SCOTTISH EXECUTIVE

Research Literature Review on Prescribing

Health and Community Care

RESEARCH LITERATURE REVIEW ON PRESCRIBING

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SUMMARY

BACKGROUND

1. The focus of current Government policy is to improve health, reduce health inequalities and to promote social justice by improving patient access to health care services. Role developments within the NHS workforce are tailored to meet these policy aims and objectives by making best use of professionals' skills and time. Examples of role expansion to improve patient access to medicines are nurse prescribing and the direct supply of medicines by pharmacists. This literature review was commissioned to examine research evidence on the impact of widening the prescribing roles of health professionals on meeting government priorities for improving patient care and to provide the context for a planned evaluation of the extension of nurse prescribing.

AIMS AND OBJECTIVES

2. The aim of the literature review was to provide a critical and comprehensive review of research literature on prescribing both in the United Kingdom and in countries with comparable health care systems from 2000 – 2003. The specific objectives of the study were to examine the research literature on:

- the impact of different approaches to prescribing on the quality of services provided by health professionals
- the impact of changing models of prescribing on patients access to medicines
- the impact of changing prescribing roles on the volume and balance of health professionals' workload
- the adequacy of current training requirements and arrangements in prescribing, clearly identifying any public safety issues covered in the literature

METHOD

3. Whilst not a full systematic review, the literature review used the methodological principles of the NHS Centre for Reviews and Dissemination (2003). A replicable search strategy was developed to interrogate electronic databases, yielding a total of 8805 potentially relevant studies. Inclusion criteria were rigorously applied to the identified studies. Publications that met the inclusion criteria were abstracted onto individual summary sheets and methodological comment was offered on each abstracted study, using the categorisation of evidence advocated by the NHS (DH 2003).

RESULTS

4. A total of 44 publications reporting on 41 studies were included in the review. The results fall into three main categories:

- education and training, including initial preparation and continuing professional development needs for both doctor and nurse prescribers
- the impact of prescribing models on patient care, including patient safety, improvement in patient care, and patient access to medicines

- the impact of prescribing models on professionals, including workload issues, use of professionals' skills, and professional teamwork

MAIN FINDINGS

Education and training

5 The findings from the review indicated that appropriate education and training were essential not only for safe and effective prescribing but also for a wider role in medicines management. This applied to pre-registration education and to continuing professional development (CPD) for doctors and nurses. The review failed to identify studies that focused on either initial preparation or CPD for pharmacists. The educational and support requirements of nurses and pharmacists within the extension of nurse prescribing and the introduction of supplementary prescribing may be considerable. Identification of their learning needs and subsequent evaluation of the educational provision will be essential to ensure safe and effective practice. Key findings are summarised below.

- Two studies' results suggested that the prescribing skills of final year medical students could be improved by using teaching methods that enabled them to integrate scientific theory and clinical skills. (Boreham *et al.* 2000; Scobie *et al.* 2003).
- Morrison-Griffith *et al.* (2002) and Sodha *et al.* (2002) raised concern that pre-registration nurse education may not prepare nurses adequately for the medicines management role that the profession expects of them on registration (NMC 2002).
- Potential nurse prescribers recognised the importance of appropriate educational preparation, particularly in pharmacology, support and supervision as essential to build confidence and ensure safe prescribing practice (Tyler and Hicks 2000, Nolan *et al.* 2001, McCann and Baker 2002).
- Nurse prescribers identified two main CPD needs; education, particularly in clinical pharmacology, and support from peers and in clinical supervision (Humphries and Green 2000; Otway 2001; Otway 2002; Luker and McHugh 2002).
- There is evidence that CPD for nurse prescribing is underdeveloped and lack of CPD may have deterred some nurses from prescribing (Luker and McHugh 2002).
- Evidence to support the routine use of academic detailing (educational outreach), a process that has been used to improve doctors' prescribing practice is inconclusive However, the process may improve professional relationships between GPs and pharmacists. (McDonald 2003, Hall *et al.* 2001; Freemantle *et al.* 2002).

The impact of prescribing models on patient care

6. Four prescribing models identified in the literature were; prescribing by doctors and nurses, the use of patient group directions and the direct supply of medicines by pharmacists. The advantages of nurse prescribing related more to access and the delivery of care rather than safety and effectiveness. Patient group directions (PGD)s, were used widely and included antibiotics although not all met the legal requirements (NHSE 2000). The government advocates the selective use of PGDs and has stressed that antimicrobials should only be included when absolutely necessary because of wider public health concerns about antimicrobial resistance. The extension of nurse prescribing has the

potential to reduce the need for PGDs in settings where access to individualised prescriptions issued by doctors has been limited. Nurse-led services enabled patients access to same day care in general practice and opportunities for nurses to take on prescribing authority under the extension of nurse prescribing could offer a more consistent and comprehensive service. Improved patient access to treatment also resulted from DSoM by community pharmacists. Key findings are summarised below.

- The overall satisfaction with which patients and nurses viewed the process and outcome of nurse prescribing implied that it was safe (Brooks *et al.* 2001a; 2001b, Luker and McHugh 2002).
- Evidence for the safety of PGDs was inconclusive. One study (Deave *et al*. 2003) found the quality and legal standing of some PGDs to be unsatisfactory when measured against the requirements of the NHSE guidelines (DH 2000). Two studies identified that nurses appeared to use PGDs accurately but they failed to record all PGD requirements in patients' case notes (Brooks *et al.* 2003 and Deave *et al.* 2003). There was some evidence to suggest that PGDs could have a positive impact on patient care (Miles *et al.* 2001; Handy 2002; Jones 2002; Johnson *et al.* 2003) and improve access to treatment (Jones 2002 and Johnson 2003).
- Nurses with additional training recognised and effectively reported suspected adverse drug reactions (Morrison–Griffiths and Pirmohamad 2000; Morrison–Griffiths *et al.* 2003).
- Patients and nurse prescribers in several studies reported the benefits of nurse prescribing. (Brooks et al. 2001a; 2001b; Harrison 2003 Luker and McHugh 2002; Otway 2001; 2002). These included timeliness of treatment and improvements in the quality of care such as more information and health promotion advice.
- Prescribing decisions made by nurses in nurse-led services were reported as safe, effective and acceptable to patients (Kinnersley *et al.* 2000; Venning *et al.* 2000; Shum *et al.* 2000). These services enabled patients same day access to nurse led care.
- DSoM by community pharmacists appeared to provide an effective and acceptable alternative to GP prescribing and improved patients' access to medicines (Philips *et al*. 2001; Schafheutle *et al*. 2003; Sheehy and Jones 2003).

The impact of prescribing models on professionals

7. The impact of prescribing models on the volume and balance of professionals' workload was unclear. In DSoM schemes GPs transferred workload to pharmacists but did not experience a corresponding reduction in their overall workload. This may have been because freed up time was used to respond to previously unmet needs within the practice. There was no indication of the effect of the pharmacist's additional workload, although financial remuneration may have enabled restructuring of services within the pharmacy. Some nurses found that nurse prescribing led to time saving but most felt that there was additional work associated with record keeping and administration. However this could be the result of inadequacies in the infrastructure to support nurse prescribing rather than nurse prescribing itself. Nurses, doctors and pharmacists cautiously welcomed prescribing developments, but identified the importance of appropriate education. They also advocated a restricted or supervised form of prescribing by

professionals other than doctors and recommended prescribing within protocols rather than independent prescribing. Supplementary prescribing by nurses and pharmacists fits this suggested model well. Key findings are summarised below.

- DSoM effectively transferred GP workload associated with minor illness from GP to community pharmacist in three pilot studies (Hassell *et al.* 2001; Philips *et al.* 2001; Sheehy and Jones 2003; Schafheutle *et al.* 2003). However, there was no overall decrease in GPs workload.
- Some nurse prescribers felt nurse prescribing saved them time and saved time for GPs (Luker and McHugh 2002; Rodden 2001). Almost half of the patients in Brooks *et al.*'s (2001a; 2001b) study perceived that nurse prescribing led to better use of GPs' and nurses' time as nurses dealt with minor problems leaving GPs free to deal with more serious cases. GPs reported that nurse practitioners who made prescribing decisions and supplied prescriptions saved them time (Offredy and Townsend 2000).
- Professionals who took on new prescribing roles found them useful and acceptable (Otway 2001; 2002; Rodden 2001; Luker and McHugh 2002). Community pharmacists voluntarily took on DSoM in three pilot studies (Hassell *et al.* 2001; Philips *et al.* 2001; Sheehy and Jones 2003; Schafheutle *et al.* 2003). Practice nurses felt that the use of patient group directions assisted them in their role (Jones 2002).
- There is some evidence of GPs' support for nurse prescribing in the UK (Carr *et al.* 2002; Rodden 2001) in contrast to the negative views of Swedish GPs reported by Wilhelmsson *et al.* (2001) and Wilhelmsson and Foldevi (2003). Nurses supported pharmacists prescribing within a model of supplementary prescribing conditional on it being limited to the pharmacists' area of clinical practice and underpinned by postgraduate training (Child 2000). Pharmacists were less supportive of an independent prescribing role for nurses, were more supportive of nurses prescribing within a supplementary model but considered themselves better placed to take on the role of supplementary prescriber (Cooper 2000).

CONCLUSION

8 Although there was relatively little research published in the last three years in any of the areas, which were addressed in the review, and the quality of the studies included varied, the results of the review identified a number of themes that can be used to:

- provide a context for the planned evaluation of nurse prescribing
- inform the debate around key issues such as patient access to services, patient safety and educational preparation of health professionals
- suggest areas for further work

The review indicated that there was broad support from patients and professionals for the use of different models of prescribing and supply of medicines although there was no evidence of a systematic or strategic approach to the selection of the most appropriate prescribing model to meet patients' needs. However, all nurse prescribing research related to district nurse and health visitor prescribing within a primary care setting. No work has yet been published which focuses on the extension of nurse prescribing

whereby nurses and midwives prescribe from a wider formulary and across a range of primary and secondary care settings.

Patient safety tended to be implicit in quality measures such as patient satisfaction. More work is required to evaluate the safety of all prescribing models and the appropriateness of their use in particular clinical settings. It may be that the extension of independent nurse prescribing and the introduction of supplementary prescribing by nurses and pharmacists have the potential to offer safe and effective alternatives.

5.6 The review raised concerns about the adequacy of educational preparation for prescribing and other medicines related roles. However, very few studies focused on education and further research is required to give an accurate indication of the impact of education on prescribing practice. This is particularly relevant now that new educational programmes to prepare nurses for extended independent nurse prescribing and nurses and pharmacists for supplementary prescribing have been introduced.

The findings suggest there is scope for:

- further research to evaluate the impact of different models of prescribing on patient care, including patient safety and on professionals' role development. In particular, research is needed to evaluate the impact of the extension of nurse prescribing and the effectiveness of educational preparation for the prescribing role

- NHS organisations to use a critical and systematic approach in selecting prescribing models which best suit patient need in different clinical situations. Guidance has been published on extending independent and introducing supplementary nurse prescribing in NHSScotland (SEHD 2002; 2003) and in England including guidance for pharmacists (DH 2002; 2003)

- a more judicious approach to the use of patient group directions (PGD)s. This may require NHS organisations to review existing PGDs against government criteria (NHSE 2001; SEHD 2001) and provide multidisciplinary education to ensure professionals are equipped to draw up PGDs and use and record them accurately

- assessment of the continuing professional development (CPD) needs of all prescribers undertaken by NHS organisations. This could inform the development of systems to support CPD

- higher education institutions to review the content and delivery of subjects that underpin prescribing and medicines related practice such as pharmacology in pre-registration nurse education

CHAPTER ONE INTRODUCTION

CONTEXT

1.1 The government's commitment to designing health services around patients' needs has been particularly evident since 1997 (Scottish Office 1997). Our National Health: A Plan for Action, a Plan for Change (SEHD 2000) gave the direction to health service organisations, patients and practitioners to reflect critically upon existing provision. Since then, Partnership for Care: Scotland's Health White Paper published in February 2003 (SEHD 2003) has confirmed the government's resolve to modernise NHSScotland. It offers patients a partnership role in their care, improved access to services locally and safe, high quality care in modern hospitals. It empowers staff to adopt new ways of working through the acquisition of new skills and role development. Recognition of the range of skills, knowledge and experience within the workforce has assisted in the acceptance of blurred role boundaries and a commitment to interdisciplinary team working in which role function is aligned with competence rather than traditional role definition. This has paved the way for more radical approaches to delivering quality health care. Services led by nurses with prescribing authority, rather than doctors and opportunities for patients to obtain medicines supplied directly by their local pharmacists have been introduced. These innovations are set within the context of a clinical governance framework where NHS organisations are accountable for continuous quality improvement and for patient safety.

BACKGROUND

1.2 The Cumberlege Committee reported the potential for community nurses to improve patient care by prescribing independently (DHSS 1986). It observed that the process of patient care was frequently interrupted or the onset of treatment delayed while the nurse returned to the general practitioner to request a prescription for the item required. Prescribing decisions were often made by the nurse and merely ratified by the doctor. This pattern, where the nurse or other health care professional has the requisite skills and knowledge to make accurate prescribing decisions but is unable to use these to their full potential and to the benefit of the patient, continues today.

1.3 A series of legislative changes have gone some way to enabling patients to receive continuous and complete episodes of care from nurses with the authority to prescribe independently. First piloted in England and evaluated positively by Luker *et al.* (1997), independent prescribing by district nurses and health visitors from the Nurse Prescribers' Formulary was introduced in Scotland in 1996. There are now approximately 3000 district nurses and health visitors in Scotland with prescribing authority of this type. In 2002, the government accepted the recommendations of the second Crown Report (DH 1999) and introduced an extension to independent nurse prescribing. This provides the opportunity for experienced nurses and midwives from a wide range of clinical backgrounds to prescribe independently from a more extensive formulary within specific areas of practice. Further, it affords the development of new models of prescribing.

1.4 The government has announced its intention to introduce supplementary prescribing by nurses and pharmacists. Supplementary prescribing offers patients access to medications that would normally be available on a doctor's prescription only. It has the potential to enable more effective and efficient use of doctor, nurse and pharmacist skills and time. Formerly named 'dependent prescribing' in the second Crown report, supplementary prescribing is based on a voluntary partnership between an independent prescriber, a doctor or dentist and supplementary prescriber, a nurse or pharmacist. It enables the patient to receive a prescription directly from the supplementary prescriber who is not eligible to prescribe the item independently. The issue of the prescription is in accordance with the patient's clinical management plan previously agreed by all three parties.

1.5 The direct supply of medicines by pharmacists was piloted in Scotland in 2001/2. The scheme enabled patients who were exempt from prescription charges to receive free over the counter (OTC) medication for minor ailments from participating pharmacists' without having to consult their family doctor for a prescription. Evaluation of the pilot scheme indicated that patients were impressed by the way in which community pharmacists managed their minor ailments and the transfer of workload from general practitioners to pharmacists was acceptable and welcomed by both professional groups (Schafheutle *et al.* 2003).

1.6 Currently, the preparation for prescribing roles is regulated, approved and monitored by the professional body for each discipline. Preparation for doctor and dental practitioner prescribing is included in initial programmes leading to registration. Pharmacists prepare for supplementary prescribing post-registration. Nurses also prepare for prescribing post-registration. Preparation for district nurse and health visitor prescribing is now an integrated element of all programmes for district nursing and health visiting or public health nursing. A further and more rigorous programme is undertaken by nurses in preparation for independent prescribing from the Nurse Prescribers' Extended Formulary and for supplementary nurse prescribing.

AIMS AND OBJECTIVES

1.7 The aim of the literature review is to provide a critical and comprehensive review of research literature on prescribing published from 2000 to 2003 both in the United Kingdom and in countries with comparable health care systems. The review focuses on the impact of different prescribing approaches on patient care, the efficient use of patients' and professionals' time, improving patient access to medicines and the best use of professionals' skills and training.

The specific objectives of the study are to examine the research literature on:

- the impact of different approaches to prescribing on the quality of services provided by health professionals
- the impact of changing models of prescribing on patients access to medicines

- the impact of changing prescribing roles on the volume and balance of health professionals' workload
- the adequacy of current training requirements and arrangements in prescribing, clearly identifying any public safety issues

THE SCOPE OF THE REVIEW

1.8 The review is set within a period of change. Consequently, the research included predates recent innovation, for example, the extension of independent nurse prescribing and the introduction of supplementary prescribing by nurses and pharmacists. Two models of prescribing, doctor and district nurse/health visitor prescribing are included and two mechanisms that allow patients' access to medications at NHS expense, patient group directions and direct supply of medicines. These are described below.

- *Doctor/Dentist prescribing*

Access to prescription only medicines (POMs) has until recently been dependent on the written order of a doctor or dental practitioner. Doctors are eligible to prescribe all items contained within the British National Formulary (BNF). Dental practitioners are eligible to prescribe all items listed in the Dental Practitioners' Formulary, which is listed in the BNF.

- *Nurse prescribing*

Nurse prescribing is now integral to the role of district nurses, health visitors and some practice nurses with either of these qualifications. The successful completion of an educational programme approved and monitored by the Nursing and Midwifery Council is required for prescribing. Nurse prescribing was introduced in England in 1994 and to the other UK countries in the late 1990s. It allows independent nurse prescribing within the limits of the Nurse Prescribers' Formulary for District Nurses and Health Visitors.

- *Patient group directions*

Patient group directions (PGDs) enable patients to receive medicines from certain health professionals in the absence of an individualised prescription. They are defined as, 'written instructions for the supply or administration of medicines to groups of patients who may not be individually identified before presentation for treatment' (NHS/HDL (2001)7 p2). The government recommends that PGDs should only be used in limited situations where they offer clinical benefit to patient care, where their use is consistent with appropriate professional relationships and accountability and where patient safety is not compromised (NHSE 2000; SEHD 2001).

- *The direct supply of medicines by pharmacists*

The direct supply of medicines (DSoM) allows patients who are exempt from NHS prescription charges to consult a community pharmacist and receive over the counter medicines for minor ailments free of charge. A prescription or referral from a GP is not required.

METHOD

Search Strategies

1.9 The methodology based on systematic review guidelines issued by the University of York NHS Centre for Reviews and Dissemination (2003), has provided a useful framework for the search and retrieval stages of the review. An inspection of all articles on prescribing was not feasible and a search strategy was therefore developed. This included English language publications from the year 2000 to 2003. It also established key search terms. Where advanced search facilities were not available, e.g. peer reviewed websites, the key words; prescribing, nurse prescribing, supplementary prescribing, patient group directions and direct supply of medicines were used to search for reports and research projects in publications lists. The use of terms describing specific typologies or changing models of prescribing, such as nurse prescribing, were found not to be required in advanced searches of electronic databases. The use of the key words shown at Annex one proved to yield this material anyway. All electronic databases and relevant websites searched are shown at Annex 2. As the combined CINAHL/Medline search was expected to yield the most literature it was undertaken first.

Inclusion criteria

1.10 All titles, and where available on-line abstracts, were scrutinised to ensure they met certain criteria. Firstly, that they referred to research studies from countries with similar health and social care systems to the UK e.g. Australia, New Zealand, North America and parts of Europe. Secondly, they examined the impact of specific typologies or changing models of prescribing on patients, on health professionals and their practice or on the adequacy of educational preparation for a prescribing role.

Data abstraction and categorisation of evidence

1.11 Publications that met the criteria for inclusion in the study were assessed for quality using an evaluation template devised by the authors. The data abstracted from each full text paper retrieved was summarised individually and a sample was scrutinised for consistency by an independent researcher. The level of evidence in each study was categorised according to the Department of Health's typologies of supporting evidence set out in its National Service Frameworks. This has been used successfully elsewhere (Anderson *et al.* 2003), and is shown in Annex 3. The results of the review are displayed in a matrix based on the evaluation template and are shown at Annex 4.

SEARCH RESULTS

1.12 Despite the limits imposed upon the searches by the use of key word combinations, a high number of references were yielded. A large number of these were rejected because they related to clinical conditions or treatments and not directly to prescribing. Others were non-research based articles or those that described health

services or systems that again did not relate directly to prescribing or to prescribing in the UK.

1.13 The first search, Cinahl/Medline, had the greatest yield of relevant titles (*n*=3866). Detailed results for the first search (Cinahl/Medline) are shown at Annex 5 which indicates the rationale for rejection of material at each stage, i.e. reference, abstract, and full text, based on the criteria given for inclusion in the study. Duplicates were rejected on subsequent searches, albeit the search itself identified similar studies between search engines. In summary 8901 titles met the initial search criteria. Titles were interrogated further through abstract then text to give a final yield of 44 publications reporting on 41 studies. These comprised 9 trials or experimental studies and 32 descriptive studies. Table 1.1 details the cumulative totals of searches which produced a final result. A summary of all searches is shown at Annex 6.

Table 1.1: Searches producing a final result

Search	Cinahl/ Medline	Show	IPA	Cochrane	RPS GB	Embase	Hand search	Totals
Title	3866	n/a	1815	4	2480	640	n/a	8805
Review	24	2	2	1	4	9	2	44

1.14 The results of the review were organised and are presented as three broad subject areas, which clearly reflect the review's aims and objectives.

- Education and training
- The impact of prescribing models on patient care
- The impact of prescribing models on professionals

Many of the studies had outcomes that were relevant to more than one of the subject areas and consequently were cited in at least one of the following chapters.

SUMMATIVE DISCUSSION

1.15 The methods developed for the review were successful in achieving its aims and objectives. The search strategy assured a broad sweep of the sources of potentially relevant publications. A large number of titles were initially identified but comparatively few were judged to meet the review's inclusion criteria. Studies that focused on a clinical condition rather than on prescribing and non-research based publications continued to be the main reasons for excluding studies at least until the abstract had been retrieved in some cases. The most frequent reason for exclusion later on was when the publication was a duplicate of one previously retrieved.

1.16 The majority of studies included in the review were small, descriptive and based in one geographical or clinical area. Due to the heterogeneity of the studies, comparisons were difficult to make between most studies. Such methodological issues limited the generalisability of some of the results to other areas and settings. The randomised controlled trials (Kinnersley *et al.* 2000, Shum *et al.* 2000 and Venning *et al.* 2000) appeared to be more robust and homogeneity allowed comparisons to be made. However, although the results were relevant, they focused on an extended nurses' role which had implications for prescribing rather than on the prescribing role itself. Publication bias is another issue of which to be aware as it means that studies with less positive outcomes may not have been published at all.

CHAPTER TWO EDUCATION AND TRAINING

2.1 Education and training in relation to prescribing were either the main focus or were documented as part of a wider theme in a number of studies. These fell into two categories; studies that addressed initial educational preparation for a prescribing role and those that examined continuing professional development for prescribers. A summary of each study is shown at Annex 4.

INITIAL PREPARATION FOR DOCTOR PRESCRIBING

2.2 Two small studies examined the performance of final year medical students in terms of safe and effective prescribing skills at three universities in England (Boreham *et al.* 2000; Scobie *et al.* 2003). The results of both studies identified underperformance and supported a different method of teaching and learning to enable students to acquire the appropriate skills and knowledge.

2.3 Boreham *et al.*'s (2000) study aimed to gain a greater understanding of pharmacotherapeutic knowledge required by doctors and to suggest ways of improving basic training in this subject area. A random sample of 32 medical students, who were about to begin their pre-registration house officer year, undertook a classroom prescribing exercise which required them to adjust the dose of a drug within a patient case study scenario. Non-optimal dose recommendations were made by 16 students, 10 of which would have constituted major errors and caused adverse drug effects. The results indicated that errors had arisen because the students did not integrate scientific and clinical knowledge effectively. The authors advocated a curriculum that integrates grounding in medical science with clinically appropriate skills and they suggested that this could be achieved through problem-based learning.

2.4 The second study, Scobie *et al.* (2003) focused on a structured approach to teaching students clinical skills to determine whether this would improve their competence and confidence in medicines management. These were skills that had not been taught as part of the curriculum but assumed to have been taught during the students' clinical experience. Forty volunteer final year students from two medical schools were recruited and randomly allocated either to participate in a series of practical teaching sessions or to act as controls. Seven skills relating to safe prescribing and administration of medicines were included, for example, preparing intravenous medication and writing a prescription. Students in the taught group achieved higher scores than the control group in all but one of nine Objective Structured Clinical Examination (OSCE) stations examined a month later. The authors concluded that structured teaching of clinical skills improved confidence and was an effective method of assisting students to achieve the medicines management skills required in the pre-registration house officer year. However, they suggested that students required to practise more complex skills in a clinical setting and recommended that structured clinical experience should follow structured teaching.

INITIAL PREPARATION FOR NURSE PRESCRIBING

2.5 One study investigated the provision of pharmacology education in pre-registration nursing programmes (Morrison-Griffith *et al.* 2002). All 52 universities in England that provided programmes were invited to participate and 33 returned postal questionnaires completed by the programme leaders. The results indicated that there was a lack of consistency in terms of teaching hours, methods and content in relation to pharmacology. The theme emerging most frequently from the qualitative data was the programme leader's belief that pharmacology should be integrated into the curriculum. However, the authors of the study concluded by recommending that a dedicated pharmacology module was required in the first instance followed by integration of pharmacology across subjects.

2.6 Sodha *et al.* (2002) surveyed a random stratified sample of 183 community nurses in 2 English NHS primary care organisations. A postal questionnaire was used to compare nurses' self rated confidence and pharmacological knowledge with their ability to solve patient medication related problems in given scenarios. The respondents comprised 41 nurse prescribers and 69 non-prescribers. 34 nurse prescribers indicated that they were confident in dealing with medication matters compared with 59 non-prescribers. The majority of all respondents rated their knowledge of pharmacology as average, although 6 nurse prescribers rated their knowledge as good and one as excellent. However, the actual medication knowledge shown in the responses to the practice scenarios did not reflect respondents' self-ratings. Overall results were poor, particularly in two scenarios in which nurses were required to advise patients about over the counter (OTC) medicines. Interestingly, non-prescribers achieved better results in all six scenarios as nurse prescribers either did not provide answers or answered incorrectly. It is unclear whether nurse prescribers' results were due to a lack of knowledge as the authors suggested that they may have elected not to respond when the scenario did not directly relate to their area of practice.

2.7 A different perspective on training is given by the self-identified educational needs of nurses for a prescribing role in the future. Family planning nurses and mental health nurses have been substantially involved in medicines management but have only recently become eligible to prescribe under arrangements for the extension of nurse prescribing. Their views on willingness and ability to adopt a prescribing role and the nature of the preparation that they would require are the subject of three studies (Tyler and Hicks 2000, Nolan *et al.* 2001, McCann and Baker 2002).

2.8 Tyler and Hicks (2000) used a training needs assessment tool to enable family planning nurses to develop a role definition for the nurse prescriber in family planning and then to identify training needs in relation to the role. A questionnaire was sent to all 1142 members of the National Association of Nurses for Contraception and Sexual Health. 388 members responded and 314 expressed an interest in becoming nurse prescribers. They described the role in terms of prescribing functions such as providing patients with information on the use and side effects of specific contraceptive preparations. Communication, teamwork, professional issues and administration were

also identified as important elements of the role. Their top fifteen training needs included applied pharmacology and advanced clinical skills, such as clinical examination and decision making. Seven research tasks were also included; for example, statistical analysis, research and audit design and report writing. Although the authors acknowledged that the questionnaire response rate was low, they suggested that the results of the study offered a role definition and an indicative curriculum for educational programmes that would be useful for family planning nurse prescribers.

2.9 A study by Nolan *et al.* (2001), surveyed a convenience sample of hospital and community based mental health nurses for their views on nurse prescribing and the educational preparation that would be required. Nurses attending a nurse prescribing conference were given questionnaires and 73 were completed and returned at the end of the conference. 58 respondents felt that mental health nurses should be able to prescribe, 13 were undecided and 2 respondents thought they should not be able to prescribe. The majority of respondents saw early intervention as the major benefit that mental health nurse prescribing would give to patient care. Other anticipated benefits stemmed from nurses' relationships and their regular contact with patients and included more effective assessment of patients and monitoring of medications, and patients' ease of access to medication. Almost three-quarters of the respondents indicated that they were already closely involved in the administration of medicines but considered their pharmacological knowledge to be limited. There was consensus that further education to equip them to undertake prescribing was needed with 67 respondents specifying additional training in the management of antidepressants. Access to clinical supervision and the support of medical colleagues was also seen as essential to the success of nurse prescribing within mental health teams. Mental health nurses that choose to attend a nurse prescribing conference may have different views on the subject from the wider population. The results of this study are therefore limited and cannot be generalised to all mental health nurses.

2.10 An Australian study by McCann and Baker (2002) used interviews and participant observation to collect data from a purposive cohort of 24 community mental health nurse practitioners. The nurse practitioners' views on prescribing were polarised and reflected two themes. The first supported limited prescribing in which nurses would prescribe from a formulary comprising medicines to treat mental health problems. This support was conditional on nurses having the appropriate educational preparation and support from colleagues for the role. The second view, maintaining the status quo, highlighted some nurses' misgivings about adopting a prescribing role. These included, fears that the addition workload would threaten their existing caring role, unease about whether further education would adequately prepare them for the medical complexities of prescribing, and that inadequate supervision could lead to mistakes. Interestingly, respondents also felt that nurses should decide whether or not to undertake the role and not be coerced into doing so. This view would go some way to accommodating the polarised views of the respondents.

CONTINUING PROFESSIONAL DEVELOPMENT FOR DOCTOR PRESCRIBERS

2.11 Figueiras *et al.* (2001) undertook a critical review of studies evaluating interventions to improve the prescribing practices of doctors in primary care. The review included 51 studies that measured change objectively through indicators such as the prescriptions issued and clinical histories taken. Interventions were categorised as either active or passive. Active strategies included group education sessions, seminars, conferences, lectures and individual outreach visits also termed academic detailing or educational outreach. Academic detailing entails a health professional, for example, a pharmacist, visiting a doctor to provide impartial and up to date prescribing information supported by written resource material. This enables the doctor to evaluate their practice and make changes accordingly. Passive interventions included mailed print materials such as guidelines, drug bulletins, self-instruction manuals, prescribing patterns and statistics, educational computer software and formulary control. The authors reported that conclusions were difficult to draw because of complexities in factors influencing the effectiveness of educational interventions on prescribing practice and the diversity of characteristics in primary care. The results did however suggest that the more personalised the intervention strategy, the more effective it was in improving prescribing practice. Further, that combining active and passive strategies was more effective than active strategies alone, for example one to one meetings reinforced with printed supporting material.

2.12 Academic detailing or educational outreach comprises both active and passive strategies and has been evaluated in a number of studies examining GP prescribing behaviour (McDonald 2003, Hall *et al.* 2001, Freemantle *et al.* 2002, Nazareth *et al.* 2002).

2.13 A project that aimed to improve pharmacological disease management by GPs in Australia used academic detailing (McDonald 2003). 120 GPs were approached and 115 agreed to participate. Participants received academic detailing visits from clinical pharmacists in 2 phases. Phase one addressed prescribing for patients with heart failure and phase 2 addressed prescribing for pain in osteoarthritis. Each phase consisted of a 30 minute visit, a 15 minute follow up visit to reiterate key points and a GP completed evaluation questionnaire to assess their perceived impact of academic detailing on their practice and their satisfaction with the process. Pharmacists also recorded observations such as the duration of visits and the apparent interest of GPs. Analysis of pre- and post-intervention prescribing data demonstrated that prescribing patterns had changed in line with the educational content of the visit. 90 GPs reported that they would be more selective prescribers and more aware of drug interactions as a result of academic detailing visits. However, whether this would lead to actual and sustained behaviour change is unknown. Interestingly, pharmacists felt that GPs and practice staff treated them with increasing respect as the project progressed. GPs were positive about the quality of the educational material and appreciated the absence of drug company bias. This study indicated that academic detailing was not only successful in developing good practice and

enhancing the quality of patient care, but also evaluated positively by GPs and pharmacists in terms of strengthening links between them.

2.14 Two English studies used a randomised controlled trial (RCT) to evaluate the effect of academic detailing on prescribing within clinical guidelines (Hall *et al.* 2001, Freemantle *et al.* 2002, Nazareth *et al.* 2002). Both studies used Prescribing Analysis and Cost (PACT) data to determine changes in GPs prescribing of specific medication identified in the clinical guideline.

2.15 The first study, Hall *et al.* (2001), was a pragmatic RCT based on Helicobacter Pylori (H.pylori) eradication in one health authority area. Half of the 76 general practices in the area were randomised to the intervention group and half to the control group. All practices received H.pylori guidelines and the intervention practices also received a visit from a community pharmacist, trained in educational outreach visiting. Analysis of PACT data indicated that the intervention did not effect a significant change in prescribing in accordance with the guideline. The authors' suggested reasons for this included; insensitivity of the drug markers as these drugs were used to treat conditions other than H.pylori, a single outreach visit, whereas other studies have used at least one visit to reinforce the message and that visits were untargeted. For example, studies, which targeted specific barriers to change, have tended to have larger effects (McDonald 2003). The authors concluded that outreach visiting used routinely was probably not a worthwhile strategy. The apparent reluctance of practices randomised to the intervention group to accept the offer of outreach visits (69% in one health authority area and 36% in the other) may have been an indication that GPs did not perceive any benefit or that they did not find the process acceptable.

2.16 Freemantle *et al.* (2002) and Nazareth *et al.* (2002) reported on the Evidence-based OutReach (EBOR) trial. This RCT examined not only the effectiveness, but also the acceptability of educational outreach visits in general practices in 12 English health authorities. Three steps were described in the study; GPs' agreement to take part, their attendance at outreach visits and the effect of the visits on their prescribing practice within four new clinical guidelines. 107 practices were approached and 75 agreed to take part although 6 practices withdrew before the second outreach visit. Each participating practice received two educational outreach visits from a community pharmacist for each of two of the clinical guidelines. The practice then acted as a control for the other two guidelines by receiving the guidelines but no additional educational input to support their use. Self-completed semi-structured assessment sheets and nominal group interviews conducted by the authors were used to evaluate the pharmacists' perception of their rapport with GPs, the acceptability of the educational message in terms of GPs changing prescribing practices and barriers to change. Six months after the second outreach visit, a questionnaire requested GPs to recall the key message of the guideline, indicate how acceptable they had found the content of the outreach visit and whether they had applied the guideline in practice.

2.17 Qualitative data from the EBOR trial was reported by Nazareth *et al.* (2002). GPs and pharmacists indicated satisfaction and acceptability of the process with

increased rapport and cooperation as the study progressed. The participation rate of over 70% compared favourably with rates reported by Hall *et al.* (2001). Overall, GPs rated the content of the visits highly and demonstrated good recall of key messages of the guidelines six months after their last visit. However, these positive finding translated into modest changes in prescribing practice. The results from analysis of the quantitative data (Freemantle *et al.* 2002) showed that although statistically significant, there was only an overall increase of 5.2% in the number of patients who were treated within guideline recommendations following the intervention. Two factors in particular appeared to effect the implementation of the guideline, practice size and guideline topic.

2.18 In larger practices (3-7 GPs) there was a 1.4% increase in patients who were treated according to the guideline following educational outreach and a 13.5% increase in smaller practices (1-2 GPs). In the majority of smaller practices where the pharmacist was able to meet all the GPs in the practice, all GPs received the same message in a personalised form, whereas in most of the larger practices the message was less personalised when delivered to a larger group and less consistent when not all GPs were present. The authors also suggested that the organisational complexity of a larger general practice might have made working practices less amenable to change.

2.19 The guideline topic was also important. There was an overall increase in the implementation of 3 guidelines but a decrease in the fourth. GPs were more likely to change prescribing practice in line with evidence of improved clinical effectiveness, as for example in the aspirin guideline where there was an overall 7% increase in patients treated according to the guideline. Where evidence was based on cost savings, a 3% reduction was measured as for the application of the non-steroidal anti-inflammatory drug guideline. This is partly explained by the authors in terms of GPs scepticism of evidence that supports cost saving. Other reasons suggested for the limited changes in practice overall were organisational barriers to change and the reluctance of patients to accept treatment changes. The authors concluded that educational outreach to influence prescribing within evidence based guideline recommendations is unlikely to be worthwhile in larger practices but there is evidence to support its use in smaller practices. Also, that the acceptability of outreach visits and knowledge of clinical guidelines does not translate into changes in prescribing. However, the findings of this study and the conclusions reached are limited by methodological issues. For example, each practice acted as control and intervention group. Consequently, their approach to the two guidelines for which they acted as control may have been influenced by the attention given to the two for which they received outreach visits.

CONTINUING PROFESSIONAL DEVELOPMENT FOR NURSE PRESCRIBERS

2.20 Three studies explored the continuing professional development (CPD) needs of nurse prescribers (Humphries and Green 2000, Otway 2001; 2002, Luker and McHugh 2002).

2.21 Humphries and Green (2000) examined the opinions of district nurses and health visitors undertaking a nurse prescribing course in one university in England on the

infrastructures necessary to support their future prescribing role. A convenience sample of 73 district nurses, 70 health visitors and 3 practice nurses from six different NHS community trusts were recruited to the study. The three most frequently occurring themes were; the availability of national and local protocols to guide prescribing, regular updates on new products and pharmacological issues and peer support such as networking and mentoring.

2.22 Two publications by Otway (2001; 2002) reflected the findings of an exploratory study of nurse prescribers in one English NHS trust. The study aimed to elicit factors which nurses felt had influenced the development of their prescribing practice. Phase one elicited qualitative data through semi-structured interviews with a purposive sample of 12 nurse prescribers comprising district nurses, health visitors and practice nurses. Thematic content analysis of interview data informed the development of a questionnaire that was used in phase two. The themes included the frequency of prescribing, its usefulness to patients and nurses, teamwork versus isolation in practice, clinical supervision, confidence and knowledge. The questionnaire was distributed to all 350 nurse prescribers in the trust and 241 were returned. Otway (2001) identified team work and peer group support as positive factors in developing the skills and confidence of nurse prescribers. The absence of these factors led to feelings of isolation and less frequent use of the prescribing role. Otway (2002) reported on the training needs of nurse prescribers in the same study. The most important of these was pharmacology with 192 nurses requesting more pharmacology education and 163 identifying this as their most urgent training need. Half of the respondents received clinical supervision with others indicating they planned to do so. However, management support was not so forthcoming with some nurses describing it as inadequate and 192 stating that they had not discussed their development as prescribers with their manager during their personal review.

2.23 The results of a survey by Luker and McHugh (2002) suggested that appropriate support is essential for the successful implementation of nurse prescribing. The study investigated nurses' prescribing patterns and continuing professional development in 3 NHS trusts, formerly one large trust. A convenience sample of 164 nurses eligible to prescribe received a postal questionnaire that included open questions about support structures and mechanisms for updating in their area. Of the 129 nurses who responded, 35 indicated that they were not prescribing. 22 of these stated that they had no prescribing experience, 5 worked in a speciality where they could not prescribe and 5 did not have a caseload. The remaining 3 nurses had not received a prescription pad and were consequently not eligible to prescribe at the time of the study. This left 93 questionnaires available for further analysis. The majority of respondents viewed nurse prescribing as a benefit to patients, with 82 stating that it provided a more efficient and responsive service. However, 45 nurses indicated that they had had difficulties when they started, particularly in building up the confidence to prescribe. This related to the length of time between completing the nurse prescribing course and commencing prescribing (median 6 months), with nurses who waited the longest for prescription pads (4 nurses waited 18 months), stating that they had forgotten what they had learned on the course. Mechanisms to support the nurse prescribers in this sample appeared to be

limited. 63 respondents were unaware of any support system in their area and only a small minority indicated that their nurse manager, nurse prescribing representative or trust pharmacist answered prescribing queries or provided support. Nurses also stated that they had not received regular updates on new products and some identified areas of care where they felt they lacked clinical and diagnostic experience. The authors concluded that employers should do more to maximise the use of nurse prescribing such as providing mentoring programmes, support and updates to nurse prescribers.

2.24 A convenience sample was used in all three studies (Humphries and Green 2000; Otway 2001; Otway 2002; Luker and McHugh 2002), and the results consequently reflect the arrangements for nurse prescribing within one university or specific NHS trust. Although, not necessarily generalisable to other areas, that the findings are comparable provides useful evidence for this review.

SUMMATIVE DISCUSSION

2.25 Throughout the review, it was evident that education and training were essential not only for safe and effective prescribing but also for a wider role in medicines management. There was some evidence in the literature to suggest that newly qualified nurses lacked a degree of pharmacological knowledge and that final year medical students lacked prescribing knowledge and skills. This raises questions about whether the content and delivery of pharmacology and related subjects within initial programmes of preparation for nurses and doctors is adequate for the roles that are expected to fulfil. For example, newly qualified nurses have an important role in medicine administration and monitoring which is described by the Nursing and Midwifery Council (NMC 2000) and in some clinical settings they supply and administer medicines within patient group directions. Core curricula in pharmacology have been published by the British Pharmacological Society (BPS 2002) for use in medicine, dentistry, pharmacy, and pre-registration nursing courses and might provide guidance to Higher Education Institutions.

2.26 There were indications that pre-registration education may not be an adequate foundation on which to base further medicines related knowledge and practice. Experienced community nurses studied by Sodha *et al* (2002) lacked the knowledge to accurately advise patients about POM and OTC medicines, an activity which is assumed to be an important part of the community nurses' role. It is unlikely that nurses received specific additional training in this area.

2.27 The effectiveness of nurse prescribing courses in providing nurses with appropriate preparation has not been evaluated rigorously. The qualified nurse prescribers in Sodha *et al*'s (2002) study appeared to be less knowledgeable than non-prescribers in advising patients about POM and OTC medicines. In addition, nurse prescribers perceived themselves to be more knowledgeable about medication related problems than they actually were. There is no clear explanation for this result although it would seem reasonable to expect the nurse prescribers to be more knowledgeable as a result of completing the prescribing course. Nurse prescribers in other studies stated that they required more education in pharmacology. These results suggest that there may be

shortcomings in pharmacology teaching and learning in nurse prescribing courses and these may be associated with shortcomings in pre-registration education.

2.28 The literature suggested that continuing professional development (CPD) played an essential role in maintaining and enhancing the role of nurse prescribers. The employers' responsibility to provide opportunities for nurse prescribers to access relevant education and training is emphasised by the government (SEHD 2002) and NHS Education for Scotland (NBS 2001). Interestingly, although all nurses have a professional responsibility to maintain and develop their skills, nurse prescribers tended to view CPD as something that should be provided for them rather than to be pursued themselves. Nonetheless, in the absence of adequate arrangements for CPD it would appear unlikely that nurse prescribing can develop to its full potential.

2.29 Nurse prescribers identified the importance of peer support and clinical supervision as important aspects of CPD. Unfortunately, the evidence suggested that organisational systems that would support this had been slow to develop or were non existent. Some nurses felt so unsupported that they lacked the confidence to prescribe at all. A delay in the onset of prescribing following successful completion of the course appeared to adversely affect nurses' confidence in starting to prescribe. A long delay resulted in some nurses not prescribing.

2.30 Only one continuing professional development method used to enhance prescribing skills was evaluated. This was the use of educational outreach visiting to enhance GPs prescribing skills. It was found to be most useful when targeted at small practices and for specific topics. This may offer a useful method of CPD for others such as nurse and pharmacist prescribers and particularly those based in remote and rural areas who find it difficult to attend events away from their base.

2.31 No research into the initial education or CPD for pharmacists was found which may indicate that this is an under-researched area and consequently open to investigation. The educational and support needs of nurses and pharmacists within the extension of nurse prescribing and the introduction of supplementary prescribing may be considerable. Identification of their learning needs and subsequent evaluation of the educational provision will be essential to ensure safe and effective practice.

2.32 Potential nurse prescribers in 3 studies expressed concerns about the adequacy of their knowledge and levels of supervision in relation to adopting a prescribing role within their clinical settings. These concerns appeared to be based on independent prescribing. However, according to current UK legislation supplementary prescribing would be used within the complex clinical situations they described. The knowledge that supplementary prescribing is based on completion of an approved educational programme and the authority to prescribe within a clinical management plan supervised by a doctor may reassure nurses with concerns such as these. More active marketing of nurse prescribing to inform and motivate nurses to undergo preparation for the role may be helpful. In addition, guidance has been published on independent and supplementary prescribing in NHSScotland (SEHD 2002; 2003) and in England (DH 2002; 2003).

2.33 SUMMARY OF FINDINGS

- The results from 2 studies (Boreham *et al.* 2000; Scobie *et al.* 2003) suggested that the prescribing skills of final year medical students could be improved by using teaching methods that enabled students to integrate scientific theory and clinical skills.

- Morrison-Griffith *et al.* (2002) and Sodha *et al.* (2002) raised concerns that current pre-registration nurse education may not adequately prepare nurses for the role in medicines management that they are expected to fulfil on registration as defined by the NMC (2002).

- Nurses with the potential to become prescribers recognised the importance of appropriate educational preparation, particularly in pharmacology. They also felt that support and supervision would be essential in building confidence and ensuring safe practice in prescribing (Tyler and Hicks 2000, Nolan *et al.* 2001, McCann and Baker 2002).

- In one study, nurse prescribers rated their confidence in dealing with medication matters and knowledge of pharmacology at a higher level than subsequent test results indicated (Sodha *et al.* 2002).

- Nurse prescribers in 3 studies identified two main continuing professional development needs; for education and in particular clinical pharmacology, and for support, including peer support and clinical supervision (Humphries and Green 2000; Otway 2001; Otway 2002; Luker and McHugh 2002).

- There is evidence that mechanisms for continuing professional development for nurse prescribing are underdeveloped in some areas and this may have deterred nurses from either using their prescribing role or using it to its full potential (Luker and McHugh 2002).

- Academic detailing (educational outreach) is a process that has been used to improve doctors' prescribing practice. Evidence to support its use routinely is inconclusive (McDonald 2003, Hall *et al.* 2001; Freemantle *et al.* 2002). However, there is evidence that the process improves interprofessional relationships between general practitioners and pharmacists.

- The searches failed to identify studies that focused on either initial preparation or CPD for pharmacists.

CHAPTER THREE THE IMPACT OF PRESCRIBING MODELS ON PATIENT CARE

3.1 A number of studies attempted to measure the impact of different models of prescribing on patient care. Many of these focused on the perceptions of patients, nurses, doctors and pharmacists.

PATIENT SAFETY

3.2 Safe and effective medicines management is central to the quality of health care. However, errors may occur at any stage in this process and there is evidence of a growing trend in the number of deaths attributable to medication errors and adverse drug reactions (Audit Commission 2001). The extensive body of literature on medication error spans all elements of the medicines management process and although relevant is beyond the scope of this review. Studies, which relate patient safety issues directly to prescribing models, are included here.

3.3 Britten *et al.* (2003) demonstrated the use of a measure for the appropriateness of GP prescribing, which included safety. The study examined unwanted, unnecessary and inappropriate prescribing for a sample of 186 patients in 24 general practices in England. Patients completed a questionnaire in the GP's waiting room before and after their consultation. These data were supplemented with information from the patient's medical records and a telephone interview with the patient conducted one week later. GPs completed a post-consultation questionnaire. The results showed that in the 121 consultations where prescriptions were written, 41% were wanted, necessary and appropriate. In 7% of consultations patients did not want a prescription and GPs recorded that 20% were not strictly indicated. Of the 92 prescriptions independently assessed, 4 were deemed to be ineffective or unsafe and in a further 19 cases assessors were uncertain. Although this was a small study, the authors suggested that the consultations were not atypical and consequently the results were relevant to other general practice settings.

3.4 The searches failed to identify any studies that looked specifically at the safety aspects of nurse prescribing. The findings from studies such as Brooks *et al.* (2001a; 2001b) which are discussed in more detail at paragraph 3.17 and Luker and McHugh (2002), indicated that patients and nurse prescribers were satisfied overall with the process and outcome of nurse prescribing. Patients in the Brooks *et al.* study were confident in the nurse prescribers' ability to manage certain clinical conditions safely and effectively and described district nurse prescribers as expert in wound management. However, they also highlighted the nurse prescribers' need for education to maintain safety and develop competence, particularly if nurses' prescribing authority was extended.

3.5 Evidence for the safe and effective use of patient group directions (PGDs) by nurses was inconclusive. Some studies reported that nurses supplied and administered

medicines safely and effectively using PGDs (Miles *et al.* 2001; Handy 2002; Jones 2002; Johnson *et al.* 2003). Other results (Brooks *et al.* 2003 and Deave *et al.* 2003) raised safety issues for patients. Apart from the study by Deave *et al.* (2003) these were small studies, which were based for example, in single departments or within one geographical area.

3.6 The use of PGDs in genito-urinary medicine clinics was audited positively in two studies (Miles *et al.* 2001; Handy 2002). In the first study (Miles *et al.* 2001) specialist nurses prospectively collected data from all 408 patients who attended the nurse-led clinic over an eleven week period. These data related to the supply of medication by nurses using PGDs, medication prescribed by a doctor and cases where no treatment was given. 36 sets of case notes from the 59 consultations, in which patients had received medication supplied by PGD, were randomly selected and reviewed by an independent assessor. The criteria used were the appropriateness of treatment by type, dose, frequency and administration and the accuracy with which nurses recorded details of relevant advice and information to patients in their case notes. Documentation to ensure safe and correct administration was judged to be present in all of the case notes reviewed.

3.7 Experienced nurses in a study by Handy (2002) were given further training to enable them to take a medical and presenting history at the patient's first appointment. Nurses made a provisional diagnosis and supplied certain antibiotics within PGDs for patients who presented with genito-urinary infection. An audit of the case notes of 300 new patients who had received nurse-only consultations confirmed that PGDs had been adhered to at all times.

3.8 Johnson *et al.* (2003) evaluated a nurse-led glaucoma assessment service. Three experienced ophthalmic nurses were given further training in diagnostic skills and managed a nurse-led assessment clinic for new referrals. A treatment protocol was agreed between medical and nursing staff and enabled the nurses to supply two types of prescribed glaucoma medications. The outcomes for the 46 patients who had been commenced on medication by the nurse were audited. Approximately two thirds of the patients identified as requiring treatment at the consultant's review clinic had already been commenced on it at the nurses' assessment clinic. No patients requiring urgent treatment had been missed by the nurses. The authors concluded by supporting the nurses' role in glaucoma assessment and made a case for independent nurse prescribing in this clinical area based on the safe and effective practice of the nurses in this study.

3.9 A survey of all 76 practice nurses in Salford was conducted by Jones (2002) nine months after the introduction of PGDs. A postal questionnaire aimed to identify:

- the extent of PGD use
- how PGDs had been introduced
- nurse perceived benefits to patients
- the impact on nursing practice
- whether the PGDs had been audited
- whether any patients treated within PGDs had experienced adverse drug reactions

33 of the 45 respondents indicated that they used PGDs. 22 nurses felt that PGDs benefited both patients and nursing practice and reported the greatest benefits as improved anaphylaxis cover, patients' speedier access to treatment and patients being better informed about their treatment. None of the respondents reported that adverse drug reactions had resulted from PGD use. However, despite the positive feedback from respondents, none of the PGDs had been audited at the time of the study and consequently the results are based upon the subjective view of the respondents.

3.10 Brooks *et al.* (2003) reported on a clinical audit to assess nurses' knowledge and record keeping in relation to supplying antibiotics within PGDs. The audit was undertaken in one walk-in centre in England and was based on the clinical records of all 1169 patients supplied with an antibiotic over a 5 month period. This represented 11.6% of the total number of patients treated at the centre during the audit. 72% of patents were assessed and supplied with an antibiotic by nurses. The results indicated that nurses used PGDs safely and judiciously with 99% of the antibiotics being supplied and administered correctly according to the PGD. However, only 63% of the patients' records confirmed that the nurse had taken an allergy and contra-indication history prior to supplying the antibiotic.

3.11 Deave *et al.* (2003) evaluated the quality and legal standing of antibiotic PGDs used in walk-in centres in England and the extent to which nurses' records complied with the PGD. All walk-in centres were contacted and asked to submit copies of PGDs that were used to supply antibiotics. A total of 20 centres used PGDs which covered 13 different antibiotics. The 20 sets of PGDs were then examined against the twenty-one legal requirements (NHSE 2000). Only seven centres' PGDs fulfilled all 21 requirements and 2 centres' met 12 or less. One legal requirement was to state the circumstances when further advice was required. However, in only half of the PGDs in which the antibiotic could effect the action of the contraceptive pill were recommendations for advising patients about additional contraceptive precautions included. Patient records from 10 of the centres were examined for compliance with the PGD. Overall only 65% of all PGD requirements were recorded in the patient records. Drug description and clinical criteria and condition were recorded in almost all records. However, route of administration was recorded in 23% of records, relevant warnings about the use of the antibiotic in 15% and contraceptive advice was recorded in only 13%. The authors concluded that the high level of non-compliance with the statutory requirements for PGDs was a concern. They also acknowledged that written records did not necessarily provide an accurate reflection of the consultation and it was impossible to confirm the quality of the care provided. The results raised issues about multidisciplinary training in the drawing up of PGDs and also in accurate record keeping.

3.12 The spontaneous reporting of suspected adverse drug reactions (ADRs) enables surveillance of drug safety by health professionals and is consequently relevant to this review. The system that has been used in the UK since 1964 is known as the Yellow Card Scheme. This enables doctors, dentists, pharmacists and coroners to voluntarily submit to the Medicines Control Agency details of a suspected ADR using a yellow card form which is included in the BNF. Since October 2002 nurses, midwives and health

visitors have also been eligible to report ADRs using the Yellow Card Scheme. The results from two studies indicated that nurses are well placed to report ADRs effectively (Morrison–Griffiths and Pirmohamad 2000; Morrison–Griffiths *et al.* 2003).

3.13 Morrison-Griffiths and Pirmohamad (2000) explored the knowledge and attitudes of hospital specialist nurses to suspected ADR reporting and found that they were willing and able to monitor patients' responses to medicines. The survey was part of a pilot study conducted prior to the introduction of yellow card reporting by nurses which enabled nurses to complete yellow cards specially designed for the purpose of the study. 238 of the 256 specialist nurses from hospital trusts in Merseyside and Cheshire agreed to participate and were sent 2 questionnaires. The first assessed base line knowledge of ADRs and was followed by an education pack to prepare nurses for ADR reporting. The second questionnaire was issued when nurses had been involved in ADR reporting for 6 months or more and aimed to assess the effectiveness of the education pack and any reasons for non-reporting. Over half of the nurses responded to the first questionnaire with most indicating that they had recognized ADRs in the past and routinely warned patients about drug side effects. 117 respondents felt that nurses had a role to play in suspected ADR reporting but would need further education on the subject. During the pilot scheme 25 yellow cards were submitted, 12 by respondents. A further 13 respondents had seen suspected ADRs during the study but had not reported them because they were reported by the doctor or they were unsure what to report. Most respondents felt that they knew more about drug safety and were more aware of ADRs after taking part in the study.

3.14 The second study was conducted after the use of the Yellow Card Scheme had been extended to nurses (Morrison–Griffiths *et al.* 2003). A sample of specialist nurses, practice nurses and community mental health nurses were recruited from community and hospital NHS trusts in Merseyside. The 763 nurses who agreed to take part received an information pack and teaching session on ADR reporting according to the Committee on Safety of Medicines and the Medicines Control Agency guidelines. They were then asked to report all suspected ADRs that they witnessed. During the 21-month study, nurses in the study group submitted 177 yellow cards. The regulatory authority judged 77% of these reports as appropriate compared with 69% of doctors' reports submitted in the same period. The proportion of nurses reporting and the quality of the information given in the reports were similar to those submitted by doctors.

IMPROVEMENTS IN PATIENT CARE

3.15 A number of methods of care delivery that featured nurses' involvement in prescribing were identified as improving patient care. These included, nurse prescribing, nurse-led services and the use of patient group directions that have been discussed earlier.

3.16 Two studies, reported in three publications examined the impact of nurse prescribing on the quality of patient care from the patient's perspective (Brooks *et al.* 2001a; 2001b, Harrison 2003). Luker and McHugh (2002) and Otway (2001; 2002)

reported nurse prescribers' views on quality of care as secondary outcomes to the main study objectives.

3.17 Brooks *et al.* (2001a; 2001b) explored the benefits and limitations of nurse prescribing from the viewpoint of patients who had received a prescription from a nurse prescriber. The 27 nurse prescribers in one English primary care group were each requested to recruit the five patients for whom they had most recently prescribed. However, only 54 patients were recruited, with 50 consenting to take part. The nurses' reasons for the low recruitment rates included that they had not needed to write five prescriptions and a lack of time due to heavy workload. All participating patients were interviewed either face-to-face or by telephone and their responses were analysed thematically. All but one of the patients interviewed made positive comments about the process and outcome of nurse prescribing. These comments included;

- timeliness of treatment
- the quality of the nurse patient relationship, including reassurance
- the nurse providing information
- health promotion
- continuity of care
- more effective use of GPs' time

3.18 33 respondents were unable to identify any disadvantages or areas for improvement, but 17 identified nurses' authority to give repeat prescriptions and prescribe from a wider formulary as areas for development. However, these respondents talked in terms of nurses being instrumental in continuing treatment but not necessarily in initiating it by prescribing independently. Interestingly, this view is consistent with the model of supplementary prescribing by nurses, which has since been implemented by the government. The majority of patients in this study indicated that they were surprised that nurses could prescribe and 2 respondents had not realised that the nurse had issued their prescription.

3.19 The study by Harrison (2003) used 2 focus group interviews to explore how 9 mental health service users felt about the future introduction of nurse prescribing. Analysis of the results identified 4 main themes which indicated that they had mixed feelings;

- mental health nurses were well placed to respond to service users needs, having more time, better knowledge of the patient and being more accessible
- nurses needed extra training for prescribing;
- nurse prescribing should be based on patient need and not imperatives such as cost saving
- new tasks related to the prescribing role threatened the core nursing role

3.20 These studies (Brooks *et al.* 2001a; 2001b, Harrison 2003) are useful as they provide insight into the views of both actual and potential users of nurse prescribing. However, there was no attempt to recruit a random sample for either study. Both used a

small convenience sample of patients within a single NHS trust or primary care group. Brooks *et al.* (2001a; 2001b) recruited through the nurse on whose prescribing the patients' experience was based. This may have introduced an element of active selection and patients may have been more likely to give positive views of nurses that they knew. Harrison (2003) was only able to recruit 9 service users from a target of up to 20 people. Consequently it would not be appropriate to generalise the results of these studies to other areas and a wider population.

3.21 Experienced nurse prescribers have identified that nurse prescribing enhances the quality of patient care. Luker and McHugh (2002) primarily investigated patterns of nurse prescribing in primary care but also elicited the community nurses' views on how prescribing affected their practice. The study's methods have been described at 2.23 Most nurses perceived that nurse prescribing benefited patients. A quicker service saving patients' time and improved quality of care were the benefits that were cited most frequently. Other benefits were the earlier commencement of treatment and more complete management of the patient's care by the nurse.

3.22 Nurse prescribers in a study by Otway (2001; 2002) described at paragraph 2.22, reflected the findings of an exploratory study of nurse prescribers in an English NHS trust. Otway reported on the views of nurse prescribers in relation to patient benefit but did not support these results with descriptive statistics. However, the results indicated that in general, nurse prescribers were positive about nurse prescribing and felt that patients valued it, although some respondents were frustrated by their perceived limitations of the formulary. Some nurses doubted whether patients realized that the nurses could prescribe, even after they had received a nurse prescription. Brooks et al. (2001a; 2001b) support this assertion as some patients recruited to their study on the basis of having received a nurse prescription, were surprised when interviewed that the nurse had prescribed.

3.23 4 Studies that focused on quality of care and patient satisfaction and examined nurse-led services in which nurses do not necessarily prescribe but make prescribing decisions, such as selecting medication as part of their role, have been included in this review. Many of the nurses involved were graduates from nurse practitioner programmes which included subjects such as clinical pharmacology, decision making and critical thinking (Kinnersley *et al.* 2000; Venning *et al.* 2000) while others had received additional training as part of the study (Shum *et al.* 2000; Pritchard and Kendrick 2001). Two studies used patient satisfaction as the primary outcome (Kinnersley *et al.* 2000; Shum *et al.* 2000) and a third (Venning *et al.* 2000) used patient satisfaction as an important outcome when measuring cost effectiveness as the primary outcome. All three studies were randomised controlled trials (RCT)s set in general practice, which aimed to compare GP and nurse consultations for patients requesting 'same day' care. Further comparison is described below.

- Kinnersley *et al.* (2000) conducted a multicentre RCT of 10 general practices in England and Wales. Of the 1757 patients who requested a same day consultation,

data were available for analysis for 716 patients randomly allocated to the GP consultation group and 652 to the nurse practitioner group.

- Shum *et al.* (2000) assessed the safety and acceptability of a minor illness service run by specially trained practice nurses in five general practices in the South of England. 900 patients requesting same day appointments were randomly allocated to consult a practice nurse and 853 to consult a GP.
- The setting for Venning *et al.*'s (2000) RCT was 20 general practices in England and Wales. This study aimed to compare the cost effectiveness of GPs and qualified nurse practitioners. The study's outcome measures, apart from cost, were similar to those of Kinnersley *et al.* (2000) and Shum *et al.* (2000) and included the consultation process, prescribing, patient satisfaction and health status. A total of 1303 patients took part with data available for analysis of 651 GP consultations and 641 nurse practitioner consultations.

3.24 In all 3 studies two patient questionnaires were used. The first was distributed to patients when they attended the GP's surgery and aimed to assess the patient's health status and their satisfaction with the consultation. The second questionnaire was posted to the patient's home 2 weeks later to assess their compliance with the treatment and any change in their health status. Practitioners recorded details for all consultations including patient details, diagnosis, examination, prescriptions issued and consultation length. The response to the postal questionnaire was high, over 75% in each of the studies. There was no significant difference in characteristics between the nurse consultation group and GP consultation group in terms of age, gender, morbidity and presenting problems. Most patients reported that their symptoms had improved at two weeks and there were no notable differences between groups in terms of prescriptions issued investigations ordered or referrals to secondary care. Significantly more patients who consulted the nurse practitioner reported receiving more information about their illness, symptom relief and action to take if the symptoms persisted. Overall, patients who consulted the nurse practitioner were more satisfied with their care, although this was not statistically significant in all three studies. The results indicated that nurse practitioner consultations were significantly longer than GP consultations. However, nurse practitioners' patients were more satisfied with their care even after researchers applied data analysis techniques to control for the time difference (Venning *et al.* 2000; Shum *et al.* 2000). Venning *et al.* (2000) failed to identify any significant difference in costs between the two groups.

3.25 Another study found that an acute minor illness service managed by two suitably trained practice nurses and a health visitor was effective (Pritchard and Kendrick 2001). Patient questionnaires and practice data were used to measure patients' satisfaction with the service, consultation rate and rates of prescribing and referral. The GPs trained the nurses during consultations over a 3-month period, drew up a list of minor illnesses to be included in the study and devised protocols for these. The protocols included nurses writing prescriptions for patients, which the GP then signed without examining the patient. During the 8 month study, 2056 patients with minor illnesses consulted the practice. The practice nurses treated 332 patients and the health visitor, 46 patients. Overall, 13% of urgent appointments for minor illnesses were managed solely by the practice nurse or health visitor. High levels of patient satisfaction with the nurse-led

service were reported in a postal questionnaire. There were no significant differences between the GPs, practice nurses and health visitor's prescribing or referral rates. This was a small study involving one general practice in England and therefore the results are not generalisable. They do however lend support to the growing body of evidence which indicates that suitably trained nurses are able to effectively diagnose and treat minor illness in primary care to the satisfaction of their patients.

3.26 Offredy and Townsend (2000) used a small convenience sample of 4 general practices in Southeast England to examine the role and working practices of nurse practitioners. This included the arrangements for nurse practitioners' patients to receive prescriptions. 36 semi-structured interviews were conducted with GPs, nurse practitioners, patients and practice staff, although the methods and rationale for interviewee selection are unclear. In each practice a different procedure was used for patients to receive a prescription during a nurse practitioner consultation. However, in all practices there were circumstances where the GP signed for drug treatment recommended by the nurse practitioner without examining the patient themselves. For instance, where protocols for supplying medication had been agreed between the GP and nurse practitioner, the GP endorsed the nurse practitioner's decision by signing the prescription she had written. In another example where protocols were in place, nurse practitioners completed prescriptions that were pre-signed by the GP. A third example was where the GP signed nurse written prescriptions in the absence of agreed protocols. A high level of patient satisfaction with the nurse practitioner service was identified. However, patients were critical that nurses in this study did not have prescribing authority.

3.27 Nurses in these studies were not eligible to prescribe independently unless they were doing so within the scope of district nurse and health visitor prescribing. No detail was given about the protocols identified in the studies and consequently their quality and legal standing is unclear. However, there is no doubt that nurse practitioners made independent prescribing decisions not all of which were ratified by a doctor. The patients' perception may in some cases have been that the nurse managed the entire episode of care including the prescription. A discussion of the legal and ethical implications of nurses prescribing outwith the boundaries of the nurse prescribing scheme are beyond the scope of this review.

PATIENT ACCESS TO MEDICINES

3.28 Different models of prescribing have not been evaluated from the perspective of patient access specifically. However, a number of studies reported on the convenience and timeliness of treatment to patients and general satisfaction with the services provided. The initiatives that were discussed in the previous section (Kinnersley *et al.* 2000; Shum *et al.* 2000; Venning *et al.* 2000) enabled same day access to nurse-led care. Other studies (Jones 2002; Johnson 2003) reported advantages of patient group directions relative to patient access.

3.29 Two projects reported in 4 publications examined the direct supply of medicines (DSoM) by pharmacists to patients exempt from NHS prescription charges. DSoM

enabled patients to consult a community pharmacist and receive free OTC medicines for minor ailments without a prescription from the GP or nurse prescriber (Philips *et al.* 2001; Schafheutle *et al.* 2003; Sheehy and Jones 2003).

3.30 Philips *et al.* (2001) conducted a before and after study of pharmacists supplying head lice treatment in three primary care groups in one health authority area in England. All patients with head lice were eligible to receive treatment from the pharmacist in the absence of a prescription but patients who were not exempt from prescription charges paid for their prescription in the usual way. GPs, practice staff, school nurses and health visitors in the area were involved and the pharmacists from 32 community pharmacies. Pharmacists received training and financial remuneration for their role. The study aimed to determine whether the introduction of the scheme would alter referral patterns away from general practice and towards the community pharmacist. Analysis of the Prescribing Analysis and Cost (PACT) data and 336 patient and 201 professionals' questionnaires indicated that there was an increase in patients self referring to the pharmacist rather than consulting the GP for head lice treatments. Patients and professionals found the scheme equally as acceptable and effective as the previous one in which a prescription was required, although some patients reported embarrassment as they had to be checked for head lice infestation in the pharmacy. A cost analysis showed that the scheme accrued savings to the NHS because prescriptions were only issued on confirmation of live infestation and the item was prescribed according to local trust policy. The difference in costs between GP and pharmacists consultations was also a contributing factor to cost savings. The scheme also saved time and prevented inconvenience for patients who would normally have had to make arrangements to consult their GP.

3.31 A similar scheme piloted in 2 parts of Scotland introduced the direct supply of medicines for 24 minor adult ailments and 7 children's ailments (Schafheutle *et al.* 2003; Sheehy and Jones 2003). This started as a one year project reported by Schafheutle *et al.* (2003) but as registration and take up rates for the scheme were slow and showed wide variation between the two areas, the project was extended by six months (Sheehy and Jones 2003). Base line information on GP consultations was recorded prior to and during the study. Telephone interviews were conducted with 90 patients using the scheme, 22 patients who were registered but continuing to consult their GP for one of the listed conditions, 19 patients who had registered but not used it and 21 eligible patients who had not registered. Interviews and focus groups with GPs, practice staff and community pharmacists were conducted both before and during the study. Pharmacists recorded patients' details on all consultations for prescription exemption status, presenting condition and item prescribed. During the first year, 1104 patients in one area and 479 patients in the other registered for the scheme with 772 and 432 respectively consulting a community pharmacist. The results indicated that the most frequent use of the scheme was for the treatment of head lice, followed by pain and cough. Patients who were exempt from prescription charges by age accounted for over 70% of the consultations, with 59% involving patients under 16 years of age and 13%, patients aged over 60 years. Patients with income related exemptions accounted for 19% of consultations. The authors reported that most users gave very favourable opinions, and were particularly impressed by the easier access it gave them for treatment of minor ailments and the

quality of advice and service. Community pharmacists and GPs were reported to be supportive of the scheme but GPs reported little impact on their workload.

3.32 During the extended pilot period, there was an increase in the number of patients registered in both geographical areas to 1636 patients in the first area and 625 patients in the second (Sheehy and Jones 2003). Other results were similar to those in the main pilot phase for example, the reason for the consultation, costs and the percentage of patients who were exempt from prescription charges.

3.33 A scheme to allow DSoM by community pharmacists for the treatment of minor illness was piloted by Hassell (2001) in one general practice and a local community pharmacy. The primary outcome for this study was transfer of GP workload rather than patient access and the study is therefore discussed in more detail in Chapter five. However the results of the study led the authors to similar conclusions as Philips *et al.* (2001), Schafheutle *et al.* (2003) and Sheehy and Jones (2003); that the management of some self-limiting conditions by pharmacists is feasible, satisfactory and acceptable.

SUMMATIVE DISCUSSION

3.34 Overall, the impact of different models of prescribing on patient care appeared to be positive. However some models raised questions about patient safety. The safety of nurse prescribing was implied by the overall satisfaction reported by patients and nurses rather than proven as none of the research attempted to measure safety specifically. However all of the research in the review referred to district nurse and health visitor prescribing which with the exception of a few POMs is limited to items with minimal safety risks that are available for OTC purchase.

3.35 Patient safety is a more serious issue when POMs are prescribed, supplied or administered. The model for which there was evidence for most concern about patient safety was the supply and administration of POMs by nurses using PGDs. The research highlighted 3 important issues:

- PGDs were used widely in clinical settings, from specialist hospital departments to walk-in centres in the community. Although it was not possible to judge whether PGDs were essential in these settings, the government does not advocate their widespread use and stresses that prescribing for individual patients should always be the first option
- the government has stressed that antimicrobials should only be included in PGDs when absolutely necessary because of wider public health concerns about antimicrobial resistance. PGDs including antibiotics were not only used widely in walk-in centres but the quality and legal standing of some were deemed to be unsatisfactory when measured against government requirements
- nurses did not always accurately record PGD use in patient records and although this may be a reflection on the quality of record keeping rather than unsafe practice there are still safety implications for patients

This suggests that a more judicious approach to the use of patient group directions is required. It may be appropriate for NHS organisations to review existing PGDs against

government criteria (NHSE 2001; SEHD 2001) and provide multidisciplinary education to ensure professionals are equipped to draw up PGDs and use and record them accurately. The extension of nurse prescribing enables appropriately qualified nurses to prescribe either independently or as supplementary prescribers and has the potential to reduce the use of PGDs in settings where access to individualised prescriptions issued by doctors has been limited.

3.36 The introduction of suspected ADR reporting by nurses was shown to be successful. This is very relevant to all nurses, as they are accountable for monitoring the effects of medicines that they administer but particularly to nurse prescribers who are also accountable for monitoring all medicines that they prescribe. Nurses' first hand involvement in the reporting suspected ADRs is a useful contribution to patient safety.

3.37 There were examples where nurses in primary care who were not eligible to prescribe and not using PGDs, assessed and diagnosed patients and wrote prescriptions which GPs then signed and issued without examining the patient themselves. This raises a number of legal and ethical issues and serious concerns about patient safety. It also advocates for the use of nurse prescribing roles within the extension of nurse prescribing, whereby nurses are suitably trained and qualified to prescribe. There were other examples where nurses who were not eligible to prescribe appeared to make safe and effective prescribing decisions that were ratified by doctors. Many of these were qualified nurse practitioners offering nurse-led services and it could be suggested that they were well qualified to do all but make autonomous decisions about the prescription. Again there is a strong case for nurses practicing in these circumstances to undertake preparation for independent and supplementary prescribing.

3.38 Patients and nurses in a number of qualitative studies described the advantages of nurse prescribing. Interestingly, these related more to access and the delivery of care, for example, timeliness of treatment and continuity of care rather than whether the treatment was safe and effective. Although there was little attention given in the research to the appropriateness of GP prescribing, one study developed and successfully used a method to measure this. A very small number of unsafe and ineffective prescriptions were identified in the sample studied.

3.39 The opportunity cost of nurse prescribing was identified within mental health settings. Service users and nurses perceived that their caring role would be threatened by the additional duties and responsibilities associated with nurse prescribing. This is an interesting viewpoint that has received very little attention in the literature and there may be scope to pursue it further.

3.40 There is evidence of improved patient access to treatment, particularly through the direct supply of medicines by community pharmacists. One scheme experienced slow uptake rates that appeared to reflect poor marketing rather than patients' reluctance to register with the scheme. Nurse-led services in general practice enabled patients to receive same day care. However, the introduction of nurse prescribing under the extension of nurse prescribing has the potential to offer a more consistent and comprehensive service to patients in primary care. There were examples where the use

of PGDs appeared to bring benefits to patients in terms of access and convenience. There were also examples of nurse prescribing opening access to district nurses and health visitors' patients who valued the convenience and earlier commencement of treatment.

3.41 SUMMARY OF FINDINGS

- One small study measured the appropriateness of GP prescribing and identified a small number of prescriptions that were deemed to be ineffective or unsafe (Britten *et al.* 2003).

- The safety of nurse prescribing has not been studied specifically. However, the overall satisfaction with which patients and nurses viewed the process and outcome of nurse prescribing implied that it was safe (Brooks *et al.* 2001a; 2001b; Luker and McHugh 2002).

- Evidence for the safety of PGDs was inconclusive. One study (Deave *et al*. 2003) found the quality and legal standing of some PGDs to be unsatisfactory when measured against the requirements of the NHSE guidelines (DH 2000).

- Nurses appeared to use PGDs accurately but they failed to record all PGD requirements in patients' case notes (Brooks *et al.* 2003 and Deave *et al.* 2003). This incomplete record keeping made it difficult to draw conclusions about the quality of care.

- Nurses with additional training recognised and effectively reported adverse drug reactions (Morrison–Griffiths and Pirmohamad 2000; Morrison–Griffiths *et al.* 2003).

- Patients and nurse prescribers in several studies (Brooks et al. 2001a; 2001b; Harrison 2003 Luker and McHugh 2002; Otway 2001; 2002) reported the benefits of nurse prescribing. These included timeliness of treatment and improvements in the quality of care such as more information and health promotion advice.

- Evidence suggested that PGDs could have a positive impact on patient care (Miles *et al.* 2001; Handy 2002; Jones 2002; Johnson *et al.* 2003) and improve access to treatment (Jones 2002 and Johnson 2003).

- Prescribing decisions made by nurses in nurse-led services were reported as safe, effective and acceptable to patients in three randomised controlled trials (Kinnersley *et al.* 2000; Venning *et al.* 2000; Shum *et al.* 2000). These services enabled patients same day access to nurse-led care.

- Evidence suggested that the direct supply of medicines by community pharmacists provided an effective and acceptable alternative to GP prescribing and improved patients' access to medicines (Philips *et al*. 2001; Schafheutle *et al*. 2003; Sheehy and Jones 2003).

CHAPTER FOUR THE IMPACT OF PRESCRIBING MODELS ON PROFESSIONALS' ROLES

4.1 Several of the studies that were identified made reference to the impact of the prescribing model on the roles of health professionals. This related to how professionals felt their overall role was affected by the new way of working, how it affected the volume and the balance of workload between professionals and its effect on teamwork and cooperation.

THE PROFESSIONALS' ROLE

4.2 District nurses and health visitors accepted nurse prescribing as part of their role (Otway 2001; 2002, Luker and McHugh 2002, Rodden 2001). The results from all three studies suggested that nurse prescribing had the greater impact on district nursing practice with district nurses writing more prescriptions than health visitors. For example, in Luker and McHugh's (2002) study, described at para 2.23, 27 of the 42 district nurse prescribers described their level of prescribing as medium to high, whereas 41 of the 51 health visitor prescribers described their prescribing level as low. The authors suggested that this difference was because many of the items which nurse prescribers were eligible to prescribe, such as wound management products, were used most in district nursing practice. The authors did not discuss the implications of the comparatively higher volume of district nurses' prescribing.

4.3 Rodden (2001) surveyed all 127 nurse prescribers in one primary care NHS trust in Scotland to elicit their views on the impact of nurse prescribing on their autonomy and independence. 90 completed questionnaires were returned which comprised 44 district nurse respondents and 46 health visitor respondents. 43 respondents felt that nurse prescribing gave them more autonomy and 55 indicated that they depended less on the GP. However, for 25 there was no change and 3 nurse prescribers felt that they were more dependent on the GP as a result of nurse prescribing. Some nurse prescribers in Luker and McHugh's (2002) study also reported an increase in autonomy as they were able to manage patients' care more completely and consequently spend less time referring to the GP.

4.4 Practice nurses using PGDs in Jones' (2002) study claimed that PGDs had assisted them in their role by increasing their confidence, facilitating practice in the absence of a doctor, providing standards on which to base their practice and specifying the educational and training requirements necessary for practice.

4.5 In each of the studies that evaluated the direct supply of medicines (DSoM), community pharmacists found this to be an acceptable addition to their role (Philips *et al.* 2001; Schafheutle *et al.* 2003; Sheehy and Jones 2003; Hassell *et al.* 2001). However, all pharmacists had agreed to participate in the scheme so might have previously held positive views about the impact of DSoM.

WORKLOAD VOLUME

4.6 Two qualitative studies that investigated patterns of nurse prescribing also gathered comments about its impact on nurse prescribers' workload (Luker and McHugh 2002; Rodden 2001). Only 9 of the 90 respondents in Rodden's study, see para 4.3, commented that nurse prescribing saved them time, while 13 of the 24 concerns raised by nurse prescribers surveyed by Luker and McHugh, related to the increased time spent on paperwork and administration.

4.7 A small study by Butler *et al.* (2001), set in a general practice in Wales, examined the effects of a nurse-led service for patients with upper respiratory tract infections. The authors raised the concern that widening access by providing a nurse-led service could result in a lowering of consulting thresholds whereby patients would consult the practice for less serious problems in the knowledge that they would get an appointment and consequently workload would increase. During the 5-month study 132 patients with upper respiratory infection consulted the nurse and 234 patients consulted the GPs. Examination of patients' case notes revealed that patients seen by the nurse tended not to be given antibiotics (7% of the nurse's patients received a prescription for antibiotics compared with 93% of the GPs' patients). The authors offered a number of explanations for this difference in prescribing including that those patients with greater morbidity and greater expectations of receiving a prescription chose to consult the doctor. The results showed that patients who consulted the nurse during the study period consulted all clinicians slightly less for upper respiratory tract infections in the year following the introduction of the service compared with the year before it was introduced. There was no corresponding change in patients' consultation rates with GPs for upper respiratory tract infections. The authors consequently concluded that nurse management of upper respiratory tract infections did not lower patients' thresholds for future consulting and resulted in patients receiving fewer antibiotics.

4.8 The results from one study suggested that the use of patient group directions saved time for doctors and nurses and streamlined the process for patients (Miles *et al.* 2001). Specialist nurses prospectively collected data from all patients who attended a nurse-led clinic over an 11 week period. The majority of the 408 patients did not require medication, 60 patients received medication prescribed by a doctor and 59 patients received medication within a PGD from the nurse. Miles *et al.* (2001) concluded that the use of PGDs reduced the number of prescriptions that were required by doctors. This not only saved the doctor time in having to examine patients and complete prescription forms but also reduced the need for nurses to wait to get a doctor's prescription which also entailed keeping the patient waiting.

4.9 55 of the 90 nurse prescribers in Rodden's (2001) study reported that the autonomy they gained from prescribing reduced their dependence on GPs consequently saving GPs' time. The effect of nurses' autonomy on doctors' time was also reported in studies where nurses made prescribing decisions, for example, examining patients and deciding on treatments, without necessarily having prescribing authority. GPs in Offredy and Townsend's (2000) study reported a significant reduction in their workload since the nurse practitioner was employed. This particularly related to the routine management of

chronic cases, upper respiratory tract infections and screening, which would have been undertaken by the GP prior to the appointment of the nurse practitioner. In an acute nurse-led minor illness service, the nurses managed 13% of urgent appointments independently and a further 5% were managed with minimal input from GPs (Pritchard and Kendrick 2001).

WORKLOAD BALANCE

4.10 One study examined the transfer of workload from one health professional to another resulting from a change in the model of prescribing used (Hassell *et al.* 2001). The study examined how referring patients with minor conditions directly to a community pharmacist within a DSoM model affected the GP's workload. One general practice in England devised a pharmacist's formulary for 12 minor conditions including indigestion, thrush, sore throat, and head lice. Data for patients who were treated for the 12 conditions by a GP during a four-month base line period and patients who were treated for the conditions by a GP or local community pharmacist during the six-month trial period were compared. Patients who contacted the practice requesting appointments for one of the 12 conditions during the trial were offered the alternative of consulting a community pharmacist. A total of 1522 patients requested treatment and 576 patients chose to consult the community pharmacist. Most patients who transferred to the pharmacist were prescribed an item from the pharmacist formulary. The pharmacist could also have issued almost half of the prescriptions issued by the GP as these were items included in the pharmacist formulary. Patients were less likely to transfer to pharmacist care for cough, earache and sore throat. The implications for the pharmacists' workload were not discussed in the study but the results indicated that although the GPs' workload for the 12 study conditions decreased during the study, their overall workload was unaffected.

4.11 Schafheutle *et al.* (2003) and Sheehy and Jones (2003) also reported that a DSoM scheme piloted in two areas of Scotland had little impact on the overall workload of GPs. This might be an indication that DSoM effectively transferred GP workload associated with minor illness and the GP time freed up was used to treat other cases that were more urgent and less straightforward. A DSoM scheme evaluated by Philips *et al.* (2001) also found that patients self referral patterns altered away from the GP within the first month of the study and continued to increase even after the formal evaluation period.

4.12 23 of the 50 patients in Brooks *et al.*'s (2001a; 2001b) study expressed the view that nurse prescribing led to better use of GPs' and nurses' time. They recognised that as GPs were busy, nurse prescribers could manage more minor problems to leave GPs time to spend on more serious cases.

ATTITUDES AND TEAMWORK

4.13 The perceptions of pharmacists on the appropriateness of nurses prescribing hormonal emergency contraception (HEC) were examined by Cooper (2000). A 10% sample, totalling 3999, of all members of the Royal Pharmaceutical Society of Great Britain (RPSGB) was surveyed using a postal questionnaire. There was a lack of

consensus amongst the 1543 respondents but pharmacists appeared to consider themselves to be more appropriate professionals than nurses to prescribe HEC. 649 respondents agreed with the statement that nurses should not be allowed to prescribe HEC, 463 disagreed and 387 were ambivalent. There was some support for nurses supplying and administering HEC within treatment protocols rather than prescribing HEC independently but more support for pharmacists using protocols for HEC. This study was undertaken before the proposals for the extension of prescribing were announced and consequently views may have since changed. This study had the potential to include a representative sample from a large study population. However, the response rate (38.6%) was low and the authors gave no indication as to how the 10% sample of RPSGB members was selected.

4.14 One study looked at nurses' attitudes to pharmacists prescribing. This was set within the context of the proposals made in the Crown Report (DH 1999) to allow dependent, now termed supplementary, prescribing by pharmacists. Child (2000) used a postal questionnaire to survey the views of 200 hospital nurses' in five teaching hospitals in Birmingham on hospital pharmacist prescribing. The 115 respondents included staff nurses, charge nurses, specialist nurses and student nurses. 98 nurses felt it would be useful for pharmacists to write prescription charts for existing treatments and 99 nurses supported pharmacists prescribing drug treatment in a limited range of situations. However, 91 nurses stipulated that postgraduate clinical training was necessary for pharmacists to take on a prescribing role and the role should only be used in the clinical area to which the pharmacist was routinely attached.

4.15 There is some evidence of GPs' support for nurse prescribing (Carr *et al.* 2002; Rodden 2001). Carr *et al.* (2002) surveyed how all 670 GPs in Lincolnshire and Sheffield perceived the role of the nurse practitioner in primary care using a postal questionnaire. From a poor response rate of 33%, the results indicated that the GPs were in general supportive of the integration of the nurse practitioner in primary care and the majority linked the nurse practitioner's role with prescribing. 16 of the 55 GPs who employed a nurse practitioner, stated that they should be able to prescribe and 28 felt they should prescribe within protocols. A similar proportion of GPs who did not employ a nurse practitioner also supported nurse practitioners prescribing although there was more support for them prescribing within protocols. The majority of nurse prescribers in Rodden's (2001) study believed that the GPs they worked with supported nurse prescribing.

4.16 A comparison with GP and nurse prescriber views in the UK is made in two Swedish studies (Wilhelmsson *et al.* 2001; Wilhelmsson and Foldevi 2003). In Sweden nurse prescribing is restricted to district nurses. Wilhelmsson *et al.* (2001) distributed a postal questionnaire to district nurses and GPs in different parts of Sweden. The overall response rate was 83%, comprising 466 district nurse and 469 GP respondents. The questionnaire included a series of positive and negative statements about nurse prescribing in relation to the quality of patient care, professionals' competence and time saving for doctors. District nurses rated nurse prescribing more positively in all statements than did the GPs. In the second study, Wilhelmsson and Foldevi (2003)

conducted focus group interviews with 18 district nurses and 5 GPs to explore similar issues. Overall, GPs demonstrated a lack of support for, and awareness of, the nurse prescribers' role and felt that the impact upon their work was marginal. District nurses were very positive, felt prescribing was part of the nursing process and a natural development in their role. The authors attempt to explain the results of the studies by saying that the interprofessional boundaries were strong and there was resistance to change on the part of the GPs.

SUMMATIVE DISCUSSION

4.17 The impact of prescribing models on the volume and balance of professionals' workload is difficult to determine from the evidence available. When professionals adopted roles that were previously the responsibility of another professional there was a transfer of workload. However, GPs who had transferred workload to community pharmacists did not experience a corresponding reduction in their overall workload. This may be because freed up time was used to respond to previously unmet needs within the practice. There was no indication of the impact of the additional workload on the pharmacist, although financial remuneration may have enabled restructuring of services within the pharmacy. Some nurses found that nurse prescribing led to time saving as it enabled them to use their time more efficiently but most nurse prescribers felt that there was additional record keeping and administration associated with prescribing. However this could be the result of inadequacies in the infrastructure to support the development of nurse prescribing rather than nurse prescribing itself.

4.18 Nurses, doctors and pharmacists cautiously welcomed prescribing developments, but identified the importance of appropriate education and training. They also seemed to find a restricted or supervised form of prescribing by professionals other than doctors more acceptable than independent prescribing and recommended prescribing within protocols rather than independent prescribing. Interestingly, supplementary prescribing by nurses and pharmacists fits this suggested model well. It gives suitably qualified nurses and pharmacists the opportunity to use their skills and knowledge within the parameters of the patient's clinical management plan which is supervised by the independent prescriber, who is currently a doctor. Potential and qualified nurse prescribers in the two previous chapters highlighted the importance of supportive colleagues for the successful development of new roles in prescribing. This suggests that a team approach is essential not only to build confidence but also to ensure good prescribing practice.

4.19 SUMMARY OF FINDINGS

- The results from a number of studies suggested that professionals who took on new prescribing roles found them useful and acceptable. Nurse prescribing was accepted by nurses as a useful addition to their existing roles as district nurses or health visitors (Otway 2001; 2002; Rodden 2001; Luker and McHugh 2002). Community pharmacists voluntarily took on the direct supply of medicines in three pilot studies (Hassell *et al.* 2001; Philips *et al.* 2001; Sheehy and Jones 2003; Schafheutle *et al.* 2003). Practice nurses felt that the use of patient group directions assisted them in their role (Jones 2002).

- A small number of nurse prescribers felt nurse prescribing saved them time (Luker and McHugh 2002; Rodden 2001). The nurse prescribers in these studies also asserted that it saved time for GPs as nurses relied on them less for prescribing issues. The perception of almost half of the patients in Brooks *et al.*'s (2001a; 2001b) study was that nurse prescribing led to better use of GPs' and nurses' time as nurses dealt with minor problems leaving GPs free to deal with more serious cases. GPs reported that nurse practitioners who made prescribing decisions and supplied prescriptions saved them time (Offredy and Townsend 2000).

- DSoM effectively transferred GP workload associated with minor illness from GP to community pharmacist in three pilot studies (Hassell *et al.* 2001; Philips *et al.* 2001; Sheehy and Jones 2003; Schafheutle *et al.* 2003). However, there was no overall decrease in GPs workload with GPs evidently taking on different types of consultations in the freed up time.

- There is some evidence of GPs' support for nurse prescribing in the UK (Carr *et al.* 2002; Rodden 2001) in contrast to the negative views of Swedish GPs reported by Wilhelmsson *et al.* (2001) and Wilhelmsson and Foldevi (2003). Nurses supported supplementary prescribing by pharmacists with the proviso that it was limited to the pharmacists' area of clinical practice and underpinned by postgraduate training (Child 2000). Pharmacists were more supportive of a supplementary model of prescribing for nurses than independent prescribing but considered themselves better placed to take on the role of supplementary prescriber (Cooper 2000).

CHAPTER FIVE CONCLUSION

5.1 This literature review was commissioned to examine the research evidence on how widening health professionals' prescribing roles can affect the attainment of policy aims and priorities for improving patient care. It was driven by the need to establish the context in which a comprehensive evaluation of the extension of nurse prescribing, planned by the Scottish Executive could take place.

5.2 Although there was relatively little research published in the last three years in any of the areas, which were addressed in the review, and the quality of the studies included varied, the results of the review identified a number of themes that can be used to:

- provide context for the planned evaluation of the extension of nurse prescribing
- inform debate around key issues such as patient safety and educational preparation for a prescribing role
- suggest areas for further work

5.3 The review indicated that there was broad support from patients and professionals for the use of different models of prescribing and supply of medicines although there was no evidence of a systematic or strategic approach to the selection of the most appropriate prescribing model to meet patients' needs.

5.4 Patients appeared to benefit from improved access to treatment afforded by nurse prescribing and other nurse-led services and from the direct supply of medicines by pharmacists. Nurses appreciated the autonomy nurse prescribing created and demonstrated their ability to effectively monitor and report suspected adverse drug reactions. Advantages to GPs such as time saving were an identified outcome of nurse prescribing. However, all nurse prescribing research related to district nurse and health visitor prescribing within a primary care setting. No work has yet been published which focuses on the extension of nurse prescribing whereby nurses and midwives prescribe from a wider formulary and across a range of primary and secondary care settings.

5.5 Patient safety tended to be implicit in quality measures such as patient satisfaction. Practices that caused concern for patient safety appeared to have developed in an attempt to improve patients' access to treatment. For example, nurse-led services in which patients received prescriptions but had not been examined by the prescribing doctor and the use of some patient group directions improved access but potentially compromised safety. More work is required to evaluate the safety of all prescribing models and the appropriateness of their use in particular clinical settings. It may be that the extension of independent nurse prescribing and the introduction of supplementary prescribing by nurses and pharmacists have the potential to offer safe and effective alternatives.

5.6 The review raised concerns about the adequacy of educational preparation for prescribing and other medicines related roles. This included the pharmacology content and delivery in pre-registration education for doctors and nurses, post-registration education for prescribing and the continuing professional development of prescribers. However, very few studies focused on education and further research is required to give

an accurate indication of the impact of education on prescribing practice. This is particularly relevant now that new educational programmes to prepare nurses for extended independent nurse prescribing and nurses and pharmacists for supplementary prescribing have been introduced.

5.7 The review's design was based on systematic review methodology and this rigorous approach enabled the most relevant published research to be identified and included. This method also highlighted gaps in the evidence in all of the areas, which the review addressed. Reasons for this were; no published research on the subject within the reviews' time frame, few studies in the subject area or studies with ungeneralisable results. In particular there was very little research on the impact of widening prescribing roles of nurses and educational preparation for the role. Clearly more work is required in this area.

5.8 SUMMARY

The review provides context for the planned evaluation of the extension of nurse prescribing and informs debate around the impact of widening health professionals prescribing roles on patient care. The results suggest there is scope for:

- further research to evaluate the impact of different models of prescribing on patient care, including patient safety and on professionals' role development. In particular, research is needed to evaluate the impact of the extension of nurse prescribing and the effectiveness of educational preparation for the prescribing role

- NHS organisations to use a critical and systematic approach in selecting prescribing models which best suit patient need in different clinical situations. Guidance has been published on extending independent and introducing supplementary nurse prescribing in NHSScotland (SEHD 2002; 2003) and in England including guidance for pharmacists (DH 2002; 2003)

- a more judicious approach to the use of patient group directions. This may require NHS organisations to review existing PGDs against government criteria (NHSE 2001; SEHD 2001) and provide multidisciplinary education to ensure professionals are equipped to draw up PGDs and use and record them accurately

- assessment of the continuing professional development (CPD) needs of all prescribers undertaken by NHS organisations. This could inform the development of systems to support CPD. A template for CPD in prescribing has been developed by NHS Education for Scotland for this purpose (NES 2003)

- Higher Education Institutions to review the content and delivery of subjects that underpin prescribing and medicines related practice such as pharmacology in pre-registration nurse education

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ANNEX 1: KEY WORDS USED TO INTERROGATE ELECTRONIC DATABASES

Search 1	Search 2	Search 3
presc*	presc*	presc*
medicine or medicines	medicine or medicines	medicine or medicines
medication	medication	Medication
patient	education or training	workload or caseload
quality	student	doctor or doctors
care	trainee	nurse or nurses
safety	skill	pharmacist or pharmacists
access	doctor or doctors	dentist or dentists
	nurse or nurses	
	pharmacist or pharmacists	
	dentist or dentists	

ANNEX 2: ELECTRONIC DATABASES AND WEBSITES

First level search: *standard databases in medicine, nursing and health care*	CINAHL Medline
Second level search: *specialist databases in nursing and health care*	International Pharmacy Abstracts Pharmline Embase CareData
Specialist research databases	Web of Science Cochrane Library NHS Research and Development European Research and Development Information Service (CORDIS) DARE ESRC (REGARD)
Peer reviewed websites	Scotland's Health on the Web Department of Health Royal Pharmaceutical Society of Great Britain British Medical Association Royal College of Nursing

ANNEX 3: TYPOLOGIES OF SUPPORTING EVIDENCE (DH 2001)

Category of evidence	Type of study
A 1	Systematic reviews which include at least one Randomised Controlled Trial (RCT) e.g. Systematic reviews from Cochrane or NHS Centre for Reviews and Dissemination.
A 2	Other systematic and high quality reviews which synthesise references
B 1	Individual RCTs.
B 2	Individual non-randomised, experimental/intervention studies.
B 3	Individual well-designed non-experimental studies controlled statistically if appropriate. Includes studies using case control, longitudinal, cohort, matched pairs or cross-sectional random sample methodologies, and well-designed analytical studies including secondary analysis.
C 1	Descriptive and other research or evaluation not in B (e.g. convenience samples).
C 2	Case studies and examples of good practice.
D	Summary review articles and discussions of relevant literature and conference proceedings not otherwise classified.

ANNEX FOUR: EVALUATION MATRIX OF STUDIES INCLUDED IN THE REVIEW

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Boreham et al (2000) ***C1**	**Doctor prescribing** Basic training for medical students in pharmaco-therapeutics.	Quantitative Random stratified sample of 32 students given a prescribing exercise to adjust doses of phenytoin sodium. The answers were recorded and transcribed.	Analysis of errors made by 16 final year students in a classroom exercise.	16 non-optimal dose recommendations were made (50% of students). 10 students made recommendations causing adverse drug effects, classed as major errors. 6 recommended a sub-optimal dose not classed as major.	Findings support the integration of theory and practice and suggest problem based learning *Limitations:* Small, single centre study
Britten et al (2003) ***B3**	**Doctor prescribing** Appropriateness of GP prescribing and development of a measure.	Qualitative and quantitative 24 practices and 186 patients. Questionnaire to patients and GPs before and after the consultation. Data from patient records and interviews. Outcome measures; unwanted, unnec-essary and pharmacologically inappropriate prescriptions.	None	Before the consultation 42% patients wanted or expected a prescription. 65% resulted in a prescription. Of 92 independent assessments of these prescriptions, 4% were judged inappropriate and in 19 cases assessors were uncertain.	Measuring appropriateness of prescriptions was feasible and offered valuable insights to prescribing and patient behaviour. *Limitations:* Small study when investigating rare events. GPs not necessarily representative.
Brooks et al (2001a) ***C1**	**Nurse prescribing** Patients' experience of nurse prescribing in one primary care NHS trust in England.	Qualitative Prescribing HVs (n=17), DNs (n=9) and practice nurses (n=1), recruited patients for whom they had prescribed. Face-to-face or telephone patient interviews. Content thematic analysis.	None	50 patients in total. 49 positive about nurse prescribing. Benefits expressed most were timeliness and response to needs. Nurses' competence seen as vital 26% highlighted training needs. Time saving to GP also identified.	Users viewed nurse prescribing positively and felt it met their needs in terms of process/ outcome. *Limitations*: Single centre. Nurse recruited convenience sample.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Brooks et al (2001b) ***C1**	**Nurse prescribing** Patients views of advantages and disadvantages of nurse prescribing.	Qualitative Prescribing HVs (n=17), DNs (n=9) and practice nurses (n=1), recruited patients for whom they had prescribed. Patient interviews face-to-face or telephone. Content thematic analysis.	None	50 patients took part. Disadvantages identified were the limited formulary and no repeat prescriptions. Nurses not seen initiating treatment but as in supplementary prescribing, continuing it. Training important for nurses to extend role further.	Education was important to maintain safety and competence of prescribers. Formulary could be expanded and roles renegotiated to meet patient needs. *Limitations:* Single centre. Nurse recruited sample.
Brooks et al (2003) ***B3**	*Patient group direction* Walk in centre antibiotic patient group directions (PGDs).	Quantitative Clinical audit of all patients prescribed an antibiotic over a 5 month period. Assessment of nurses' knowledge of PGDs. Review of clinical records against agreed criteria. Analysis by SPSS.	None	99% of drugs administered were correct according to PGD but only 63% of patients had allergy or contraindication checks recorded-record keeping issues.	Nurses supply and administer antibiotics judiciously and safely according to local protocol. *Limitations:* Uncertainty regarding the quality of care due to the reliance on written records.
Butler et al (2001) ***B3**	**Doctor prescribing** Nurse makes prescribing decisions. Nurse versus GP care of upper respiratory tract infection (URTI).	Quantitative A description of demographic and prescribing data between patients consulting the nurse or GP. Comparisons are made between the groups and within the groups for the year before and year after the index consultation.	Practice nurse trained to manage URTIs in a general practice in Cardiff.	Nurse saw 132 and GPs saw 234 patients with URTIs. Data were obtained from over 90% of nurse's and GPs' patients. 93% of GP patients and 7% of nurse's were prescribed antibiotics. In follow up year the nurse's patients consulted slightly less often and received antibiotics less for URTIs than in the preceding year.	Nurse management of URTIs did not lower patients' threshold for future consulting, and patients who saw the nurse were prescribed for less often. *Limitations:* Case study of one nurse providing service. Generalisability not possible.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Carr et al (2002) ***C1**	**Doctor prescribing** Nurse makes prescribing decisions. The role of the nurse practitioner in primary care. GPs views on role including prescribing.	Quantitative and qualitative All GPs in Lincolnshire (n=348) and Sheffield (n=322) were mailed a covering letter and information sheet. Questionnaire comprised open and closed questions. Results were analysed by SPSS.	None	Poor response rate of 33%. Of the respondents, 31% of GPs who had NPs within their teams stated that NPs should prescribe and 52% identified this should be done with protocols.	In general, GPs were supportive of the integration of the nurse practitioner into the primary care team, but held reservations about prescribing *Limitations:* Low overall response. Views of a limited number of GPs who employ nurse practitioners.
Child (2000) ***C1**	**Supplementary prescribing by pharmacists**. Hospital nurses' views on pharmacist prescribing.	Quantitative and qualitative Piloted questionnaire to 200 nurses at 5 NHS teaching hospitals in Birmingham. Closed questions used with responses on a 5-point Likert scale. Space for comment.	None	115 (57.5%) questionnaires completed. 61.7% nurses felt pharmacists should prescribe weak agreement from 23.5%. 79.1% of nurses felt only pharmacists with postgraduate clinical training and clinical area attachment should be permitted to prescribe.	Nurses supported pharmacist prescribing in line with Crown II. *Limitations*: nurses in one area. Views before supplementary prescribing by pharmacists was introduced.
Cooper et al (2000) ***B3**	**Nurse prescribing** Pharmacists views on nurse prescribing of hormonal emergency contraception (HEC).	Quantitative and qualitative Questionnaire to 10% sample (n=3999) of all members of the Royal Pharmaceutical Society of GB (RSPGB). Responses were statistically analysed using SPSS.	None	1543 (38.6%) completed questionnaires. Respondents' profile representative of RPSGB membership. 616(42%) felt that nurses should not be allowed to prescribe HEC, (31.6%) said they should and (24.6%) were ambivalent.	Pharmacists felt they were the more appropriate professionals to prescribe HEC. No consensus for nurses prescribing HEC *Limitations*: Prescribing policy developments since study.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Deave et al (2003) ***B3**	*Patient group direction (PGD)* ***Nurse supply of antibiotics in walk in centres (WiCs) England. Legality of PGDs and compliance of clinical records with PGDs.***	Quantitative 20 Antibiotic PGDs were assessed against the 21 legal requirements of NHS Executive. 10 of the WiCs were selected (purposive sample) and medical notes of 50 patients from each centre (500) were compared with PGD requirements.	None	Of 20 PGDs examined there was little consistency with discrepancies in content. Only 7 WiCs' PGDs fulfilled the 21 statutory requirements. Overall only 65% of all PGD requirements were recorded in the records examined.	High level of non-compliance with statutory requirements. *Limitations:* Uncertainty regarding the quality of care due to the reliance on written records.
Figueiras et al (2001) ***C1**	**Doctor prescribing** CPD to improve prescribing in primary care.	Literature review English/Spanish literature 1988-1997. Included studies measuring change in prescribing behaviour using objective sources.	None	52 studies included. Evidence that effectiveness increased as strategy became more personalised. Most effective was combined personalised and active /passive strategies.	Methodological problems and practice diversity in studies reviewed –better quality studies needed. *Limitations:* Publication bias
Freemantle et al (2002) ***B1**	**Doctor prescribing** CPD: acceptability and effect of evidence based outreach on GPs' prescribing within 4 clinical guidelines	Quantitative and qualitative RCT with block randomisation. 75 randomly selected practices from 6 HAs in England. Nominal group technique used for pharmacists' views (EBOR Trial).	Pharmacists covered 2 topics per practice. Practice was control for the 2 others.	73.5 % of invited practices took part. Primary outcome was average effect across all 4 guidelines. Outreach was associated with 5.2% increase in the number of patients treated according to guidelines. Increase was 13.5% in smaller practices and 1.4% in larger. 13.5%,	Support for outreach in small practices. Evidence of acceptability by GPs and pharmacists *Limitations:* complex study, conclusions overestimate the effect.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Hall et al (2001) ***B1**	**Doctor prescribing** CPD: effect of evidence based outreach on GPs' prescribing within clinical guideline for Helicobacter pylori.	Quantitative RCT. All general practices in one English HA, randomised to outreach/ no outreach. Analysis of prescribing (level 3 PACT) data, 12 months pre and post outreach.	New clinical guideline to all practices. Outreach to intervention group only.	19 of 38 intervention practices agreed to outreach visit. As per guideline an overall increase in prescribing of omeprazole and metronidazole during study but no significant change in intervention group.	Routine use of untargeted outreach not worthwhile. *Limitations*: barriers to change within practices not identified. Strategies maybe already in place for H.Pylori eradication.
Handy (2002) ***B2**	**Patient group direction** Evaluation of nurse led care in a genito-urinary medicine (GUM) clinic including supply of antibiotics. Newcastle General Hospital	Quantitative with qualitative analysis of follow-up questionnaire A retrospective audit of sample of 300 patients who were seen by the specialist nurse.	Nurses trained to use PGDs. Nurse led service introduced.	Of 5135 new and re-book patients seen in study period, 300 (6%) had a nurse only consultation on first visit. Nurses made a provisional diagnosis in 140 (47%) and prescribed for 58% of these cases. Of patients seen 160 (53%) no treatment. Medical staff checked 16% of female cases and 14% men, the audit confirmed that PGDs had been adhered consistently.	Evidence suggests experienced nurses can successfully expand their role in GUM to offer service previously offered by doctors. *Limitations:* Single centre, convenience sample
Harrison (2003) ***C1**	**Nurse prescribing** Views of mental health service users on nurse prescribing.	Qualitative Opportunistic sample of service users (n=9) in 2 focus groups.	None	Service users felt nurse prescribing should be based on meeting patient need. May threaten core nursing role- new tasks at expense of existing caring activities. Nurses need educational preparation.	May threaten core nursing role, new or additional tasks at expense of existing nursing activities. *Limitations*: Very small convenience sample

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Hassell et al (2001) *B3	**Direct Supply of Medicines (DSoM)** Transfer of workload from doctors to community pharmacists.	Quantitative 6 month trial. Patients offered an appointment with GP or pharmacist on basis of their condition. 12 self-limiting conditions identified and formulary devised for pharmacists to treat these.	Direct supply of medicines by community pharmacists scheme.	No change in the overall workload of GPs during trial but decrease for the 12 conditions. This resulted in the transfer of 37.8% of the GPs workload associated with the conditions.	Pharmacist consultation and direct supply of medicines for self limiting conditions feasible, satisfactory and acceptable. *Limitations*: Lack of detail in the methods used for to evaluate the trial.
Humphries and Green (2000) *C1	**Nurse prescribing** CPD: Student nurse prescribers' views.	Qualitative Convenience sample -students at University of Central Lancashire Focus groups (n=12). 6 health visitor (HV), 6 district nurse (DN) student groups (n=146).	None	Students identified 10 themes; updates protocols, support from - manager, peer, GP, patient records, clinical supervision, safety of prescription pads pharmaceutical representatives, arrangements for unregistered patients.	CPD is important to future prescribers. *Limitations:* single site results not generalisable. Sample not yet prescribing
Johnson et al (2003) *C1	**Patient group direction** The potential for a nurse – led service using PGDs within a glaucoma assessment clinic.	Quantitative 3 experienced ophthalmic staff nurses were recruited. They completed a validated proforma for all patients referred to the clinic. Following tests, patients were ascribed to one of five categories ranging from normal to ocular hypertension, the nurses then prescribed according to PGD. The clinic was audited on 2 occasions.	Introduction of service using PGDs.	In the first 12 months 378 patients were seen and 52(13.8%) were put into the glaucoma category. In total, about two thirds of the patients identified at the consultants review clinic as requiring treatment had been commenced on it at the nurse assessment clinic. No patients requiring urgent treatment were missed.	Nurses were safe and effective in diagnosing and treating glaucoma within PGDs. *Limitations:* Small study which relates to a specialized clinical area. Results not generalisable to other areas.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Jones (2002) ***B3**	**Patient group direction** (PGD) The perception of nurses in general practice on the use of PGDs.	Quantitative Questionnaire to all practice nurses in Salford (n=76) after PGDs had been used for at least 9 months. Items included were: benefits of PGDs to patients and practice nurses, method of introduction of PGDs, need for further training, intention to audit practice and need for improvement in quality.	None	60% response rate. No PGDs had been audited but 22% of nurses intended to audit (all required training). 73% of respondents used PGDs. 49% reported 1 or more benefits to patients, 40% reporting speedier access and 22% perceived potential to avoid hospitalisation. However, 13 % of nurses were unhappy with the way the PGDs were introduced and requested further training.	Managed introduction of PGDs into general practices would be helpful. Nurses required training to use and audit PGDs. *Limitations:* Nurses perception only. No objective measures were used.
Kinnersley et al (2000) ***C1**	**Doctor prescribing** (Nurses make prescribing decisions). Nurse practitioners versus GP care for patients requesting "same day" consultations for acute minor illness.	Quantitative Multicentre RCT of 10 GP practices in England and Wales. 1368 patients allocated by one of two randomisation schemes. Outcome measures were patient satisfaction, resolution of symptoms, care provided (prescriptions, investigations, referrals, recall, length of consultation).	Patients randomised to nurse practitioner or GP consultation.	No difference between resolution of symptoms between the two groups. Prescribing, investigations similar, significantly more information re illness from nurses and consultations slightly longer.	Nurse practitioner service effective/acceptable to patients. *Limitations:* Study failed to achieve recruitment target numbers for power calculation. Not a nurse prescribing model but useful comparisons.
Luker and McHugh (2002) ***C1**	**Nurse prescribing** CPD and patterns of prescribing in three NHS primary care trusts in England (formerly one large trust). Includes prescribing costs.	Quantitative and qualitative Postal questionnaires to 164 community nurse prescribers.	None	129 (79%) completed questionnaires. 35 nurses not prescribing. 93 (72%) available for analysis. DN prescribing costs = £7.65 to £18,053 (median £2,023. 64), HV = £0.73 - £2,556 (median £42.77) over 12 months. Nurses felt patients benefited. Main concerns - lack of supervision and update.	Prescribing allowed more autonomy in patient care and opportunity for health promotion. Infrastructure and support slow to develop. *Limitations:* convenience sample, single site.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
McCann and Baker (2002) ***C1**	**Nurse prescribing** Community mental health nurse practitioner role in prescribing in one region of Australia.	Qualitative Purposive sampling followed by theoretical sampling. 24 community mental health nurse practitioners Participant observation.	None	Respondents wanted a formulary limited to mental health items, education for the role, a system of clinical supervision and ongoing support. Felt nurses should choose to have prescribing authority.	Nurse prescribing was a contentious issue. *Limitations:* Limited size, future rather than actual prescribers. Australian model may not be transferable to UK model.
McDonald et al (2003) ***B3**	**Doctor prescribing** CPD: effect of outreach on GP prescribing within a coordinated care trial.	Quantitative Quasi-experimental study with 12 month follow up. Analysis of prescribing data. GP and pharmacist evaluation following visit.	GPs had 2 visits from pharmacists in 2 phases, 1 heart failure And 2, pain in osteoarthritis.	120 GPs were invited and 115 (96%) participated. Changes in prescribing practice were mostly consistent with the main message of both phases. The visits were positively evaluated by the most GPs and pharmacists.	Intervention was partly successful. Offers scope to improve links between doctors and pharmacists. *Limitations:* Sample size of drug groups is small. Change beyond study is not measured.
Miles et al (2001) ***B3**	**Patient group direction** Audit of supply of medicines according to 3 PGDs in a London genito-urinary medicine clinic.	Quantitative Treatment of 408 patients at nurse-led clinics categorized as; nurse supply using PGDs; prescription by doctor; no treatment. Of the 68 patients who had medication by PGD, a random sample of 36 case notes was analysed for type/dose/ administration and correct recording.	Supply of medicines by specialist nurses using PGDs.	After the introduction of the 3 PGDs, prescriptions given by a doctor reduced from 35.4% to 16.9% of the specialist nurses' caseload. This reduced patient waiting time. In the case-note review, documentation to ensure correct and safe administration was present in all case notes examined.	The use of PGDs reduced number of prescriptions required from doctors, thus saving time for doctor's nurses and patients correctly. *Limitations*Single centre, convenience sample

Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Morrison-Griffiths and Pirmohamed (2000) ***B3**	**Adverse Drug Reactions** (ADR)s Knowledge and attitudes of specialist nurse to ADR reporting.	Quantitative and qualititative All specialist nurses (n=256) from 15 NHS hospital trusts in Merseyside and Cheshire invited to participate. Questionnaire to nurses before and 6 months after the study plus follow up interviews (n=6).	Information pack and further educational materials followed first questionnaire.	238 nurses agreed to participate.121(50.8%) completed the first questionnaire and 143(60%) the second. 90.9% reported previously recognising ADRs and 92.6% routinely warned patients. 96.7% felt nurses had a role to play 97.5% felt more education needed for ADR reporting.	Nurses are willing to report ADRs but request further education. *Limitations*:None of note
Morrison-Griffiths et al (2002) ***B3**	**Nurse prescribing** Provision and curriculum content of pharmacology in all pre registration nurse education programmes in England.	Quantitative with qualitative analysis of open questions. Questionnaire to (course leaders) at all 52 University nursing departments offering pre-registration programmes.	None	33 (63.5%) completed questionnaires Considerable variation between universities for teaching hours, methods, content and evaluation. Most frequent themes from qualitative data were calls to integrate pharmacology into the curriculum and students' lack of mathematical and scientific knowledge.	Pharmacology provision is inconsistent between universities. Nurses may not be adequately prepared for their role on registration. *Limitations:* Results are detailed, complex and difficult to appreciate in summary. Inclusion of in-complete questionnaires.
Morrison-Griffiths et al (2003) ***B3**	**Adverse Drug Reactions** (ADRs) Investigation into the value of community and hospital based nurses reporting adverse drug reactions.	Quantitative 3 groups of nurses, from Merseyside region recruited at intervals during 21 months study. Reports submitted to UK Medicines Control Agency (MCA) were analysed statistically.	ADR teaching session/ information pack to nurses. Reporting using Committee on Safety of Medicines and MCA guidelines.	90% of these invited (277 of 307) agreed to take part. In 21 months, 177 nurse reports were submitted and assessed objectively for appropriate-ness, completeness and causality. When compared with 177 randomly selected ADR reports from doctors-nurse reporting and quality of reports was similar.	Nurses are capable of recognising and reporting adverse drug reactions. *Limitations:* Useful study although only one geographical area.

Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Nazareth et al (2002) ***B1**	**Doctor prescribing** CPD: effect of evidence based outreach on GPs' prescribing within 4 clinical guidelines.	Quantitative and qualitative RCT with block randomisation. 75 practices from 6 Health Authorities (HA) in England. Nominal group technique for pharmacists' views. Known as EBOR Trial.	Pharmacists covered 2 topics per practice. Practice was control for 2 others.	73.5 % invited practices took part. Primary outcome was average effect across all 4 guidelines. Outreach was associated with 5.2% increase in the number of patients treated according to guidelines. 13.5% increase smaller practices 1.4% in larger practices.	Outreach was effective in small practices. Method was acceptable. *Limitations:* complex study, conclusions overestimate the effect
Nolan et al (2001) ***C1**	**Nurse prescribing** Community and hospital based mental health nurses' perceptions of prescribing and their training needs for the role.	Quantitative and qualitative Opportunistic sample at a nurse prescribing conference. Questionnaire to 110 nurses consisting of 14 items. Chi-squared analysis and descriptive statistics used to analyse data.	None	73 (66%) completed questionnaires. 58 (79.4%) of respondents thought mental health nurses should prescribe, 2 (2.7%) thought not and 13(17.8%) were undecided. 23 (31.5%) expressed a lack of sufficient education and skills, 25 (34.2%) feared litigation. Half felt they could prescribe for minor mental illness.	Mental health nurses felt prescribing benefited patients. They need education and support from medical colleagues for the role. *Limitations:* Self selecting group, at a prescribing conference- not generalisable.
Offredy and Townsend (2000) ***C1**	**Doctor prescribing** Nurse makes prescribing decisions Role and practice of nurse practitioners in primary care.	Qualitative 4 general practices in South East England, purposive sampling. 36 semi-structured interviews ((NUD*IST) with GPs, Nurse practitioners, receptionists and patients.	None	All GPs reported significant decrease in workload, routine management of chronic cases, URTI and screening. Wide variation in prescribing arrangements.	Variation in autonomy of nurse practitioners is highlighted which raises issues for clinical governance and quality of care. *Limitations:* small convenience sample

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Otway (2001) ***C1**	**Nurse Prescribing** CPD needs of nurse prescribers and recommendations for the future	Qualitative and quantitative Interviews (n=12) Analysis of interviews informed the development of a questionnaire (n=350) to nurse prescribers.	None	241(69%) completed questionnaires. Majority felt prescribing was essential part of practice. Not all prescribing. Peer support important in developing prescribing skills. Clinical supervision perceived positively.192 (80%) wanted more pharmacological training. For 163, (68%) was most urgent training need.	Nurse prescribers positive about role, but blanket training policy may not have been a success. CPD is required, e.g. mentoring and more pharmacology. *Limitations:* Views from one organisation.
Otway (2002) ***C1**	**Nurse Prescribing** CPD needs of nurse prescribers and focusing on peer support and future recommendations.	Qualitative and quantitative Interviews (n=12) Analysis of interviews informed the development of the questionnaire (n=350) to nurse prescribers.	None	241(69%) completed questionnaires. Active prescribers worked in teams with other prescribers and had informal peer support and mentorship. Isolation in practice led to negative attitudes and less likelihood of prescribing.	Informal peer support is valuable. CPD at organisation level was suggested; peer support networks, skilled mentors, clinical supervision. *Limitations:* Views from nurses in one organisation.
Philips et al (2001) ***B3**	**Direct Supply of Medicines (DSoM)** Supply of head lice treatments by community pharmacists to patients exempt from prescription charges.	Quantitative Before and after study. Analysis of prescribing patterns/costs (PACT). Questionnaire to patients and professionals. All GPs/health visitors/practice staff and 32 pharmacies in 3 primary care groups in West Nottingham.	Scheme introduced – Pharmacists were trained and remunerated for their role.	336 patient questionnaires completed 201 from professionals. Referral patterns altered away from GP to pharmacist within first month. Cost analysis found scheme saved money – (lower cost of pharmacist consultation). Patients and professionals thought it at least as acceptable as the previous system.	No evidence of ineffectiveness: evidence of patient and professional acceptability and cost savings. Less prescribing because all patients checked for infestation and compliance with local policy. *Limitations:* None evident.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Pritchard and Kendrick (2001) ***B1**	**Doctor prescribing** (Nurses make prescribing decisions). HV and practice nurse led acute minor illness service for patients requesting "same day" consultations.	GP practice in Nottingham. Data gathered for 8 months. Patient satisfaction questionnaires and practice data used. Outcome measures; patient satisfaction with consultation, referral, care provided and impact on GP consultation rates, Sample size 2056 (1900 required to measure effect statistically).	Nurses trained by GPs. Patients offered GP or nurse service. Protocols used and GP signed prescriptions written by nurse.	High levels of satisfaction expressed by patients Reduced GP workload (13% urgent cases managed by nurse). Similar prescribing, re-consultation and referral rates by GPs and nurses.	Practice nurses/Health visitors can effectively manage minor illness service in general practice. *Limitations:* Single centre relying on data from 3 nurses. Not nurse prescribing model but useful comparison.
Rodden (2001) ***C1**	**Nurse Prescribing** Nurse prescribers views on autonomy and dependence on GPs. district nurses and health visitors in Scotland.	Quantitative Questionnaire to all Nurse prescribers in primary care trust (n=127).	None	90 (71%) completed questionnaires. Nurse prescribing viewed positively (90%). 80% believed their GPs to be supportive. District nurses prescribed more than health visitors. Overall nurses perceived an increase in their autonomy and a decrease in dependence on GPs.	Nurse prescribers were positive about prescribing and felt more autonomous and less dependent on GPs. *Limitations:* Views from nurses in one organisation.
Schafheutle et al (2003) **B3*	**Direct Supply of Medicines (DSoM)** Pilot in 2 areas of Scotland. Community pharmacist supplied patients' OTC medicines for minor ailments.	Quantitative with some qualitative analysis. Audit of consultations with patients' GPs and pharmacists Interviews with patients, GPs, practice staff and pharmacists before and during the scheme.	Direct supply of OTC medicines by pharmacists.	Slow uptake and wide variation between 2 areas. 70% users exempt by age. Most frequent use was for head lice, then pain and cough. Most users gave very favourable opinions. Cost described as modest. Pharmacists and GPs supportive but GPs reported little impact on their workload.	DSoM appreciated by/ convenient for patients. Workload accommodated by pharmacists. No perceptible change to overall GP workload. *Limitations:* Slow uptake and low numbers of patients in one area.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Scobie et al (2003) ***B3**	**Doctor prescribing** Basic training for final year medical students in pharmaco-therapeutics at two English universities.	Quantitative Random allocation of 40 students to pharmacist teaching sessions that included practical skills or no teaching sessions. Intervention group completed post-teaching questionnaire. After a month, a random sample from both groups took an OSCE.	Additional pharmacist led teaching sessions for final year medical students and OSCE.	There was overall improvement in performance in the structured teaching group. They scored higher on eight out of nine Objective Structured Clinical Examination (OSCE) stations. Questionnaire elicited positive views on the provision of new information and relevance to Practice.	Structured teaching improved confidence, was an effective, acceptable method of teaching the medicines management skills. *Limitations:* No rationale for randomisation. Small sample and only two sites.
Sheehy and Jones (2003) ***B3**	**Direct Supply of Medicines (DSoM)** Extension of a pilot scheme in 2 areas of Scotland. Community pharmacist supplied patients OTC medicines for minor ailments.	Qualitative and quantitative Audit of consultations with patients' Gps and pharmacists Interviews with patients, GPs, practice staff and pharmacists before and during the scheme.	Direct supply of medicines by community pharmacists	Registration with scheme increased but near steady state only achieved in one area (27% of practice population). Head lice remained the most frequently presenting condition. Majority of patients exempt by age. Cost per consultation increased under the extension.	Figures suggest that people registered will use service once per year on average. *Limitations:* Possible data recording fatigue identified. Results not generalisable to other areas with different demographic profiles.
Shum et al (2000) ***B1**	**Doctor prescribing** (Nurses make prescribing decisions). Practice nurse versus GP care for patients requesting "same day" consultations for acute minor illness.	Quantitative Multi centre RCT South west England. 1815 patients (1060 required to measure effect statistically). Satisfaction questionnaires used. Outcome measure: general satisfaction of patients (length of consultation, prescription rates, patients reported health status).	Patients randomised to practice nurse or GP consultation.	Patients satisfied with both nurse and GP consultation. Significantly more satisfaction in practice nurse group. Nurses and doctors wrote similar proportion of prescriptions. 577/790 (73%) of patients managed entirely by nurses. No difference between 2 groups in patients ratings of health status re clinical improvement in 2 weeks.	Practice nurses appear to offer an effective service for patients with minor illness who request same day appointments. *Limitations:* Conclusions about satisfaction inconsistent with some findings. Not nurse prescribing model but useful comparisons.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Sodha et al (2002) ***B3**	**Nurse Prescribing** Knowledge, self rated knowledge and confidence of community nurse prescribers in relation to clinical pharmacology.	Quantitative and qualitative Cross-sectional survey with sample of 183 nurses. Open and closed questions and case related scenarios. Descriptive statistical analysis performed and chi-squared analysis.	None	110 (60%) completed questionnaires 41 (37%) were nurse prescribers. More non-prescribers 13(19%) rated their medication related knowledge as poor compared to prescribers 2 (5%). In medication-related scenarios, overall performance was poor but in all six, nurse prescribers' scores were lower than non prescribers.	Nurse prescribers confidence unjustified by their knowledge base. This raises concerns about current education/training. *Limitations:* Single centre study, limited number of nurse prescribers, who may have attended the same training course.
Tyler and Hicks (2000) ***B3**	**Nurse Prescribing** An occupational profile for the family planning nurse prescriber. Nurses identify critical tasks and training requirements.	Quantitative Postal survey to all 1142 current members of the National Association of Nurses for Contraception and Sexual Health. Responses to questions were given on a 5-point Likert scale and analysed on SPSS for differential and inferential statistics.	None	388 (34%) completed questionnaires. 314 (81%) of respondents interested in being prescribers, of these 53% very interested. Top 15 training needs included 7 research tasks, advanced clinical activities, applied pharmacology and technical activities	A role definition of the nurse prescriber in family planning is offered, and an indicative curriculum for cognate educational programmes. *Limitations:* Low response rate.
Venning et al (2000) ***B1**	**Doctor prescribing** (Nurses make prescribing decisions). Cost effectiveness of nurse practitioners versus GP care for patients requesting "same day" consultations for acute minor illness.	Qualitative Multicentre RCT of 20 geographically dispersed practices in England and Wales. Data recorded by nurse or doctor re consultation e.g. history, diagnosis, tests prescriptions. SF 36 or child health questionnaire used to assess satisfaction.	Patients randomised to nurse practitioner or GP consultation.	1316 eligible patients randomised. Patients more satisfied after consultation with nurse, even after controlling for differences in length. Nurse consultations slightly longer, no difference in health status of 2 groups at end of 2 weeks. Nurses' prescribing behaviour similar to GPs, Some practice used protocols anyway.	Nurse practitioner service effective and acceptable to patients. NHS costs not significantly different *Limitations:* Not nurse prescribing but useful comparison.

*Categorisation of Evidence

Study	Focus	Methodology & Methods	Intervention	Results	Conclusion/limitations
Wilhelmsson et al (2001) ***C1**	**Nurse Prescribing** District Nurses and GPs views on nurse prescribing in Sweden.	Quantitative Questionnaire to 554 District Nurses and 566 GPs. Full statistical analyses.	None	935 (83%) questionnaires completed. In all statements district nurses more positive than GPs. No strong rational arguments against nurse prescribing but overall responses from the GPs were negative.	Strong professional solidarity amongst GPs. Generally negative about nurse prescribing. *Limitations:* Quantitative approach was unable to probe subjects' reasons for their views.
Wilhelmsson and Foldevi (2003) ***C1**	**Nurse Prescribing** Views of district nurses and GPs on Nurse prescribing in Sweden.	Qualitative Focus group interviews (n=4 District Nurses/ n=2 GPs). 18 District Nurses and 5 GPs took part. Analysis NUD*IST4.	None	District nurses very positive, natural development part of reform process, very aware of additional responsibility. Some had introduced self monitoring. Limited support from GPs who were not very aware of nurse prescribers role. GP felt impact on their work was marginal.	Swedish GPs less positive about nurse prescribing than nurse prescribers. Communication on prescribing issues is limited. *Limitations:* Small sample, only five GPs. results may not be generalisable to the whole of Sweden

*Categorisation of Evidence

ANNEX 5: CINAHL/MEDLINE SEARCH RESULTS

Search terms	Total	Kept from title	Kept from abstract	Full text	Includ-ed in review
Search 1 Kw: presc* and (kw: medicine or kw: medicines or kw: medication) and yr: 2000-2003	14,708				
1a (((patient or patients) and quality) and care)	1,143	48	37	22	7
1b (patient or patients) and safety	879	27	22	5	3
1c (patient or patients) and access	396	30	25	9	4
Search 2 (w: presc* and (kw: medicine or kw: medicines or kw: medication)) and ((kw: education or kw: training) or (kw: student* or kw: trainee* or skill*)) and ((kw: doctor or kw: doctors)) and yr: 2000-2003	296	24	6	3	4
2a as above but (nurs*)	183	18	13	4	4
2b as above but (dent*)	78	2	1	1	0
2c as above but (pharmac*)	817	50	38	20	1
Search 3 (kw: presc* and (kw: medicine or kw: medicines or kw: medication)) and (workload* or caseload*) and ((kw: doctor or kw: doctors)) and yr: 2000-2003	25	6	5	0	0
3a as above but (nurs*)	14	3	1	1	1
3b as above but (dent*)	3	2	0	0	0
3c as above but (pharmac*)	32	4	0	0	0
Total	3866	214	130	48	24

ANNEX 6: SUMMARY OF SEARCH RESULTS

Database	Total identified	Included in review
CINAHL/Medline	3866	24
International Pharmacy Abstracts	1815	2
Pharmline	7	0
Embase	640	9
CareData	2	0
Web of Knowledge	85	0
NHS Research and Development Information Service (CORDIS)	2	0
REGARD	2	0
Cochrane (which includes DARE)	4	1
Scotland's Health on the Web (website)	N/A	2
Department of Health (website)	N/A	0
Royal Pharmaceutical Society of Great Britain e-Pic & Ceuted databases	2480	4
British Medical Association (website)	N/A	0
Royal College of Nursing (website)	N/A	0
Handsearches	N/A	2
Total	8901	44

ANNEX 7: GLOSSARY OF ABBREVIATIONS

ADR	Adverse Drug Reaction
BNF	British National Formulary
CPD	Continuing Professional Development
DSoM	Direct Supply of Medicines
EBOR	Evidence Based Outreach
GP	General Practitioner
HEC	Hormonal Emergency Contraception
NMC	Nursing and Midwifery Council
OSCE	Objective Structured Clinical Examination
OTC	Over the Counter
PACT	Prescribing Analysis and Cost
PGD	Patient Group Direction
POM	Prescription Only Medicine
RCT	Randomised Controlled Trial

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