	0 (0)
Advice on sedation policies	29 (15)	26 (16)	0 (0)	2 (17)	1 (13)	0 (0)
Advice on analgesia/equipment used in patient controlled analgesia	35 (18)	32 (19)	0 (0)	1 (8)	2 (25)	0 (0)
Information on general drug-related matters	92 (48)	80 (49)	2 (67)	5 (42)	5 (63)	0 (0)
Drug information from drug information centres	52 (27)	43 (26)	0 (0)	4 (33)	5 (63)	0 (0)
Educational services	61 (32)	52 (32)	2 (67)	3 (25)	4 (50)	0 (0)

* Includes residential homes, hospices and nursing homes

† Includes district health authorities (England) health boards (Scotland and Northern Ireland) and health authorities (Wales and special health authorities)

‡ Special health authorities

provided useful additional information. In 22 districts, hospital pharmacy departments were increasing their activities in primary care. Sometimes the input was via family health services authority (FHSA) pharmaceutical advisers, who were often hospital pharmacists on a part-time or sessional basis (12 cases).

Twenty-nine respondents provided examples of specific services that were not inquired about in the closed questions, or gave further details of answers to the closed questions. These included the provision of newsletters outlining changes in

hospital prescribing policy, issue of pre-packed intravenous products to patients and educational booklets to primary care professionals and institutions, the creation of common hospital-primary care prescribing policies, assistance with the development of practice formularies and assessment of day-centre patients' drug therapy.

Respondents ($n = 72$) also described barriers to and opportunities for change. The most commonly cited reason for lack of involvement in primary care was lack of resources (10 cases). Other reasons were that hospital pharmacists thought that the FHSA pharmaceutical advisers were providing many of these services (5 cases) or that the responsibility for such service provision rested with community pharmacists (4 cases). Factors which could lead to increased involvement in the provision of services to primary care included the belief that hospital pharmacists should become more involved (14 cases), the potential payment for such services (4 cases), increased funding for primary care (4 cases) and increased funding for hospital pharmacy as a result of gaining trust status (6 cases).

Discussion

This study suggests that the involvement of hospital pharmacists in primary care is extremely variable but generally limited. There are some explanations for the observed findings. For example, SHA pharmacies would not be expected to provide services to primary care because most do not serve local populations. The less frequent provision of more advanced services in Northern Ireland may be because of the relative under-development of clinical pharmacy there. This could be a consequence of the small numbers of pharmacists employed in each hospital pharmacy in Northern Ireland, the dominance of the medical profession and inherent conservatism. In the remainder of the UK, however, the lack of service provision to primary care is not so easily explained. Although there were some encouraging results, such as the extent to which individual patient counselling was provided to patients and the high proportion of hospital pharmacies providing information on drugs to various recipients, other results were disappointing.

Respondents' comments suggested that hospital pharmacies were becoming increasingly involved in the provision of services to primary care. Reasons for the delay in such involvement were also provided, namely, lack of resources, prior provision by FHSA pharmaceutical advisers and the attitude that community, rather than hospital, pharmacists should provide such services. The comments implied that hospital pharmacists' awareness of the importance of, and need for, their contribution to the provision of health care in the primary sector could stimulate their involvement. Payment for such activities was identified as an incentive to their provision. Respondents also volunteered information on services that had been developed.

This study has certain limitations. Although respondents were managerially responsible for pharmacy services in their districts, they may have been unaware of all the services being provided. This may have occurred despite advice

(in the covering letter) to delegate completion of the questionnaire to a more appropriate person if necessary. In addition, replies to questions on the provision of more advanced clinical services, such as the provision of advice on PCA, may reflect their uptake rather than their availability. Hypotheses relating to the effects of trust status referred to net resource shifts and did not specify their direction. More specific hypotheses were impossible since some health authorities contained multiple trust hospitals and resource changes in individual hospitals could be either positive or negative.

Although the variations in service provision to different recipients and between different parts of the UK, which are described in this survey, could be partially explained by resource factors that have affected hospital pharmacy, the overall lack of service provision may be explained by other factors. The barriers to change and the reasons for current progress also reflect the opportunities presented by the internal market, changes in hospital pharmacists' attitudes and FHSA's expressed need for pharmaceutical advisers.

Many health professionals and managers recognise the need for greater integration of primary and secondary care. We believe that hospital pharmacists have much to contribute in this endeavour. Their increased involvement in the provision of services that are not already being provided by primary care pharmacists or other health care workers has potential advantages for patients, professionals and institutions. Hospital pharmacists could consider the provision of home intravenous therapy, particularly for products that are not available commercially or to ensure continuation of therapy while the commercial supply is being organised. This may speed patient discharge and will utilise production facilities and skills in hospital pharmacies. Increased liaison about prescribing between practitioners in primary and secondary care creates a need for hospital pharmacists to inform GPs, among others, of changes in hospital prescribing policies. This may extend to assistance in the creation of primary care prescribing policies. Drug information centres and formulary, specialist and drug economy pharmacists have potential roles in this area, probably via links with, or acting as, FHSA pharmaceutical advisers.

Increasingly, patients with specific drug related needs are being discharged. Hospital pharmacists' experience of such patients could be usefully employed, in collaboration with primary care professionals and institutions, to ensure smooth transfer and optimum after-care of these patients. Visits by hospital pharmacists to the patient's home or institution to monitor complex therapy, for example, may help reassure GPs and others involved in continuing care. It is likely that hospital pharmacy departments are currently considering their potential involvement in primary care. Our suggestions provide some ideas for co-operative ventures with purchasers and providers in primary care.

Conclusion

The provision of hospital clinical pharmacy services to recipients in primary care was low.

despite the existence of several facilitating factors. These include the removal of barriers between primary and secondary care that has led to a need for hospital pharmacy input into the care of patients in the community, rising expenditure on drugs in primary care that has created a need for increased controls on drug use, and advocacy of the use of hospital pharmacy expertise in the provision of advice on better prescribing. Notwithstanding these factors, the implementation of government policy^{4,5} on hospital pharmacists' involvement in the provision of clinical services to primary care has been incomplete.

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HOW FAR FORWARD?

By SIOBHAN COTTER, MARTIN MCKEE and NICHOLAS BARBER

THE Way Forward for Hospital Pharmaceutical Services (HC(88)54 in England and Wales and similar documents in Scotland and Northern Ireland) were the first government policy documents supporting the development of clinical pharmacy in United Kingdom National Health Service hospitals. They assumed that some clinical pharmacy services were provided in most hospitals and made specific recommendations on the provision of others.

SURVEY

The Way Forward was effective for five years and has recently been extended. It is appropriate, therefore, to consider if it has achieved its aims and whether its recommendations are still relevant in the changed NHS of 1994. We do so here, on the basis of a major survey that we have carried out into the work of NHS hospital pharmacies (*Am J Hosp Pharm* 1994;51:2676).

The creators of the Way Forward assumed some clinical pharmacy services were well-developed in 1988 although there were few published data to hand. The services concerned were the routine review of prescriptions, drug information, guidance and preparation of products requiring assembly for specific patients, and systems to encourage rational and economic use of medicines. Our survey, which quantified the provision of an extensive range of clinical pharmacy services provided in UK NHS hospitals in mid-1992, found that most of the assumptions were correct.

The survey found that almost all UK NHS hospital pharmacies routinely reviewed in-patient prescriptions. Although an on-site drug information centre was to be found in just two thirds of hospitals, all pharmacies provided drug information. Most hospitals (87 per cent) had drug and therapeutics committees and pharmacists were active in almost all of these. Hospitals usually (82 per cent) had a formulary; in most it was actively used to control drug use.

The predominant message in the Way Forward was a recommendation to develop clinical pharmacy services. The 1992 survey quantified the provision of many of these services and showed that several, but not all, services have been developed (see Table).

From these results we conclude that services which were assumed to be already well-developed in 1988 were extensively provided by 1992 but recommendations for service development have not been implemented universally. We found that 43 per cent of respondents thought that circular

HC(88)54 or its equivalent had increased resources for clinical pharmacy. The survey also showed that provision of clinical pharmacy services was associated with a perception of increased resources for clinical pharmacy as a result of the Way Forward. Although the absence of comprehensive data on service provision prior to the publication of the Way Forward makes it difficult to comment on its effect in furthering the development of clinical pharmacy our results suggest that its publication was an important facilitator in this process.

Since the publication of the circular there have been significant changes in the NHS. Although its aim is still pertinent today the system for the management and provision of health care has changed. Resource management has been implemented widely and there is an internal market for health care. Hospital pharmacies now provide services to clinical directorates. Some do so within contracts, with directorates defining the services they wish to purchase. This, rather than the Way Forward, may increasingly be determining the services that are provided. The NHS changes have also provided pharmacy with further opportunities to promote the rational use of medicines. Pharmacies in two thirds of hospitals with clinical directorates had availed themselves of these by providing directorates with advice and financial information on drug use and material for the creation of prescribing policies.

SHARING

Government policy has emphasised the provision of health care in the primary sector. This has several implications for hospital pharmacy. There is a pressing need to share hospital clinical pharmacy expertise with community pharmacists since increasing numbers of patients are being treated in primary care. Reductions in the length of hospital stay and the greater use of day care has created a need for hospital pharmacists to extend their traditional clinical activities to facilitate the provision of seamless care. Primary care is also receiving increased resources, financed in part by reallocation of resources from secondary care. Consequently, pharmacy departments have to contend with annual cost improvements with ramifications for staff and services. Furthermore hospital services are competing to secure contracts with purchasers in primary care. This has increased the emphasis on the provision of cost-efficient, high quality pharmaceutical care by hospital pharmacies. As contracts increase in specificity it is likely that pharmacy departments will adjust service provision to meet the expectations and needs of the primary care customer.

Since 1988, there have been other significant developments in hospital clinical pharmacy. Numerous clinical pharmacy services not mentioned in the Way Forward have been developed and many hospital pharma-

cy departments have large numbers of staff with valuable expertise and skills. Most hospital pharmacists now receive further education, frequently acquiring a higher qualification. A core of highly educated hospital pharmacists exists who can potentially provide a variety of clinical pharmacy services. But which services?

CUSTOMERS

In the past the answer might have been guided by the recommendations of the Way Forward or of other clinical pharmacy documents. Now the answer is more likely to be provided by hospital pharmacy's customers, both within and outside the hospital. Some of the basic services are likely to be secure, such as those that help ensure safe prescribing and efficient utilisation of expensive drugs. Quality and cost-effectiveness of patient care is now paramount and services that contribute to these goals are welcomed. Questions may, however, be asked about the manner in which services are provided and pharmacists may be required to show how their services are contributing to effective patient care.

The problem with the Way Forward is that it did not answer such questions. It was a policy document. It made recommendations but did not require compliance with them. It provided guidance on the provision of clinical pharmacy services but not proof that they were necessary or effective.

Pharmacists and their representative bodies must now take a major role, linked closely with the NHS research and development strategy, to review systematically the current state of knowledge on the efficiency, effectiveness and acceptability of their clinical pharmacy services, develop programmes of research to fill the gaps and disseminate the results. They will then be in a position to answer the key questions that will be posed in local negotiations. This must be the new way forward.

Table: Provision of clinical pharmacy services in UK NHS hospitals related to recommendations made in the Way Forward (HC(88)54)

Service	Provision
Medication history-taking	16%
Operation of Committee of Safety of Medicines adverse drug reaction monitoring scheme:	46%
(i) ensured the doctors got the yellow card	75%
(ii) ensured the yellow form was completed	55%
Operation of an additional ADR scheme	13%
Contribution to drug therapy decisions on ward rounds	78%
Formal therapeutic drug monitoring service	21%
Discharge counselling	42%
Support for clinical trials	92%
Practice research activity	41%

Note: 508 questionnaires were mailed and 416 usable responses returned

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