



Cooper, Mark Alastair (2003) *Diversity and effectiveness of emergency nurse practitioner services in Scotland*.
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Diversity and Effectiveness of Emergency Nurse Practitioner Services in Scotland

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This thesis is presented for the degree of Doctor of Philosophy

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Abstract

Background

The National Health Service is undergoing considerable change. Nursing roles in many areas of practice, including Accident and Emergency (A&E) services are expanding. These include the development of nurse practitioner roles which have shown that nurses can provide high quality care within the context of an expanded area of practice, although this has not been comprehensively studied. In the UK, emergency nurse practitioners (ENPs) are increasingly responsible for the management of patients with minor injuries. However, there are a limited number of rigorous empirical studies conducted to specifically evaluate the role of the ENP. To ensure that high quality patient care is provided, in-depth evaluation of this role is required. In order to achieve this two areas require to be addressed. First, the identification and development of comprehensive and sensitive measures of effectiveness, and second the development of assessment instruments that have utility across the wide ranging operational structures of A&E departments. This work aimed to develop methods and tools that could be easily used in different A&E departments to evaluate the effectiveness of minor injury care provided by ENPs compared to that provided by medical staff.

Objectives

The objectives were to:

- Explore the extent and nature of ENP services across Scotland and describe changes over a three year period.
- Develop an instrument to measure the quality of clinical documentation written by ENPs or senior house officers (SHOs).
- Undertake a randomised controlled trial (RCT) to test instruments to measure the quality of ENP-led care (in terms of patient satisfaction, quality of clinical documentation, unplanned follow-up and missed injuries) and to calculate the required trial size to detect differences in potentially serious missed injuries or inappropriately managed patients between ENPs and SHOs.

- Explore unplanned follow-up in minor injury patients treated by a range of different clinicians in an A&E department.

Methods

The research was undertaken in two phases. The first used a postal survey: a questionnaire was sent to every A&E department in Scotland on two separate occasions three years apart. The second phase involved a number of different methods including:

- The modified nominal group technique (NGT) (a consensus method) to develop an instrument to measure the quality of clinical documentation relating to minor injuries.
- A RCT to evaluate ENP-led care compared with SHO-led care for the management of patients (n=199) with minor injuries, primarily examining clinical documentation and patient satisfaction.
- Routinely collected data and a postal questionnaire to collect data on unplanned follow-up for a cohort of minor injury patients (n=3,004), and a case note review of those who re-attended A&E to identify missed injuries or inappropriate initial management.

Results

Phase 1

The surveys of A&E departments in Scotland identified that:

- The proportion of departments providing some form of ENP service rose from 47% in 1998 to 63% in 2001.
- There was considerable variation in role title, educational preparation, pay grading and scope of practice for ENPs between departments.

Phase 2

The modified NGT was an effective method to develop the *Documentation Audit Tool*.

- Which had good levels of inter-rater reliability and almost perfect stability (ICC (1,1) = 0.67, ICC (2,1) = 0.88 respectively)

The *RCT of ENP-led care* found:

- Patients were satisfied with the level of care from both ENPs and SHOs. They reported that ENPs were easier to talk to ($p=0.009$); gave them information on accident and illness prevention ($p=0.001$); and enough information on their injury ($p=0.007$). Overall they were more satisfied with the treatment provided by ENPs than that from SHOs ($p<0.001$).
- ENPs clinical documentation was of higher quality ($p<0.001$) as measured using the *Documentation Audit Tool*.
- No differences were found in recovery times, level of symptoms, time off work or unplanned follow-up between groups.
- Missed injuries were the same for both groups ($n=1$ in each group), and two patients in the ENP group had unsatisfactory initial management.
- To test the significance of the identified 2% difference in missed injury and mismanagement rates between ENPs and SHOs, a larger trial involving 1,538 patients would be required.

The *Unplanned Follow-up Study* of minor injury patients found:

- Approximately, one in twenty (5.5%) re-attended A&E within six weeks of their initial attendance. A proportion (40%) attended for unplanned follow-up related to their original injury and 12% of these had missed injuries or had been incorrectly managed at initial presentation.
- Overall, 0.4% of all minor injury patients, were identified with a missed injury or having been inappropriately managed at initial presentation.
- Approximately one fifth of patients (18%) reported the need to seek unplanned follow-up in the month following their attendance in A&E. Most reported that this was sought from their general practitioner (GP) (52%), only 11% reported returning to the original A&E department.

Conclusions

ENPs are practising throughout the different types of A&E department in Scotland, but educational preparation, scope of practice, job titles and grading vary considerably.

The modified NGT was found to be an effective method to develop the *Documentation Audit Tool* which had good inter-rater reliability and stability. The *RCT of ENP-led care* was sufficiently large to demonstrate higher levels of patient satisfaction and clinical documentation quality with ENP-led compared to SHO-led care. The methods and tools developed for use in this trial could be used in other A&E departments to measure the quality of ENP-led care.

Missed injuries were relatively rare, however around a fifth of patients sought unplanned follow-up; most from GPs, a smaller proportion returned to A&E. Monitoring returns to A&E may be a useful procedure to assess the quality of minor injury care.

In summary, ENPs can provide care to patients with minor injuries, which results in high levels of patient satisfaction. Their clinical documentation is of a higher quality and complications in terms of missed injuries are low. However, A&E departments should consider ensuring they have systems in place to identify patients who re-attend, or who attend another health-care provider for unplanned follow-up, in order to ensure that missed injuries can be effectively monitored.

Acknowledgements

I would like to thank my two principal supervisors Dr Grace Lindsay and Dr Sue Kinn for their expertise, encouragement and support in guiding me through the whole research process to the completion of this thesis. I would also like to thank two other individuals who have helped supervise specific areas of this research: Dr Tracy Ibbotson and Mr Ian Swann.

This study could not have taken place without the support of North Glasgow University Hospitals NHS Trust, and the medical and nursing staff at the principal research site (Glasgow Royal Infirmary). I would like, in particular, to thank the emergency nurse practitioners (ENPs) and the senior house officers for participating in the randomised controlled trial, and the senior nurses in A&E departments across Scotland who enabled a detailed picture of Scottish ENP services to be painted. A special thank you also goes to the hundreds of patients who participated in the both the *Randomised Controlled Trial of ENP-led care* and the *Unplanned Follow-up Study*.

My wife, Kathryn, has made many sacrifices to allow me to complete this work. I owe much to her, as without her support this thesis would never have been completed. I also must thank my parents, David and Sheena, and my wider family for their advice, cajoling and never wavering support.

The following individuals have contributed much over the six years of the study and I would like to take this opportunity to thank:

- Derek Nelson, Clinical Nurse Manager, Accident & Emergency, Glasgow Royal Infirmary.
- For statistical advice, Suzanne Hagan, Nursing Research Initiative for Scotland and Angus McFadyen, Senior Lecturer, School of Computing and Mathematical Science, Glasgow Caledonian University.
- The library staff at Glasgow Royal Infirmary, in particular Michelle Kirkwood and Leslie Robertson, for putting up with my many endless and strange requests, and their never-ending enthusiasm to track down even the most obscure reference with the smallest amount of information.

- My colleagues in Accident & Emergency, who without their support this research could not have been undertaken, but who also help ensure my feet stayed firmly on the ground throughout these last six years. In particular to Margaret Lawson and Val Ness who helped review thousands of A&E notes to identify patients with minor injuries.
- Dr Lynn Sbaih, Brian Dolan and Barbara Neades for their comments and advice on questionnaire design.
- Sarah Haggerty and Stewart Hair for their valuable assistance in undertaking the surveys of ENP services in Scotland.
- Brigid Campbell, Dr Jennifer Devine, Dr Peter Freeland, Mr Colin Graham, Mr Pat Grant, Linda McMillan, John McGuinness, Dr Ian McLaren, Elspeth Ritchie and Kay Smith for the time and effort either as part of the expert panel which developed the *Documentation Audit Tool* or for reviewing clinical documentation using the tool.
- Dr M. Jenkins for the use of the *Patient Satisfaction Questionnaire*, and Professor Susan Read for use of the *Patient Diary* and the inspiration behind undertaking this thesis.

The study was undertaken, in part, as a Research Training Fellowship, funded by the Chief Scientist Office, Scottish Home and Health Department; and part funded by an award from the Royal College of Nursing Accident and Emergency Nursing Association and Tyco Healthcare Ltd.

Declaration

The work presented in this thesis was performed solely by the author, except where the assistance of others is acknowledged.

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List of Abbreviations

A&E	Accident & Emergency
ACP Journal Club	American College of Physician’s Journal CLub
ANOVA	Analysis of Variance
APLS	Advanced Paediatric Life Support
ATLS	Advanced Trauma Life Support
BMA	British Medical Association
BNI	British Nursing Index
CaMIS	Clinical and Management Information System
CINAHL	Cumulative Index to Nursing and Allied Health
CNS	Clinical Nurse Specialist
CT	Computerised tomography
DAT	Documentation Audit Tool
DGH	District General Hospital
Dip IMC	Diploma of Immediate Medical Care
EMBASE	Excerpta Medica Database
ENB	English National Board
ENP	Emergency Nurse Practitioner
ENRiP	Exploring New Roles in Practice (a research project)
FFAEM	Fellow of the Faculty of Accident & Emergency Medicine
GCS	Glasgow Coma Scale
GMC	General Medical Council
GP	General Practitioner (Family Doctor)
HPAU	Health Policy Advisory Unit
ICC	Intraclass correlation coefficient
ICN	International Council of Nurses
IQR	Inter Quartile Range
ISD Scotland	Information and Statistics Division, Scottish Executive
ITU	Intensive Therapy Unit
LREC	Local Research Ethics Committee
MSS	Misdiagnosis Severity Score (Scale to measure the severity of a misdiagnosis)
MIU	Minor Injury Unit
NGT	Nominal Group Technique
NHS	National Health Service
NMC	Nursing and Midwifery Council
NP	Nurse Practitioner
PGD	Patient Group Direction
PHEC	Pre-hospital Emergency Care Course
PoP	Plaster of Paris (Cast)
PNP	Paediatric Nurse Practitioner
PRHO	Pre-registration House Officer
QHOM	Quality Health Outcomes Model
RCN	Royal College of Nursing
RCT	Randomised Controlled Trial
SHO	Senior House Officer
SpR	Specialist Registrar
SPSS	Statistical Package for the Social Sciences
TNCC	Trauma Nursing Core Course
UKCC	United Kingdom Central Council for Nursing, Midwifery and Health Visiting

Chapter 1

General Introduction

1.1 Introduction

1.1.1 Policy background

The National Health Service (NHS) is undergoing major modernisation. Shortly after the new Labour Government entered power in 1997, the white paper *The new NHS: Modern, Dependable* (Department of Health, 1997) was published and outlined the plan for modernisation. Details of this modernisation programme for England were contained in *The NHS plan: a plan for investment, a plan for reform* (Department of Health, 2000b). Plans for Scotland were laid out in a separate white paper, *Our National Health: a plan for action, a plan for change* (Scottish Executive, 2001c), as responsibility for the NHS in Scotland had been devolved to the new Scottish Parliament in 1999. In addition to redesigning much of the service, both these plans for modernisation viewed NHS staff as the key to the reforms. One way to improve the quality of the service and to deliver a more patient focused service is to make maximum use of the talents of the workforce. The expansion of the role of the nurse is seen as an important element in the delivery of a more efficient, and patient focused health service. The contribution of nurses to the modernised health service in Scotland was outlined in *Caring for Scotland* (Scottish Executive, 2001a). Within this document the role of the emergency nurse practitioner (ENP) in managing patients who presented with defined categories of trauma and illness was both recognised and encouraged, together with a number of other innovative nursing roles.

Since the early 1990s, the number of innovative nursing roles in the NHS has increased at a rapid rate. This was in large part due to the publication of the *Scope of Professional Practice* (UKCC, 1992b) by the previous regulatory body for nursing, the United Kingdom Central Council for Nursing Midwifery and Health Visiting (UKCC), which helped legitimise these new roles. This publication marked the shift from a restrictive system of certifying every extension to the nurses' role, to an arguably more professional framework that recognised that each nurse was accountable for their own

practice and put the responsibility on the individual to define the limits of their practice. Another significant driver in the development of the nurse practitioner role has been the reduction in junior doctors hours in part initiated by the *Junior Doctors: the new deal* (NHS Management Executive, 1992) in the early 1990s and implications of implementing the *European Working Time Directive* (Council Directive 93/104/EC, 1993). Together these pieces of legislation have placed legally bound maximum working hours on junior doctors, and reduced the number they work. This has effectively reduced the number of junior doctors available.

The changes to specialist training for medical practitioners described in the *Calman Report* (Department of Health, 1993) has increased the pressure on NHS Trusts to cover the work undertaken by junior doctors. Proposed changes to junior doctors' training outlined in the *Donaldson Report* (Department of Health, 2002c) will further increase this pressure (see Section 2.8.1). Other initiatives such as additional consultants and general practitioners (GPs), as well as an increased number of medical school places (Department of Health, 2000b) have been put in place to help buffer the effect in the reduction in junior medical staff working hours. However recent changes to GPs' contracts (Department of Health, 2003c) are likely to encourage further development of new nursing roles primarily in primary care, as NHS Trusts rather than GP practices take on much of the responsibility for out-of-hours care (including minor ailment and injury care).

As well as reforming much of the way the NHS delivers care, the white paper *The new NHS: modern, dependable* (Department of Health, 1997) introduced the concept of 'clinical governance'. In essence, clinical governance can be described as an umbrella term for everything that helps to maintain and improve high standards of patient care (Currie, Morrel and Scrivener, 2003). It is about corporate responsibility for the quality of care delivered at every level of the NHS. It means ensuring that services, including new nursing services such as those provided by nurse practitioners; are of a high standard; perform, at least, as well as existing services; and, above all, meet the needs of the patient.

1.1.2 Expanding the role of the nurse in A&E

In a systematic review of 23 observational studies and 11 trials from developed countries across the world (including the trial reported in this thesis), Horrocks,

Anderson and Salisbury (2002) demonstrated that a growing body of research evidence is being established which argues that nurse practitioners are able to provide high quality care to patients as a first point of contact, and with undiagnosed health problems. However, only two of the studies in the review were undertaken in Accident and Emergency (A&E) departments.

Nurses are increasingly managing patients with minor injuries in A&E departments across the UK. In 1997, Tye (1997) reported that a paucity of empirical evidence to support the role of the Emergency Nurse practitioner (ENP) existed despite the relentless pace of the role's development. The idea for this programme of research developed following a literature review I conducted on the role of the ENP (Cooper and Robb, 1996) and the realisation that many departments were struggling to undertake small scale evaluation studies as they introduced ENPs, as specific instruments and methods did not exist to readily evaluate that role.

Read and George (1994) had undertaken some initial work in developing a randomised controlled trial comparing ENPs with A&E senior house officers (SHOs). However, they had to abandon their plans for a clinical trial for a number of reasons including the small number of patients managed by the ENPs at their proposed research site and concerns about the similarities in the pathways of care for patients managed by the two groups (ENPs and SHOs). The authors felt that the similarity in care pathways might make it unlikely for differences in outcome to be demonstrated. A further concern was that they felt that the ENP scheme in the hospital where they had intended to conduct the study was perhaps not typical of schemes in other hospitals. Nevertheless Read and George (1994) argued that experimental research into the assessment and management of minor injuries, comparing the work of ENPs and SHOs was desirable.

It was only after the start of the research programme described in this thesis and after the *Evaluating an ENP service: a randomised controlled trial (RCT of ENP led care)* was completed (see Chapter 7) that the first full-scale randomised controlled trial of ENPs compared with SHOs was published (Sakr, Angus, Perrin *et al.*, 1999). Utilising a study design which involved randomised patients being seen and assessed by the SHO or ENP they had been assigned to, and then assessed for a second time by a research registrar, the researchers were able to directly compare the ENPs or SHOs assessment and management with the research registrars. This study demonstrated that the ENPs

were better at recording medical histories and that fewer patients seen by them had to seek additional advice about their injury through unplanned follow-up (Sakr *et al.*, 1999). There were no other statistical differences between the two groups in terms of process or outcome. The authors concluded that properly trained ENPs, working within agreed guidelines, could provide care to patients with minor injuries to a standard at least equal to junior doctors (SHOs). However, this study only showed that ENPs working within the guidelines at the research site used in the study, and who were trained on the English National Board A33 course, could provide a similar level of service to the SHOs in that same hospital. With ENP education being non-standardised and variation in guidelines from department to department, the transferability of these results to other departments should be undertaken with caution. A smaller trial, also published after the work described here was started, involving 169 patients randomised to ENPs or junior doctors in Australia was inconclusive in terms of any of the outcomes measured due to the small size of the study (Chang, Daly, Hawkins *et al.*, 1999).

Perhaps the most important clinical indicator of performance of any clinician group managing minor injuries, and of greatest concern to clinicians and hospital management is the number of injuries missed or cases incorrectly managed. This indicator is a sensitive issue and can prove to be extremely difficult to measure. It is an important performance indicator which was not examined in either the trial undertaken by Sakr *et al.* (1999) or that by Chang *et al.* (1999).

A need for instruments and methods which could be incorporated into local evaluation studies during the introduction of ENPs or for use in a multi-centre evaluation study was felt to be required, and methods of determining missed injuries or incorrectly managed cases needed examining. This thesis is based on a programme of research which firstly examined the extent and nature of ENP services in Scotland, and secondly developed and tested both instruments and methods for use in evaluating ENP services. The study objectives were formulated to address the following questions:

- How widespread are ENP services throughout the different types of A&E departments in Scotland?
- What are the commonalities between ENPs in different departments
- How have ENP schemes evolved over a three-year period?

- How does ENP-led care compare with SHO-led care (in terms of patient satisfaction, quality of clinical documentation, unplanned follow-up and missed injuries)?
- How large would a full scale trial require to be to identify whether differences existed between ENPs and SHOs in terms of missed injuries or incorrectly managed cases?

During the course of the research programme further questions evolved from both the trial undertaken as part of the programme and from the trial published by Sakr *et al.* (1999). These questions concerned the unplanned follow-up advice some patients reported needing to seek in the month after attending A&E with a minor injury, and with patients who returned to A&E and were subsequently found to have missed injuries. Objectives for a further study were formulated around the following questions:-

- What is the extent and nature of the unplanned follow-up sought by patients, following an attendance in A&E with a minor injury?
- What proportion of patients who return to A&E are subsequently found to have missed injuries?

To answer these questions a range of different research methodologies were required: a survey methodology was employed to examine the extent and nature of ENP services in Scotland; a nominal group technique to develop an instrument to measure the quality of clinical documentation; a randomised controlled trial to evaluate ENPs with SHOs; and, a patient completed postal questionnaire to examine patient reported unplanned follow-up. The literature pertaining to these various methods is discussed in Chapter 3, and the methodologies used are described in Chapter 4. The results from the first phase of this research programme (the extent and nature of ENP services in Scotland) are presented in Chapter 5, and the results from the second phase in which instruments were developed and tested to evaluate the role of the ENP are presented in three separate chapters, namely Chapters 6, 7 and 8. A general discussion is presented in Chapter 9 which brings the thesis to a conclusion with recommendations for further areas of research based on the findings from the different parts of this research programme.

Chapter 2

Literature Review

2.1 Introduction

Every year, across the UK, more than 15.5 million visits are made to A&E departments (Department of Health, 2000a; Department of Health Social Security and Public Safety, 2002; Health Statistics and Analysis Unit, 2002; ISD Scotland, 2002), and the number has been increasing (Audit Commission, 2001). Waiting times in A&E have also been rising. At the current time, the National Health Service (NHS) is undergoing extensive reform (Department of Health, 2000b), and the Government intends to end the long waits patients have traditionally had in A&E. One approach to facilitate the reduction in waiting times has been to increase the role of nurses, in delivering care to patients. The Chief Nursing Officer for England has outlined ten key roles for nurses, which include: the ability to admit and discharge patients; order diagnostic tests; manage patient caseloads; run clinics; prescribe medicines; perform minor surgery, and make and receive referrals (Department of Health, 2000b; 2003a).

It has been estimated that nurses could assess and treat approximately 30% of all the patients attending a large inner city A&E department (Brebner, Ruddick-Bracken, Norman *et al.*, 1996), as this proportion of patients: 1) self-presented with a minor injury; 2) required either no investigations or only x-rays; 3) required only simple management; and, 4) were discharged home with no follow-up. If this could be generalised to the whole A&E patient population, nurses potentially could manage around 4.65 million patients every year. Nurses who have taken on the role and responsibility for managing many of these minor injury patients are often referred to as ‘emergency nurse practitioners’ or ENPs. These ENPs have expanded their role to include clinical assessment, diagnostic skills, and clinical management responsibilities, areas which were once considered the sole responsibility of medical practitioners (Walsh, 2001). This chapter describes the historical development of the ENP role; the major factors which have influenced the development of the role and critically evaluates, within a specific conceptual framework, selected published research related to the evaluation of the role.

2.2 Literature Search

The following databases were searched for this literature review: Medline (Index Medicus and the International Nursing Index) 1966–Jan 2003, the Cumulative Index of Nursing and Allied Health Literature (CINAHL) 1982–Jan 2003, British Nursing Index (BNI) 1994–Nov 2002, EMBASE (Excerpta Medica) 1980–2003 week 1, the ACP Journal club, Cochrane Database of Systematic Reviews and the Database of Abstracts of Reviews of Effectiveness. For details of the search strategies see Appendix I.

2.3 Definition of the Emergency Nurse Practitioner

There have been many attempts to define the role of the ‘emergency nurse practitioner’ or the ‘nurse practitioner in Accident and Emergency’. The latest proposed definition by the Royal College of Nursing’s (RCN) Emergency Nurse practitioner Network Group, states that an *‘Emergency Nurse practitioner is an experienced registered nurse who has undergone specific additional training. The ENP is competent in assessing patients with undifferentiated conditions which the patient may perceive to be an emergency; diagnosing, treating and discharging them home or to an alternative clinical pathway’* (Lipley, 2002). This definition highlights the ENP’s role in the complete management of a patient with an undiagnosed health-care problem and notes the ENP’s authority to discharge or refer that patient to another healthcare professional. The exact form or length of training is not prescribed in this definition, neither are the types of undiagnosed problems ENPs may manage, nor the clinical settings in which they are likely to practise.

At the present time there is no formal recognition of the ENP role in the UK by the statutory body for registering nurses: the Nursing and Midwifery Council (NMC). Currently, there are many definitions of what an ENP either is, or should be. Dolan (2000) defined an ENP as *‘a nurse working within an acute, emergency care setting who has undertaken a specific course of study to enable him or her to make professionally autonomous decisions for which he or she has sole responsibility, and who can assess, treat, refer and discharge patients without recourse to a medical practitioner’*. This definition does specify to some extent the types of clinical areas where ENPs might be found practising. These acute, emergency care settings are usually A&E or Minor Injuries Units (MIUs), and increasingly in the new NHS Walk-in Centres. Like the proposed RCN ENP Network Group’s definition, Dolan’s definition states that ENPs have undergone a ‘specific course of study’. However not all nurses

functioning in this role have undertaken specific training (Meek, Ruffles, Anderson *et al.*, 1995), so these definitions are closer to an aspiration of what an ENP should be.

Read *et al.* (1992) used a more inclusive definition. They defined an ENP as '*a nurse who is authorised to assess and treat patients attending an accident and emergency department, either as an alternative to the patient being seen by a doctor, or in the absence of a doctor in a department where a continuous medical presence is not maintained*'. They also note that '*some nurses function as nurse practitioners without actually holding the title*'. This definition would include nurses who function in the role of a nurse practitioner, but do not hold the title nor have any specific training. However, it does restrict ENPs to working within A&E departments. Other definitions exist (Royal College of Nursing, 1992; Walsh, 1995; Tye, Ross and Kerry, 1998), however all agree that ENPs are nurses who can independently assess, treat and discharge patients in emergency care settings.

Recently, the International Council of Nurses (ICN) arrived at an international definition of a generic nurse practitioner or 'advanced practice nurse'. This is '*a registered nurse who has acquired the expert knowledge base, complex decision making skills and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or country in which s/he is credentialed to practice. A Master's degree is recommended for entry*' (DeBack, 2002). At the present time, this definition appears more applicable to countries where nurse practitioners are formally recognised, and in particular the United States where most nurse practitioners have been prepared on Master's degree programmes (Curry, 1994; Winson and Fox, 1995; Cole, 2003) (see Section 2.4.4).

2.4 Historical Development

In the following subsection the historical development of the ENP role in the United Kingdom is explored, including the establishment of the role in A&E departments across the country. Later subsections examine the wider development of nurse practitioner roles both in the UK and the rest of the world.

2.4.1 Emergency nurse practitioners in the UK

Nurses have treated patients in many smaller A&E departments unofficially, for many years, using their clinical judgement whether to consult the doctor, send the patient to a

major A&E department or treat the patient (within locally agreed guidelines) therefore, functioning in essence as nurse practitioners (Jones, Hayward, Khaw *et al.*, 1986; Woolwich, 1992; Read and George, 1994). In 1986, the first officially recognised nurse-led minor injuries service was introduced for a trial period of three-months at Oldchurch Hospital, Essex (Ramsden, 1986; Head, 1988; Morris, Head and Holkar, 1989). This service was introduced following increased numbers of complaints received by the local Health Authority concerning waiting times and a suggestion by the local Community Health Council that 'some form of "vetting" process should be carried out, say by a nurse practitioner' (Head, 1988; Morris *et al.*, 1989).

This idea of a more formal nurse practitioner role was accepted by Morris *et al.* (1989) as not being new. It is likely that the idea originated from North America where the nurse practitioner role had been both pioneered and several early evaluations conducted (Sackett, Spitzer, Gent *et al.*, 1974; Spitzer, Sackett, Sibley *et al.*, 1974; Hoekelman, 1975; Burnip, Erickson, Barr *et al.*, 1976; Chambers and West, 1978). The Oldchurch ENP scheme was viewed locally as a great success and even had a visit by representatives from the Department of Health and Social Security (Head, 1988).

Over the next few years the idea that nurse practitioners in A&E could contribute to reducing waiting times and increasing patient satisfaction created considerable interest (Yates, 1987; Walsh, 1989; Booth, 1992; Burgess, 1992; Burgoyne, 1992; Woolwich, 1992). In the early 1990s, the National Audit Office reported that the number of people seeking medical attention in A&E departments every year was steadily growing and that experienced medical staff were often over-stretched (National Audit Office, 1992a). By 1996, the replacement body for the National Audit Office, the Audit Commission, was recommending the introduction of ENPs into A&E departments to assist by managing a proportion of the patients seeking care in A&E (Audit Commission, 1996).

In 1991, all A&E departments (major, minor and specialist) in England and Wales were surveyed by Read *et al.* (1992), with a response rate of 92% (n=465) (Table 2.1). Nurses were reported as working in nurse practitioner roles in as many as 40% (n=186) of these departments, however the vast majority (34%, n=159) were considered 'unofficial' schemes and only 6% (n=27) were 'official' schemes. 'Official' schemes were classified in this study as ones where the title 'nurse practitioner' was used to denote nurses working in this role and 'unofficial' schemes were ones where no title

was used. Most of the ‘official’ schemes were found in major A&E departments (20 out of 213 major departments) in contrast to ‘unofficial’ schemes most commonly being found in specialist (paediatric and ophthalmic) departments (12 out of 25 specialist departments).

Study & Country	Major Departments		Minor Departments		Specialist Departments (Ophthalmic and Paediatric)		All Departments	
	'Official'	'Unofficial'	'Official'	'Unofficial'	'Official'	'Unofficial'	'Official'	'Unofficial'
Read <i>et al.</i> (1992) England & Wales	9% [20 out of 213]	8% [16 out of 213]	1% [3 out of 227]	58% [131 out of 227]	16% [4 out of 25]	48% [12 out of 25]	6% [27 out of 465]	34% [159 out of 465]
	17% [36 out of 213]		59% [134 out of 227]		64% [16 out of 25]		40% [186 out of 465]	
Meet <i>et al.</i> (1995) England & Wales	24% [49 out of 202]	5% [11 out of 202]	11% [15 out of 140]	53% [74 out of 140]	NS	NS	19% [64 out of 342]	25% [85 out of 342]
	30% [60 out of 202]		64% [89 out of 140]		NS		44% [149 out of 342]	
Crimson (1995) England	NS	NS	NS	NS	NS	NS	NS	NS
	33% [54 out of 163]		NS		NS		NS	
Tye <i>et al.</i> (1998) England & Wales	39% [88 out of 223]	NS	NS	NS	NS	NS	NS	NS
Scotland	14% [5 out of 35]	NS	NS	NS	NS	NS	NS	NS
UK	36% [98 out of 274]	NS	NS	NS	NS	NS	NS	NS
	NS		NS		NS		NS	

NS=Not studied

Table 2.1: Percentage of major, minor and specialist A&E departments with ENPs from four surveys

In 1992, the regulatory body for nursing, at that time, the United Kingdom Central Council for Nursing, Midwifery and Health Visiting (UKCC), the predecessor of the NMC, launched a new ‘*Code of Professional Conduct*’ (UKCC, 1992a) and the ‘*Scope of Professional Practice*’ (UKCC, 1992b). The ‘*Scope of Professional Practice*’ in reality gave nurses ‘permission’ to expand and extend their role without the need to get certification for every new task. Individual nurses were encouraged to ensure they were competent to make appropriate decisions or to perform specific tasks to improve patient

care (UKCC, 1992b; 2000; Sbairh, 1995). At the same time, the Chief Nurses of the UK Health Departments withdrew previous guidance on certification for extended roles and requested, instead, that all nurses and managers act in accordance with this new document and the newly revised '*Code of Professional Conduct*' (Department of Health, 1992). With the '*Scope of Professional Practice*' and the change in guidance from the Chief Nursing Officers nurses had more freedom to expand their roles.

Two years later in 1994, a second survey was conducted (Meek *et al.*, 1995). This survey used the same definition of an ENP as used in the original survey by Read *et al.* (1992). Questionnaires were distributed to all major and minor A&E departments in England and Wales, and replies were obtained from 357 out of 465 departments (response rate 77%). Nurses were reported to be working in ENP roles in 44% of these departments (n=149). Thirty per cent of major departments reported that they utilised ENPs (60 out of 202 major departments) with the majority (82%) being 'official' schemes, whereas, a larger proportion (64%) of minor departments (89 out of 140) used ENPs, and where approximately only 17% were 'official'. Between these two surveys it appears that whilst the number of departments utilising ENPs had increased modestly, there had been greater movement from 'unofficial' services to 'official' ones (Table 2.1). This could be interpreted as a legitimising of the role. At approximately the same time, a different survey conducted by Crinson (1995) reported that 33% of the major A&E departments in England (54 of 163 departments who responded to the survey) had ENPs. There was no attempt to define an ENP for this survey, therefore, it is possible that this figure includes both 'official' and 'unofficial' schemes.

The most recent survey, conducted in 1996, Tye *et al.* (1998) surveyed only the larger departments across the whole of the UK, and defined an ENP service as '*a formally recognised clinical service provided within an A&E department by one or more designated qualified nurses, authorised to independently assess, treat and discharge predefined categories of patients*'. By this time the number of major A&E departments who provided an 'official' ENP service had increased to 36% (98 out of 274). In the future ENPs are likely to be providing a substantial part of the A&E service as reliance on SHOs decreases through the reduction in junior doctors' hours, as part of the European Working Time Directive (Council Directive 93/104/EC, 1993) and through Government plans to make greater use of non-physician personnel to deliver more care in the NHS (Department of Health, 2000b).

2.4.2 Nurse practitioners in the UK

Immediately prior to the first formal nurse practitioner role developing in A&E, the nurse practitioner role was being pioneered in the UK in general practice by Barbara Stilwell (Stilwell, 1982) who worked in two practices in Birmingham in the early 1980s, and Barbara Burke-Masters (Burke-Masters, 1986) who worked with homeless people in London. From these early days the nurse practitioner role has found its way into many other areas of nursing including specialist outpatient departments (e.g. ophthalmology, rheumatology and respiratory clinics) (Coopers and Lybrand, 1996), school nursing (Coopers and Lybrand, 1996), neonatology (Redshaw and Harvey, 2002), breast cancer screening (Chapman, Purushotham and Wishart, 2002), urology (Kilburn, 2002), endoscopy (Pathmakanthan, Murray, Heeley *et al.*, 2001), cardiology (Lloyd, Roberts, Bashir *et al.*, 2000), dermatology (Godsell, 1998) and pre-hospital care in a paramedic role (Walsh and Little, 2001). Nurse practitioner services have also developed in areas where no specific health-care services existed, for example, in services for the homeless, community pharmacy stores (Touche Ross, 1994) and health services for farmers (Walsh and Howkins, 2002). However, this last service has been withdrawn despite positive evaluation findings (Walsh, 2002).

Hundreds of new nursing roles have been introduced into the NHS within the last decade. A study (Exploring New Roles in Practice – ENRiP) which aimed to map new roles which have recently emerged for nurses and professions allied to medicine, was undertaken in five acute Hospital Trusts in each of the eight NHS regions in England (Read, 1998; Read, Jones, Collins *et al.*, 2001). The Trusts were chosen to provide a range of hospital-based organisations in a variety of locations and included Trusts in areas where there was a known problem with medical staff recruitment. Information on ‘new roles’ was sought through a number of methods, which began with personal approaches by the researchers to Trust executive board members and other senior staff. A database of ‘new roles’ was created. The criteria for inclusion were: 1) posts had to have been established for six months or more and were likely to continue; 2) post-holders had to possess a nationally registered qualification in a health care discipline, and 3) that they either were undertaking direct clinical work with patients that was considered beyond the generally accepted scope of their profession or work that was new to that professional group in the local context. The decision to enter a role onto the database lay with the manager responsible for that area of the Trust’s work. If the manager considered the role innovative for that unit the role was entered. This

database covered approximately 20% of the NHS in England, excluding midwifery and psychiatric units. A total of 838 'new roles' were identified, with the majority 603 (72%) belonging to the nursing profession. Only 39% of these 'new' nursing roles had been subjected to any form of evaluation. Ninety-four of the 'new' roles identified had the job title of nurse practitioner and only just over half (53%) of these had been evaluated. As local managers had discretion to enter a role onto the database, it is possible that some innovative roles may not have been included and other roles which may have been in existence in other Trusts for many years and therefore not newly innovative were included. Similar 'new roles' established in different Trusts at around the same time were entered separately. For example, the title 'Emergency Nurse Practitioner' appears on nine separate occasions (Exploring New Roles in Practice Project Team, 1997). The study does, however, highlight the rapid development and lack of evaluation of 'new roles' in the NHS.

2.4.3 The international development of nurse practitioners

Whilst formalised and officially recognised nurse practitioner services are relatively new to the UK, the role has had a much longer history in the USA. In the 1960s, scientific advances created the opportunity for specialisation and soon, in the USA, medical specialists outnumbered generalists by more than three to one (National Centre for Health Statistics, 1971). Doctors increasingly moved from working in general (family) practice to either working in specialist fields of primary care (for example, in paediatrics, internal medicine or obstetrics and gynaecology) or into hospital based medicine, causing a perceived shortage and maldistribution of physicians across the USA (Reedy, 1978). General (family) practice held little allure for doctors, as specialists were better paid and retained a higher degree of esteem from among their colleagues (Winson and Fox, 1995). The problem was most acute in the rural counties and inner-city areas. One method used to help reduce the problem was to exempt medical graduates from the military draft if they went to practise in under-doctored areas instead (Reedy, 1978), however, this alone was not sufficient to address the growing problem, further initiatives were needed.

The role of the physician's assistant was created and at approximately the same time the nurse practitioner role developed. In 1965, the first physician assistant programme was established at Duke University (Stead, 1967). The same year, the first paediatric nurse practitioners (PNPs) were trained at University of Colorado (Dunn, 1997). This nurse

practitioner programme was initially undertaken as a feasibility project to determine whether nurses could provide effective and more widely available health care for children (Mauksch, 1987).

Nurse practitioners in the USA are considered to be one of four types of 'advanced practice nurse'. The others are clinical nurse specialists (CNS), certified registered nurse anaesthetics and certified nurse midwives. In the UK, midwifery is now 'direct entry' and therefore candidates do not have to be registered nurses before training to become midwives. At present there are no nurse anaesthetists. There are, however, many CNSs. Read and Graves (1994) argued that many new roles in British nursing have developed along two broadly divided streams: a nurse practitioner stream and a clinical nurse specialist stream. Recent research in the USA which examined NP and CNS graduates over a 10-year period (1977–1987) found that the functions (and opinions) of the two groups were very similar (Elder and Bullough, 1990). The authors concluded that there were far more similarities between the two groups than the literature suggested, and raised the notion that these two roles were merging.

In Canada, the nurse practitioner role also began in the 1960s, primarily due to a shortage of GPs and the reluctance of health professionals to service certain areas (Pearson and Peels, 2002). A growing physician shortage was predicted and nurse practitioners were advocated as a potential solution. A number of extensive evaluations of the nurse practitioner role in urban practice settings were undertaken in the 1970s. The findings demonstrated that nurse practitioners were able to provide safe, cost effective care with high patient satisfaction (Spitzer *et al.*, 1974; Chambers and West, 1978). However, the predicted shortage did not occur. Political pressure had resulted in more medical school places being made available and new medical schools were founded. Major opposition from the Canadian Medical Association and a lack of full support from the nursing community meant that nurse practitioner movement in Canada nearly became extinct (Spitzer, 1984; Leon-Demare, Chalmers and Askin, 1999). Recently a growing renewed interest in the role has developed primarily due to new health-care reform (Leon-Demare *et al.*, 1999), and once again the role is developing.

In Australia, during 1992 early nurse practitioner projects in the state of New South Wales led to a formal accreditation process for nurse practitioners (Nurses Registration Board of New South Wales, 2002; Pearson and Peels, 2002). In 1998, the state of

Victoria launched its own Nurse Practitioner Project, followed by South Australia in 1999, and more recently, by the Northern Territory (Pearson and Peels, 2002).

As well as the USA, Canada, Australia and the UK, nurse practitioners or nurses working in nurse practitioner roles have begun to develop in other countries around the world including New Zealand (Geraghty, 2002; Harris, 2002; Trim, 2002), Thailand (Sindhu and Puttapitukpol, 2002), Ireland (Meagan, 1998; Doran, 2001), Sweden (Lindberg, Ahlner, Ekstrom *et al.*, 2002), South Africa (Geyer, Naude and Sithole, 2002), India (Khakha, 2001), Jamaica (Seivwright, 1982; Catlin, 1996), the Netherlands (Vrijhoef, Spreeuwenberg, Eijkelberg *et al.*, 2001) and Saudi Arabia (Aboul-Enein, 1999).

Since the early days of nurse practitioner development in North America and particularly in the USA, the nurse practitioner role has expanded from its origins in paediatrics and general practice into a much wider variety of specialties including acute care, gerontology, occupational health, and obstetrics and gynaecology (Winson and Fox, 1995) and emergency departments (Cole, Kuensting, Maclean *et al.*, 2002).

2.4.4 Emergency nurse practitioners in North America and around the world

The ENP role emerged in North America in the mid 1970s in response to an increased use of emergency departments (Geolet, 1975). This was partly a result of the decreased accessibility of medical care especially at night and weekends, caused by the lower numbers of GPs (Hayden, Davies and Clore, 1982).

In the late 1970s and early 1980s, the Robert Wood Johnson Foundation funded three-year demonstration ENP programmes in seven American states, however when the funding ran out, these programmes were often incorporated into other Master's level degrees (Curry, 1994). For a while no formal ENP programmes existed, until in 1994, a Master of Science degree for nurse practitioners in emergency and ambulatory care was started at the University of Texas Health Science Centre at Houston (Cole and Ramirez, 1997) and in 2001 an ENP programme opened at Loyola University in Chicago (Cole, 2003).

Most nurse practitioner programmes in America are now at Master's degree level (Curry, 1994; Winson and Fox, 1995; Cole, 2003). Whilst the above two Master's degree ENP programmes exist in the USA most American ENPs are educated on Adult or Family Nurse Practitioner programmes (Cole, Ramirez and Mickanin, 1998; Cole *et al.*, 2002). In 1980, the American Nurses Association formally defined the advanced practice role and established guidelines for education programmes for the preparation of nurse practitioners (American Nurses Association, 1980). A recent major survey in America (Running, Calder, Mustain *et al.*, 2000) estimated that there are 60,000 nurse practitioners in the USA and that 86% of these are graduates at either Bachelor's or Master's level.

ENPs are not as widespread in the USA as they are in the UK. In 1994, the American Academy of Nurse Practitioners tentatively estimated that only around 1% of all nurse practitioners in the USA practised in the emergency department setting equating to approximately 320 ENPs (Curry, 1994). This compares to approximately 627 full-time equivalent ENPs in the UK in 1996 (Tye *et al.*, 1998).

ENPs can now also be found in a growing number of other countries around the world Australia (Chang *et al.*, 1999), Ireland (Meagan, 1998), New Zealand (Geraghty, 2002) Canada (Drummond, 2003), and the Netherlands (Zeegers, H. 2003, Personal Communication).

2.4.5 Conclusion

The nurse practitioner role has become an internationally recognised nursing role. The role in A&E could be viewed as a legitimising of the often 'unofficial' practice which occurred in many A&E departments across the UK. The nurse practitioner role has been formally established in the USA for a longer period of time than most other countries including the UK, although the ENP role appears to be more widespread in the UK than it is in the USA.

2.5 Overview of Research on the Nurse Practitioner Role

In North America, particularly in the USA, a combination of a well-established research culture and a longer history of the nurse practitioner role, has produced a significant body of research evidence related to the role of the nurse practitioner. A large number of studies have attempted to evaluate the nurse practitioner, but many of these have various

methodological problems including; small sample sizes, lack of random assignment of patients, a lack of appropriate controls, and measurement of few outcome events (Kassirer, 1994).

2.5.1 Early North American research on the nurse practitioner role

Two of the first trials ever undertaken which also stand out for methodological rigor were known as the '*Burlington Randomised Controlled Trial*' (4,325 patients) (Sackett *et al.*, 1974; Spitzer *et al.*, 1974) and the '*St. John's Randomised Trial*' (868 families) (Chambers and West, 1978). Each trial randomised a family group, to either a nurse practitioner or GP for a one year period. Each study found no difference in the quality of care provided by nurse practitioners or by the general practitioners. Similarly, two randomised controlled trials comparing paediatric nurse practitioners with paediatricians conducted in the USA in the early 1970s, which together included a total of 1,398 babies, also found that the nurse practitioners provided well baby care to a similar standard as the paediatricians (Hoekelman, 1975; Burnip *et al.*, 1976).

In 1979, a descriptive review of ten years worth of research, that examined the quality of care provided by nurse practitioners or physician assistants compared to physicians was published (Sox, 1979). Fourteen studies relating to nurse practitioners were included in the review (a further seven studies related to physician assistants). A further 24 studies were excluded as they did not meet a minimum of seven of the methodological standards listed in Table 2.2. No study included in the review met all 11 standards.

Only seven of the 14 nurse practitioner studies involved random allocation of patients to providers. Study sizes ranged from 79 patients (Skinner and Kahn, 1972) to 4,325 patients (Sackett *et al.*, 1974; Spitzer *et al.*, 1974). All the studies were either based in primary care (e.g. general practice, student health centres or walk-in centres) or hospital outpatient clinics. The review examined broad measures of the process of health care, outcome of health care, patient satisfaction with care and how nurse practitioner decisions and conclusions compared with physicians. Only one nurse practitioner study in this review examined any process outcomes: the *Burlington Randomised Controlled Trial* (Sackett *et al.*, 1974; Spitzer *et al.*, 1974). Nine studies measured one or more outcomes of care. In eight of the studies (six of these randomised patients to providers), no systematic differences were found between patients managed by nurse practitioners

or physicians. In one study, physicians were found to be better at clinically diagnosing streptococcal pharyngitis than nurse practitioners (Merenstein and Rogers, 1974). Nine studies examined patient satisfaction with health care. In four studies (all with random patient allocation) patients managed by nurse practitioners reported higher levels of satisfaction. In four studies satisfaction was equal between patients who saw nurse practitioners or physicians, and in only one study patients were significantly less satisfied with ‘access’ related to waiting times to see the nurse practitioner (Linn, 1976). In two studies, patients saw both a nurse practitioner and a physician. In these studies agreement between the findings of each clinician was assessed, and in both no significant difference was identified between the two in triage (prioritisation for care) decisions (Russo, Gururaj, Bunye *et al.*, 1975) or treatment decisions for female urinary tract disorders (Greenfield, Friedland, Scifers *et al.*, 1974). Sox (1979) concluded that the office-based (outpatient) care provided by nurse practitioners was indistinguishable from physician care in the studies examined.

Methodological Standards
Random allocation of patients
Comparison of patients’ pre-treatment status
Description of patients who drop out of study
Calculation of probability that a true difference was missed
Size of patient groups
Dates of study
Description of patients
Numbers of providers described
Description of practice environment
Description of provider training
Duration of providers’ prior practice experience

Table 2.2: Methodological standards required by the review of nurse practitioner and physician assistant studies by Sox (1979)

In the mid 1980s, a report, produced by the Congressional Office of Technology Assessment (1986), analysed nurse practitioners and physician assistants from the point of view of cost savings to society. The report contained an extensive review of the literature and reached similar conclusions to Sox (1979) relating to the quality of care provided by nurse practitioners within their defined areas of competence. It also concluded that the existing data precluded a definitive cost-effectiveness analysis.

2.5.2 A meta-analysis of North American studies

The first meta-analysis of nurse practitioner studies was not conducted until the early 1990s. Brown and Grimes (1993; 1995) searched for published and unpublished North American studies. They used Medline, Dissertation Abstracts and contacted all National League of Nursing accredited Master's degree programmes in nursing and all schools of public health for relevant theses. They also requested unpublished data from 30 health care and professional organisations bibliographies. In all, more than 900 articles were collected, 210 contained data on nurse practitioner or nurse-midwives care. Only 38 nurse practitioner studies fulfilled the criteria for inclusion in their meta-analysis, and only 12 of these involved randomised research designs.

The inclusion criteria for this meta-analysis were: 1) an intervention provided by a nurse practitioner or a nurse practitioner-physician team; 2) data derived from patient care provided in the USA or Canada; 3) control group patient data derived from physician managed care; 4) a measure of outcome in terms of process of care or clinical outcomes; 5) an experimental or quasi-experimental research design was employed; and, 6) data was provided that permitted calculation of effect sizes and or the determination of direction of effects. One hundred and four nurse practitioner studies and 53 certified nurse-midwife studies were rejected as they did not meet these criteria. The majority of these studies were rejected because no physician provider controls were used.

The findings from this analysis showed that nurse practitioners practised primarily in community based or hospital based ambulatory care settings (e.g. outpatient clinics). Analysis of data from randomised studies demonstrated that patient compliance, a variable which included compliance with taking medications, keeping appointments and following recommended behavioural changes, showed a small but statistically significant difference indicating that nurse practitioner patients showed higher compliance ($p=0.01$). Statistical analysis of other variables measured demonstrated that nurse practitioners: 1) ordered more investigations ($p<0.0001$); 2) scored better than physicians on the 'resolution of pathological conditions' (which included improvements in diastolic blood pressure, blood sugar levels, symptom relief and resolution of otitis media) ($p=0.01$), and higher on patient satisfaction ($p<0.0001$); 3) nurse practitioners and physicians were equivalent on quality of care ($p=0.30$), prescription of drugs ($p=0.18$), functional status (e.g. mobility) ($p=0.60$), number of visits per patient ($p=0.78$) and patient use of the Emergency Department for additional or emergency

treatment ($p=0.52$). The authors concluded that for the outcomes measured in the included studies the nurse practitioners had patient outcomes equivalent to or slightly better than those of physicians (Brown and Grimes, 1993; 1995) supporting the findings from the earlier work by Sox (1979) and the conclusions drawn by the Office of Technology Assessment (1986).

2.5.3 A systematic review of nurse practitioner studies from around the world

Recently, a systematic review has been undertaken which includes studies conducted outside North America (Horrocks, Anderson and Salisbury, 2002). Searches of Medline, EMBASE, CINAHL, Science Citation Index, Database of abstracts of reviews of effectiveness, National Research Register, Cochrane controlled trials register and the specialist register of trials maintained by the Cochrane Effective Practice and Organisation of Care Group identified 119 potentially relevant papers, of which 35 reported a total of 34 trials which fulfilled the inclusion and exclusion criteria for the review. Thirteen of the studies identified had been previously included in the meta-analysis by Brown and Grimes (1993).

Of the 34 trials identified by Horrocks *et al.* (2002), 11 were randomised controlled trials and 23 observational studies. The selection of studies for their systematic review was limited to studies from developed countries (Europe, North America, Australasia, Israel, South Africa and Japan) to increase relevance to the UK health care system. Studies were also only included if they provided data on one or more of the following outcomes: patient satisfaction, health status, health service costs, or process of care measures (consultation length, number of prescriptions, investigations, referrals, admissions, return consultations, patient adherence or measures of quality of care).

Analysis of the data contained in these papers demonstrated that patients were more satisfied with the care provided by primary care nurse practitioners (standardised mean difference 0.27; 95% C.I. 0.07 to 0.47) in five trials which reported patient satisfaction using continuous data (e.g. a score of satisfaction was calculated for each group). Three studies reported patient satisfaction using dichotomous data (e.g. the proportion of each group who were satisfied or dissatisfied was reported), when this data were analysed no significant difference was found in patient satisfaction (all studies $n=3$, odds ratio 1.56; 95% C.I. 0.56 to 4.34; overall effect $z=0.85$, $p=0.4$). Consultations with nurse

practitioners were longer ($p < 0.001$), and nurse practitioners undertook significantly more investigations ($p = 0.03$). No difference was found between nurse practitioners and physicians in the number of prescriptions issued ($p = 0.80$), referrals made ($p = 0.4$) or the number of return consultations ($p = 0.60$). Whilst seven randomised controlled trials reported health status or quality of life outcomes, the results were not included in the meta-analysis because of the heterogeneity between measures and episode of care length. The authors also were unable to conduct a robust economic analysis as only five studies reported costs and all used different approaches to the valuing of resources and were all inadequately powered for economic analysis. The authors concluded that patients are at least as satisfied with the care at first point of contact with nurse practitioners as they are with that provided by physicians. They also concluded that although the quality of care and short term health outcomes appear to be equivalent to that of physicians, further research is needed to confirm that the nurse practitioner is safe in terms of detecting rare, but important health problems.

2.5.4 Overview of the research on the emergency nurse practitioner role

Compared to the research spanning three decades on nurse practitioners working in primary care and in selected hospital outpatient clinics, relatively little empirical research on ENPs had been conducted until the research described in this thesis had begun. The meta-analysis by Brown and Grimes (1993; 1995) included only one small study ($n = 62$) comparing an ENP with physicians (Powers, Jalowiec and Reichelt, 1984). The systematic review by Horrocks *et al.* (2002) included two: one conducted by Sakr *et al.* (1999) (see Section 2.12.2) and the one conducted as part of this thesis (see Chapter 7). Only one other randomised controlled trial has been conducted specifically comparing ENP-led care with physician-led care (Chang *et al.*, 1999) (see Section 2.12.1). Other experimental studies have compared ENPs with physicians and examined patient satisfaction (Powers *et al.*, 1984; Rhee and Dermeyer, 1995; Byrne, Richardson, Brunsdon *et al.*, 2000), ability to request x-rays (James and Pyrgos, 1989; Freij, Duffy, Hackett *et al.*, 1996; Mann, Grant, Guly *et al.*, 1998; Allerston and Justham, 2000), and the ability to interpret selected x-rays (Freij *et al.*, 1996; Meek, Ruffles, Anderson *et al.*, 1998; Overton-Brown and Anthony, 1998). Another study has examined the supply of medication to patients by ENPs (Marshall, Edwards and Lambert, 1997). In addition there have been a few large descriptive studies (see for example Touche Ross, 1994; Heaney and Paxton, 1997b; Macduff, West and Lawton, 1999). As the ENP does not

practise within a vacuum, but within a complex health-care system, it can be useful to use a theoretical model to help organise the evidence. Using a specific conceptual model, the Quality Health Outcomes Model, described in Section 2.7 each of these studies will be examined in more detail in Section 2.11

2.6 Conceptual Models of Health Care Quality

A conceptual model can provide a meaningful framework for interpreting research findings and may facilitate the production of new unanticipated areas for future study (Radwin and Fawcett, 2002). One model (Donabedian, 1966) has been used for assessing health-care quality for more than 30 years. The model has three major components:

- **Structure** – relates to the health-care facilities, resources and even geographical setting. It can relate to the availability of radiology services, educational preparation of nursing staff and fiscal resources to provide care.
- **Process** – concerns the way health care is delivered.
- **Outcome** – relates to the change in health status as a result of a health care intervention. This may relate to a single dimension such as change in blood pressure or may relate to multi-dimensional factors, for example, patient satisfaction.

Donabedian's model is essentially linear and assumes that structures may affect processes which in turn affect outcomes; it takes little account of how patient characteristics may influence processes or outcomes. Other models based on Donabedian's work have been developed. Iezzoni, Shwartz, Ash *et al.* (1994) suggested that certain patient characteristics such as the severity of illness would affect processes and eventual outcomes. Holzemer (1994) extended Donabedian's structure-process-outcome model by incorporating the client, provider and setting into an outcome model for health-care research. The Outcomes Model for Community Based Settings (Cohen, Saylor, Holzemer *et al.*, 2000), the Nursing Role Effectiveness Model (Irvine, Sidani and Hall, 1998) and a model for quality-of-care measurement developed by Kahn, Malin, Adams *et al.* (2002) are further examples of the adaptation of the structure-process-outcome model. Each of these models expanded the basic model by sub-

dividing each element. However, all are essentially linear and do not allow for the very dynamic nature of health care delivery which exists in the real world. For example, a patient may determine that their wound has healed and no longer requires the sutures, so they remove them early; therefore the outcome may be different from that initially anticipated by both parties. The final outcome may be determined by the patient’s interpretation and it may not matter that the professional consulted (a part of the healthcare system), used an appropriate suture material, skilfully closed the wound and advised them to have the sutures removed after a stated time. Similarly, if the sutures are left in for the appropriate length of time, but the GP’s surgery was closed on the day the sutures should have been removed, or no appointment was available, then the system may directly affect the outcome.

2.7 The Quality Health Outcomes Model

The Quality Health Outcomes Model (QHOM) is a newly proposed model which incorporates the structure-process-outcome framework into a dynamic model that recognises the influence that patients have on the system (or context in which care is provided), interventions and outcomes (Mitchell, Ferketich and Jennings, 1998) (Figure 2.1).

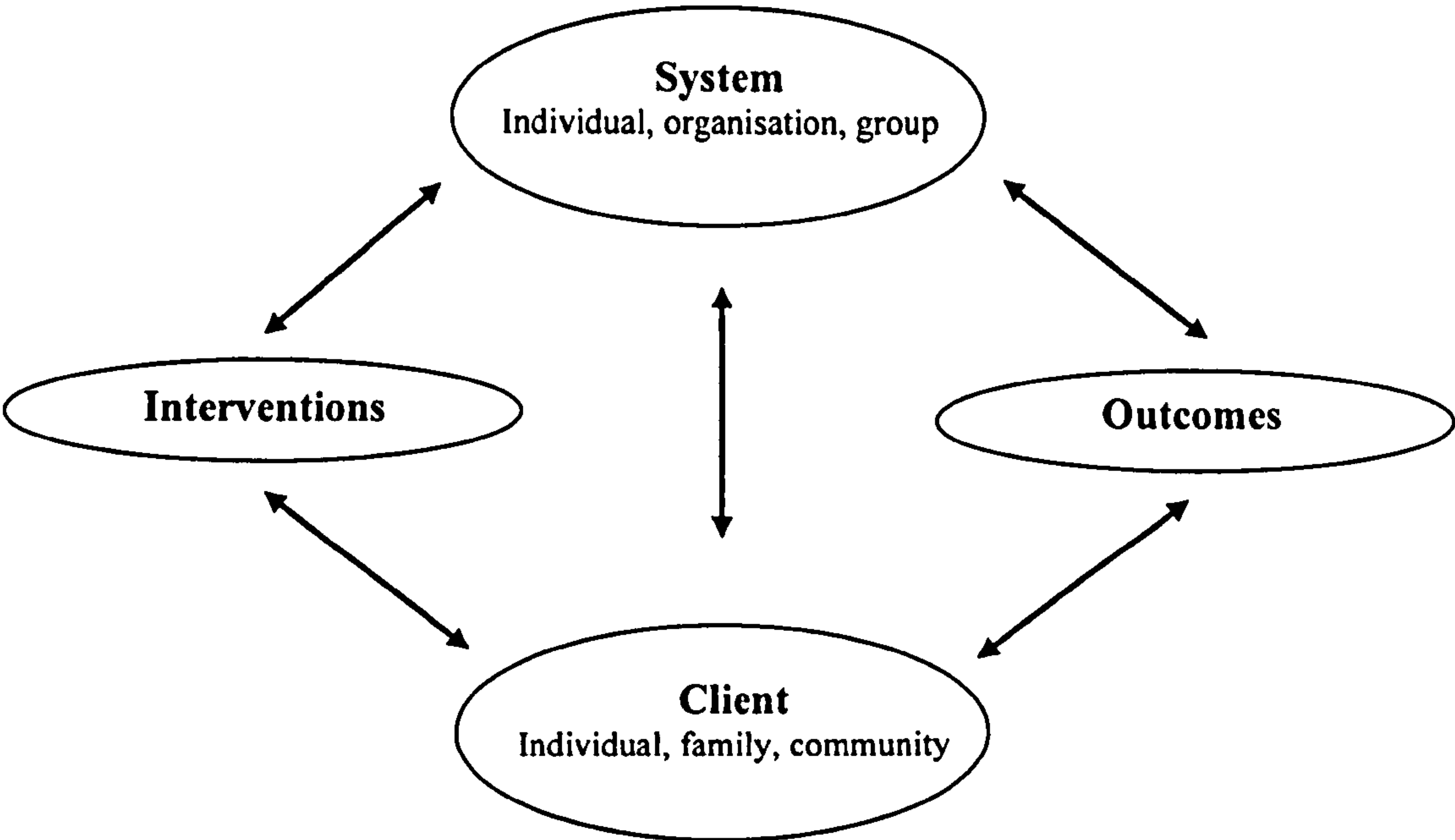


Figure 2.1: Quality Health Outcomes Model (Mitchell *et al.*, 1998 p.44)

One substantial difference with this model, compared to earlier models, is that there is no direct connection linking interventions and outcomes. The outcome of any intervention will be dependent on the client (or patient) and the health-care system to varying degrees. For example, how well a sutured wound heals will probably depend to an extent on client characteristics e.g. health status, compliance with treatment, and the nature of the wound, and also on the system e.g. the suturing skill of the clinician closing the wound, the quality of materials used, and for the patient to have access to an appropriate health-care service to remove the sutures at the optimal time. The model also suggests reciprocal directions of influence. These indicate that interventions both affect and are affected by the system and client characteristics in producing desired outcomes. Furthermore, the model demonstrates the complexity of health care and indicates the hypothesis that a single intervention does not act directly through either the system or the client alone. Therefore, the effect of an intervention is mediated by both client and system characteristics (Mitchell *et al.*, 1998).

The traditional structure and process elements are incorporated together in system characteristics. The system should be considered as an organised agency such as a hospital or health-care system. The size, skill mix of staff, available technology and funding are all structural elements that interact with treatment intervention processes to affect outcomes. This would include the type of A&E department, the staff and the facilities available (e.g. x-ray).

Interventions are clinical processes which may be either direct or indirect, and any related activities by which they are delivered. For example, the effectiveness of an intervention for an ankle sprain may depend both on the amount of encouragement patients are given to mobilise early and the locally advocated treatment for managing an acute ankle sprain (Eiff, Smith and Smith, 1994).

Outcomes will be directly affected by the characteristics of the patients (clients) to whom the interventions are applied. Several research studies have shown that it is necessary to adjust the variations in outcomes for differing states of patient health, demographics and a variety of disease risk factors. For example, older patients and those with a history of diabetes mellitus are more likely to develop wound infections than younger fit patients (Cruse and Foord, 1973; 1980; Hollander, Singer, Valentine *et al.*, 2001).

Patient outcome is an immensely complex construct. Traditionally, an outcome has been defined as the 'end result' of a process, treatment or intervention (Davies, Doyle, Lansky *et al.*, 1994). A more contemporary and broader definition defines an outcome as 'anything that happens to a patient associated with the health-care process' (Houston, 1996). Many definitions of 'outcomes' refer to an 'end result' or a 'change in patient status' (Marek, 1989), however, sometimes the desired outcome is not a 'change in patient status' but stabilisation and the use of the term 'end result' can be misleading as some outcome measurements may need to be conducted many times, as stages towards an ultimate end target. Perhaps a more appropriate definition of an outcome is 'a patient's, or community's, health status at a defined point after a health-care intervention' (Marek, 1997). However, with the move towards more patient-centred health care delivery, outcomes may also include non-health related measures (Scottish Executive, 1997).

Florence Nightingale was an early pioneer in the use of patient outcomes. Her use of mortality statistics to demonstrate the needless demise of soldiers in the Crimean War (Nightingale, 1858) is recognised as the first use of outcome measures in health care (Marek, 1997). Outcomes can be measured both directly and indirectly, and from different sources of information. They vary according to perspective, and have different degrees of reliability and validity (Bond and Thomas, 1991).

Outcomes have been categorised in many different ways. One traditional categorisation has been the 'five Ds' (Lohr, 1988): death, disease, disability, discomfort and dissatisfaction. All of which can be considered as negative outcomes. In the 1970s, Hover and Zimmer (1978), describe a quality assurance system they developed which classified outcomes into five categories: 1) knowledge of illness and its treatments; 2) skills; 3) knowledge of medications; 4) adaptive behaviours; and 5) health or physiological status. This classification was developed from the examination of 35 previously developed sets of criteria.

Another notable contribution to the development of nursing outcomes was the work of Horn and Swain (1987) who, using expert groups, identified 539 measurement items and categorised them into four domains: 1) requirements met (physiological); 2) knowledge; 3) skills and performance abilities; and, 4) motivation. Marek (1989) in a separate project classified existing outcomes identified from nursing literature and based

on the labels nurses use for outcome measures. A total of 15 categories were identified: physiological, psychological, functional, behavioural, knowledge, symptom control, home maintenance, well-being, goal attainment, patient satisfaction, safety, nursing diagnosis resolution, frequency of service, cost and re-hospitalisation. Marek (1989), however, did not claim that these categories are mutually exclusive or exhaustive, and warned that there was no consistent conceptual framework underlying this categorisation. Other classification systems related to rehabilitation potential (Daubert, 1979), community health nursing (Martin, Scheet, Crews *et al.*, 1986) and home health (Rinke, 1988) have also been developed.

The developers of the QHOM propose that outcome measures should be operationalised into five categories: 1) achievement of appropriate self-care; 2) demonstration of health promoting behaviours; 3) health-related quality of life; 4) perception of being well-cared-for; and 5) symptom management (Mitchell *et al.*, 1998). These are not all inclusive, and the developers have recognised that outcomes related to living, dying, clinical health status and health-care costs may be included in the future.

The majority of frameworks for categorising outcomes which have been described in the literature appear to have been derived from aggregating commonly measured outcomes into broad groups. To some extent any categorisation will be arbitrary as what constitutes an outcome is also arbitrary. Whilst it has been argued that categorising outcomes is an interesting intellectual occupation (Bond and Thomas, 1991), it is more important that outcome measures selected for a study address the study questions and meet the purposes of the study (Bond and Thomas, 1991; Roland and Torgerson, 1998). Using multiple outcomes in an individual trial can have statistical drawbacks. Increasing the number of measures in a trial increases the probability that one of them will reach statistical significance on the basis of chance alone (Roland and Torgerson, 1998).

In summary, any framework which categorises outcomes will to some extent be arbitrary. However, the use of a conceptual model can be a useful way to organise evidence and can assist with the clarification of a complex situation. The QHOM, is a dynamic model which recognises the influence of patients on any health-care system and was developed from the tried and tested structure-process-outcome framework (Donabedian, 1966). Evidence related to ENPs and the health-care system they practise

within will be examined using the framework of this model (system characteristics, interventions, client characteristics and outcomes).

2.8 System Characteristics of A&E Services

A&E departments manage major trauma, serious illnesses as well as less serious illness and minor injuries. A&E services vary considerably across the UK from the largest A&E department at the Queen's Medical Centre in Nottingham, a large university teaching hospital, which managed 142,947 new patients during 2001-2002 (Department of Health, 2002b) to the smallest department, situated in a tiny community hospital on the island of Barra off the west coast of Scotland which managed 92 new patients during the same year (ISD Scotland, 2002). Most large teaching hospitals and general hospitals have an attached general A&E department. There are also a small number of dedicated paediatric and ophthalmology A&E departments. Each general A&E department deals with approximately 50,000 patients per year, with larger teaching hospitals managing in excess of 90,000 (British Association for Accident & Emergency Medicine, 1996; McHugh and Driscoll, 1999). Across the whole of the UK approximately 15.5 million new patients are seen in A&E every year. A total of 12.8 million to 377 departments in England (Department of Health, 2002b), 1.3 million to 93 departments in Scotland (ISD Scotland, 2002), 0.8 million in Wales (Health Statistics and Analysis Unit, 2002) and 0.6 million in Northern Ireland (Department of Health Social Security and Public Safety, 2002).

In the UK, A&E service provision has changed considerably over the last fifty years. Prior to the 1960s most hospitals had a 'casualty'. This was an area of the hospital where acutely sick and injured patients were received and stabilised, as well as an area which saw members of the public who believed they had a problem which merited immediate medical attention (McHugh and Driscoll, 1999). The first major governmental review of casualty services, *The Platt Report*, was published in 1962 (Standing Medical Advisory Committee of Central Health Services Council, 1962), it reported the existence of nearly 800 'Casualty' departments in England and Wales. The report noted the difficulty in providing adequate, suitably experienced medical staff for this large number of departments, and the growing need for a service to deal with the seriously injured at any time of the day or night and in particular with the increased number of road traffic accidents occurring at that time. It was also noted that many patients attending these departments could have been appropriately managed by GPs.

The report made a couple of substantial recommendations: firstly, that the name 'Casualty' should be replaced by 'Accident and Emergency' to emphasise that these departments were not intended for casual attendance; and secondly, that the number of departments providing an A&E service should be greatly reduced and that each remaining department should be supported by adequate numbers of medical staff, including three consultant surgeons each devoting a substantial part of their time to A&E work. The Government adopted the report and used it as the basis of subsequent policy for two-tier provision of A&E services. This concentrated resources for accidents and emergencies in larger A&E departments and made separate provision, where necessary, for minor injuries and ailments (National Audit Office, 1992a).

In 1968, the Department of Health issued a circular which reported that 80% of new accident and emergency cases during 1965 had been dealt with in the 335 departments designed and equipped to manage A&E patients at any time of the day or night including patients with major injuries (Department of Health and Social Security, 1968). The remaining 20% of cases in England and Wales were managed in 548 hospitals without designated A&E units. These self-presenting 'casual' attendees at hospitals without A&E facilities were seen as a considerable problem. The circular recognised that patients would present at these hospitals 'despite publicity and information' to the contrary. The circular directed staff in these hospitals to render essential first aid and refer the patient to a GP or a designated A&E department. Only A&E departments were to have the authority to 'sort' casual attendees into those who need hospital care and those who do not. The circular made it explicit that the responsibility for 'sorting' patients who present at a hospital into those who need hospital care and those who do not, should only be decided by a registered medical practitioner and not by the nursing service.

A review by a committee of the British Medical Association (BMA) in 1970, concluded that the concept of consultant surgeons supervising A&E departments was not working well, because of their commitments outside the department, leading to nominal consultant cover, low standards of work and poor planning (British Medical Association, 1970). The following year, the BMA's Joint Consultants' Committee recommended the creation of a new grade of specialist consultant, the 'Consultant in Accident and Emergency Medicine' (Joint Consultants Committee, 1971). The speciality of Accident and Emergency Medicine was born.

The 'two-tier' A&E system described in the 1960s continues to the present day. An experiment with an alternative regional trauma centre system was piloted in the Trent region in the 1990s and found not to be cost effective (Nicholl, Turner and Dixon, 1995). In 2001–2002 there were 196 consultant led A&E departments providing a service with full resuscitation facilities in England, with a further 32 single speciality departments (providing paediatric or ophthalmology A&E services and usually consultant led) and 149 minor departments (Department of Health, 2003b). In Scotland in the same time period 2001–2002, the *Scottish Health Service Costs* book lists 92 hospitals which provided some form of A&E service (ISD Scotland, 2002). Whilst the hospital classification system is different, 33 departments were to be found in large general hospitals of the type likely to have consultant led A&E services, 3 were consultant led departments located in dedicated children's hospitals, and 56 in a range of smaller community hospitals where GPs often provide medical cover. The overall number of A&E departments continues to decrease as services are merged or re-designed as part of the Government's re-design of the health service (Scottish Executive, 1997; 2001c).

2.8.1 Consultant led A&E departments

Patients attend A&E departments with a huge variety of health-care problems, ranging from individuals with life-threatening injuries or illness to those with relatively trivial problems. Whilst large A&E departments are staffed and designed to manage serious life-threatening conditions, this makes up less than 0.5% of the workload, the bulk of the workload consists of minor trauma. For example, cuts, bruises, fractures, sprains and dislocations alone make up approximately 42% of the workload (Audit Commission, 1996).

A&E consultants have at least eight years of training following their medical degree, with a minimum of five years on a Higher Specialist Training programme for A&E as a Specialist Registrar (SpR) and will have successfully passed the exit examination to become a Fellow of the Faculty of Accident and Emergency Medicine (FFAEM) (McHugh and Driscoll, 1999). Whilst minor injury patients may be managed by A&E consultants or A&E SpRs most are managed by relatively inexperienced junior doctors (McHugh and Driscoll, 1999; Armon, Stephenson, Gabriel *et al.*, 2001; Wallis and Guly, 2001). These SHOs are usually in their first or second year post full registration with the General Medical Council (GMC). Medical practitioners undertake five years of

education at medical school to gain their Bachelor of Medicine and Surgery degree. This is followed by a one year pre-registration apprenticeship year in hospital as a pre-registration house officer (PRHO) (McHugh and Driscoll, 1999). This year often comprises of a six-month general medicine post and six-month general surgery post. After full registration with the GMC each medical practitioner must have at least two years of general professional training as a SHO. SHOs can choose from a wide variety of specialties including A&E. Generally, PRHOs are not allowed to work in A&E departments unsupervised, although a special dispensation from the Scottish Office in 1983 authorised PRHOs in a small number of hospitals in Scotland to work unsupervised (National Audit Office, 1992b).

There is no standard training programme to prepare junior doctors to work in the role of an A&E SHO. In a survey of SHOs in A&E departments in England and Wales, it was found that whilst most SHOs attended an A & E induction course at the beginning of their six-month post, the content of those various courses varied widely (Hormbrey, Todd, Mansfield *et al.*, 1996). Most SHOs also received regular weekly teaching, although many programmes were generally of less than three hour's duration (Hormbrey *et al.*, 1996).

New proposals from the UK Government suggest that the SHO grade will be radically reformed. A consultation paper from the Chief Medical Officer for England (*Donaldson Report*) (Department of Health, 2002c) proposes considerable changes to the SHO grade and training. It is planned that the pre-registration house officer year (PRHO) and the current first SHO year are integrated into a two-year 'foundation programme'. Following successful completion of this programme, doctors can progress into a 'basic specialist training programme' (a choice of one from eight: medicine in general, surgery in general, child health, general practice, obstetrics and gynaecology, mental health, anaesthetics and pathology in general). This programme would last between two and three years. After that, medical practitioners aiming to specialise in A&E medicine would enter the 'higher specialist training programme' for A&E and have a post of SpR. In the future A&E SHOs are likely to be in the second year of the two-year foundation programme (Department of Health, 2003d), and not be expected to provide the same level of service delivery as they do currently (Department of Health, 2000b).

Unlike in medicine, there had until recently, been no formal or national career structure for A&E nurses. There are, however, many educational and training opportunities for A&E nurses (Heys, 1999), these include specific short courses on A&E nursing, often based on the now defunct English National Board's (ENB) curriculum for A&E nursing (ENB199) (Wood, 1998). In addition there are a variety of A&E nursing diplomas (Heys, 1999), ENP courses (Marsden, 2003), and multi-disciplinary diplomas such as the Royal College of Surgeons of Edinburgh - Diploma in Immediate Medical Care (Dip IMC) (Mowat, 1999). There are also a myriad of short courses, some multidisciplinary and others tailor-made for nurses, these include, Advanced Trauma Life Support (ATLS), Trauma Nursing Core Course (TNCC), Advanced Paediatric Life Support (APLS), and Pre-Hospital Emergency Care (PHEC).

In 1997, Crouch and Jones (1997) outlined plans for a 'Faculty of Emergency Nursing', within the RCN, which would 'develop a national educational framework to facilitate career development at all levels within the specialty' of A&E nursing. The speciality of A&E nursing has been divided up into eight broad areas: 1) emergency care of the adult; 2) emergency care of the older person; 3) emergency care of the child and younger person; 4) emergency care of the person with minor injury/illness; 5) major trauma management; 6) care of the patient with psychological needs; 7) major incident planning; and, 8) pre-hospital care (Rowe and Crouch, 2003). A competency based framework has been developed around each of these broad areas. This new faculty, the first for the Royal College of Nursing, was officially launched at RCN congress in 2003 (Pantrini, Bethel and Payne, 2003). As membership grows it is envisaged that this new, innovative and more clearly defined A&E career pathway will become established.

The Audit Commission (1996; 2001) describes a major A&E department as one which receives '999' ambulances and offers the full range of accident and emergency care. This would include immediate resuscitation, co-ordination of a range of services for treating severe trauma, a diagnostic service, assessment and referral of patients who may require admission, and the definitive care of emergencies and minor injuries (Audit Commission, 1996). One of the biggest complaints about A&E departments is the length of time patients have to wait before being fully assessed. In the Audit Commission's report on A&E services in 2001, waiting times were found to have shortened in some departments, but in most the waiting times had increased since 1998 (Audit Commission, 2001). This was despite an increase in the number of doctors by

10% in the same time period. Most of the growth in numbers has been in the 'non-consultant career grades'. These are experienced doctors who are not training to become consultants. The number of SHOs or A&E nurses, who together provide the bulk of clinical care delivered in A&E, has barely changed (Audit Commission, 2001), which may explain, at least in part, why waiting times have not changed.

A&E departments are not stand-alone units. They require day and night access to a wide range of supporting services to assist with diagnosis, to offer specialist expertise and to assist with the initial care of the critically ill or injured (Audit Commission, 1996). No complete profile exists on the availability of supporting services, units or equipment in hospitals with major A&E departments. An insight into the facilities available can be found in a relatively old British Orthopaedic Association survey of 217 hospitals with major A&E departments: 99% had a 24-hour radiology service, 98% pathology (24-hour transfusion service), 94% an Intensive Therapy Unit (ITU), 51% Computerised Tomography (CT scanner), 15% cardiovascular surgery and 12% a neurosurgery speciality on site (British Orthopaedic Association, 1992). Smaller departments may not have the same range of services or staff available to larger departments.

2.8.2 Minor A&E services

In 1999, Cooke, Higgins and Bridge (2000; 2001) conducted a postal survey of minor injury services in the UK, which were not part of a full A&E department. For the purposes of this study they defined a minor injury service as any department in the *Directory of Emergency and Special Care Units* (CMA Medical Data, 1999), which described itself as a minor injury unit or any department described as an accident unit or casualty which was not led by an on-site consultant in A&E medicine. Questionnaires were sent to the nurse-in-charge of 309 services. Replies were received from 206 departments (67% response rate). The number of attendances was found to be highly variable. The median number of annual new attendances was 6,400 patients (range 40 - 61,000). The lead clinician was a GP in 67% of cases (n=137) and an A&E consultant in 22% (n=45). GPs were the main service provider in 49% of departments (n=99), other doctors in 15% (n=30) and ENPs in a further 27% (n=55). The main service provider in the remaining 9% of departments was not specified in the paper. Whether the non-consultant lead clinicians have access to clinical advice and support from A&E consultants was not examined in this study.

The nurses working in the minor injuries service were permanently based in the service in 50% of departments (n=101), available from the ward in 37% (n=76), rotated from the wards in 3% (n=6) or were based in the A&E department but also rotated to the wards in 4% of departments (n=8). X-ray facilities were available at 76% of units. This study provides an insight into minor injury services in the smaller hospital departments across the UK. Relying solely on data from the *Emergency and Special Care Units* (CMA Medical Data, 1999) may mean that some of the small departments were not included in the survey, as less than half of all the hospital departments providing some form of A&E service in Scotland are listed in this directory (see Section 4.4.3).

2.8.3 Emergency nurse practitioners in major and minor A&E departments

A number of studies (Read, Jones and Williams, 1992; Crinson, 1995; Meek *et al.*, 1995) have recorded an increase in ENP schemes in major departments (see Section 2.4.1). The most recent survey by Tye *et al.* (1998) examined only 'formal' ENP schemes in major A&E departments across the whole of the UK. In this survey, formal ENP services were identified in 36% of the departments who responded to the postal questionnaire (response rate 94%). Ninety-one (93%) of the departments in the UK who provided an ENP service employed ENPs who had received some form of education or training for the role. However, wide variations in preparation were found. The majority of departments (60%) provided training in-house. A third of departments 33% (n=30) had prepared their ENPs on a course from an external establishment. Frequent mention was made of specific short, unaccredited courses of one to two weeks' duration, offered by a core of Trusts with experience of running ENP services. This implied that 7% of major departments who provided a formally recognised service utilised ENPs with no formal educational preparation or training for the role. This represented a decrease on the 12% of major departments who reported nurses functioning as ENPs with no formal training identified in a survey (Meek *et al.*, 1995) conducted two years earlier.

Many of the injuries ENPs are able to manage require x-rays to assist with diagnosis. ENPs in the major departments were found to be able to request x-rays in 84% of departments (Tye, 1997), again an increase from 59% identified two years earlier by Meek *et al.* (1995). However Tye *et al.* (1998) report less than half (43%) of the departments which allowed their ENPs to request x-rays allowed the same ENPs to interpret them. Prescribing or more accurately supplying medications under local

protocol by ENPs also varied between different large departments. Tye *et al.* (1998) found that ENPs in two-thirds of services (68%) were able to supply from pharmacy and general sales list and in 54% of services ENPs were permitted to supply from an agreed list of prescription only medicines.

In different departments, ENPs may be deployed in a variety of ways to manage patients with minor injuries. Three operational models of ENP deployment in the major A&E departments were also identified. The most common model, found in 54% of major departments, was described as an 'integrated model', where the role of the ENP was combined with other nursing duties. A 'dedicated role' approach, where ENPs were permanently employed in that capacity and did not take on any other nursing duties, was identified in 27% of departments (but only in England) and a 'rotational approach' where the ENP only practised as an ENP when rostered to that role, after which they returned to their conventional nursing role occurred in 14% of departments. Five departments (5%) did not specify which approach they took.

The most common clinical pay grade for an ENP to be paid on, in the major departments was G-grade (Meek *et al.*, 1995; Tye *et al.*, 1998), in the minor departments the majority were on E-grade (Meek *et al.*, 1995).

Generally, less appears to be known about the ENP services in minor A&E departments. The most recent survey of ENP services to include minor departments was undertaken by Meek *et al.* (1995). They identified that 64% of minor A&E departments in England and Wales had some form of ENP service in 1994 (11% 'official' and 53% 'unofficial') (see Table 2.1). Little has been published on the ENP services in minor A&E departments in Scotland. Some information on 'official' ENP services in a few minor departments can be gleaned from published papers. Macduff, West, Lawton *et al.* (2001) reported on nine minor A&E departments in community hospitals in the Grampian region of Scotland. In these units, senior casualty nurses undertook a non-accredited 'short skills-based education programme' which enabled them to practise as 'official' ENPs. ENPs in these departments utilised 47 different flowchart protocols to provide care predominately for patients with minor injuries. Local GPs provided medical cover to the units and could be called in for advice or for patients whose injuries were not covered by protocols. Heaney and Paxton (1997a) reported on another 'official' ENP service in Edinburgh. ENPs in this nurse-led unit were the sole providers

of care to any patient who attended. Their locally developed collection of 54 clinical and 18 pharmaceutical protocols covered the majority of patients who attended the unit. Two-thirds of patients were discharged from the clinic and the remainder were referred to different clinicians. X-ray facilities were available and more than 10,000 per year were managed by these ENPs. Virtually nothing is known about 'unofficial' ENP services in Scotland.

2.8.4 Conclusion

As a result of UK government policy in the 1960s and 1970s two different types of A&E department in the UK have developed: major departments which are consultant-led and minor departments which may be led by a number of different types of clinician. The size, staffing levels and facilities vary widely between the two groups. Most minor injury patients are managed by relatively junior doctors (SHOs) and increasingly ENPs are practising in both types of department.

The training of ENPs, their deployment in departments, the facilities they have available or are authorised to use and even their pay grade appears to vary considerably between major departments. Little is known about the smaller departments and the provision of ENP services in Scotland.

2.9 Interventions

The most commonly managed injuries in A&E departments are minor injuries, which make up the 'bread and butter' of A&E work. Based on diagnostic coding of A&E records, cuts, sprains, fractures and dislocations accounted for a third (32%) of all attendances in the major departments visited by the Audit Commission (1996). Patients with minor injuries comprised between 85% and 90% of the attendances in minor injury units (Dolan and Dale, 1997; Heaney and Paxton, 1997a).

Between and even within departments there can be different opinions about the most effective method of treatment to manage a specific injury. Often there is relatively little empirical evidence to support one treatment modality over another in terms of long term outcomes. Literature searches were conducted on Medline, EMBASE and the Cochrane Database of Systematic Reviews to identify trials which compared different treatment modalities for a selection of common minor injuries: minor traumatic wounds, ankle

sprains, and two types of commonly managed minor fractures (fifth metacarpal fractures, base of fifth metatarsal fractures).

2.9.1 Closure of minor wounds

Several randomised controlled trials have been conducted which have compared two very different wound closure techniques: sutures and tissue adhesive (Quinn, Drzewiecki, Li *et al.*, 1993; Bruns, Simon, McLario *et al.*, 1996; Quinn, Wells, Sutcliffe *et al.*, 1997; Simon, McLario, Bruns *et al.*, 1997; Barnett, Jarman, Goodge *et al.*, 1998; Quinn, Wells, Sutcliffe *et al.*, 1998), and standard wound closure methods (sutures or staples) and tissue adhesives (Bruns, Robinson, Smith *et al.*, 1998; Singer, Hollander, Valentine *et al.*, 1998). The resulting longer-term cosmetic outcome has been assessed at varying times after initial closure (from three months to one year), and study sizes varied from 61 patients to 163. No statistical difference was found in the rating for cosmetic result between any of the techniques in any of the studies (Quinn *et al.*, 1993; Bruns *et al.*, 1996; Quinn *et al.*, 1997; Simon *et al.*, 1997; Barnett *et al.*, 1998; Bruns *et al.*, 1998; Quinn *et al.*, 1998; Singer *et al.*, 1998). No difference was found in time to healing (Quinn *et al.*, 1997) or in detected wound complications (e.g. infection rates) (Barnett *et al.*, 1998; Singer *et al.*, 1998).

Initial patient outcomes in terms of pain during the procedure were evaluated in four studies. In three of the studies, the patient (or their parents) assessment of pain was less with the tissue adhesive (Quinn *et al.*, 1993; Bruns *et al.*, 1996; Bruns *et al.*, 1998), and in one study no difference was seen in the child's interpretation of pain between the two procedures under test (Barnett *et al.*, 1998). Differences were detected in certain process outcomes for example the time to close the wound, where using a tissue adhesive was faster than suturing (Quinn *et al.*, 1993; Bruns *et al.*, 1996; Quinn *et al.*, 1997; Barnett *et al.*, 1998; Bruns *et al.*, 1998).

None of these trials managed to follow-up all the patients randomised into the study. Follow-up rates varied from a very respectable 94% at three-months (Singer *et al.*, 1998) to a relatively poor 43% at one year (Barnett *et al.*, 1998). Complications appear to be rare, but none of these studies were designed to be adequately powered to assess differences in complications.

No difference, in long term cosmetic results, has been reported for steri-strips versus tissue adhesives (Zempsky, Grem, Nichols *et al.*, 2001), and sutures versus staples (Brickman and Lambert, 1989). Other randomised controlled trials have not detected any significant differences in complication rates between sutures and staples (MacGregor, McCombe, King *et al.*, 1989; Ritchie and Rocke, 1989). Again, none of these studies were designed to be sufficiently powered to assess differences in complications.

2.9.2 Management of lateral ankle sprains

Injuries to the lateral ligament complex of the ankle are one of the most commonly managed problems in the A&E department (Stiell, Wells, Laupacis *et al.*, 1995). Functional treatments (e.g. treatments which involve early mobilisation) have been shown to have more favourable outcomes than immobilisation (Kerkhoffs, Rowe, Assendelft *et al.*, 2002). Twenty-one trials involving 2,184 participants were reviewed as part of a Cochrane Systematic Review of various treatment options for acute lateral ankle ligament injuries in adults. Statistically significant differences in favour of functional treatment were found for seven outcome measures: more patients returned to sport in the long term (relative risk 1.86; 95% C.I. 1.22 to 2.86); the time taken to return to sport was shorter (weighted mean difference 4.88 days; 95% C.I. 1.50 to 8.25); more patients had returned to work at short term (within six weeks) follow-up (relative risk 5.75; 95% C.I. 1.01 to 32.71); the time taken to return to work was shorter (weighted mean difference 8.23 days; 95% C.I. 6.31 to 10.16); fewer patients suffered from persistent swelling at short-term follow-up (relative risk 1.74; 95% C.I. 1.17 to 2.59); fewer patients suffered from objective instability as tested by stress x-ray (weighted mean difference 2.60; 95% C.I. 1.24 to 3.96); and patients treated functionally were more satisfied with their treatment (relative risk 1.83; 95% C.I. 1.09 to 3.07).

Mild (grade 1) and moderate (grade 2) lateral ligament ankle sprains are often managed functionally using an elasticated bandage (a double Tubigrip). One randomised controlled trial compared the management of grade 1 and 2 sprains with Tubigrip and without (Watts and Armstrong, 2001). Four hundred patients who attended one of the two A&E departments involved in the trial with a grade 1 or 2 ankle sprain were recruited into the trial and randomised to receive a double Tubigrip bandage or not. Analgesia and rehabilitation advice were standardised between the two groups by means of an advice sheet which described exercises and advised simple analgesia if necessary.

Patients were telephoned by a member of A&E reception staff one week after their attendance and a set of standardised questions asked. A sample size of 400 patients was calculated based on the assumption that grade 1 and 2 lateral ankle sprains take approximately 10 days to recover to a level where the patient can return to work. Two hundred patients were randomised into each group. Only approximately half the patients in each group were followed up (no Tubigrip, $n=92$; Tubigrip group, $n=105$), because A&E reception staff had difficulty contacting all the patients in the study by telephone. No significant difference was detected between the groups in terms of whether time was needed off work ($p=0.67$), the number of days off work ($p=0.94$), days until walking unaided ($p=0.23$), and whether patients were kept awake at night ($p=0.67$). The only difference found in this study was that patients given a double Tubigrip were more likely to report they had taken pain killers ($p=0.001$).

With just under 50% of the required patients followed up, the results in this trial run the risk of a type II error being introduced (i.e. the null hypothesis is not rejected even though it is false), as the power calculation required 400 patients. The study does, however, highlight the difficulty of trying to follow up A&E patients. Whether a dedicated researcher would be more likely to contact a higher proportion of patients than busy A&E reception staff is not known. Why patients were contacted after seven days rather than the estimated 10 days for recovery was not reported. The finding that patients treated with the double Tubigrip required significantly more analgesia for their sprains is a surprising finding and requires further investigation, especially as it has been claimed that a double Tubigrip bandage can provide an analgesic effect by providing counter-irritation to the skin (Tufft and Leaman, 1994). Watts and Armstrong (2001) question whether the increased need for analgesia may be due to the Tubigrip making patients more aware of their injury or whether it reflects a real effect that such bandages increase the discomfort particularly if not reapplied correctly, alternatively, it could be just a chance observation. A smaller, but non-randomised study involving 100 patients also found no difference either in inflammatory score or swelling between patients treated with Tubigrip and those managed without (Linde, Hvass, Jurgensen *et al.*, 1984).

A number of randomised controlled trials have sought to detect differences in outcomes for patients with ankle sprains following various physiotherapy interventions including diathermy (Pasila, Visuri and Sundholm, 1978), ultrasound (Williamson, George,

Simpson *et al.*, 1986; Nyanzi, Langridge, Heyworth *et al.*, 1999; Van Der Windt, Van Der Heijden, Van Den Berg *et al.*, 2002), 'wobble board' training (Wester, Jespersen, Nielsen *et al.*, 1996), compression pads and mobilisation (Karlsson, Eriksson and Sward, 1996), supervised physiotherapy sessions (Holme, Magnusson, Becher *et al.*, 1999) and passive manipulation (Green, Refshauge, Crosbie *et al.*, 2001). The trials varied in size from 41 patients to 572. Generally, no differences were detected in any of the longer term outcomes measured except in the trial which compared passive manipulation with rest, ice, compression and elevation versus rest, ice, compression and elevation alone (Green *et al.*, 2001). In this trial, patients in the passive physiotherapy group were likely to return to normal walking 1.5 days before patients in the control group, and likely to return to sport 1.2 days earlier. However, the clinical significance of such a relatively small improvement is unclear.

The other physiotherapy treatment modalities appear not to make a significant difference in any of the criteria measured: measurements of strength (recorded using a dynamometer) (Pasila *et al.*, 1978), range of movement (Pasila *et al.*, 1978; Nyanzi *et al.*, 1999; Van Der Windt *et al.*, 2002), swelling (Pasila *et al.*, 1978; Karlsson *et al.*, 1996; Wester *et al.*, 1996; Nyanzi *et al.*, 1999; Van Der Windt *et al.*, 2002), pain (Williamson *et al.*, 1986; Karlsson *et al.*, 1996; Green *et al.*, 2001; Van Der Windt *et al.*, 2002), activity (Karlsson *et al.*, 1996; Wester *et al.*, 1996), instability and stiffness (Karlsson *et al.*, 1996), weight-bearing (Wester *et al.*, 1996; Nyanzi *et al.*, 1999), isometric testing, postural control and position sense (Holme *et al.*, 1999), functional disability and general improvement (Van Der Windt *et al.*, 2002).

2.9.3 Management of minor fractures

Fifth metatarsal fractures commonly present to the A&E department and are often the consequence of an acute ankle injury (Greaves, Porter and Burke, 1997). Only one trial has been published which has compared the management of fractures to the base of fifth metatarsal using a short leg cast or a soft (Jones) bandage (Wiener, Linder and Giattini, 1997). Eighty-nine consecutive patients with an avulsion fracture of the base of the fifth metatarsal were randomised to be treated with a short leg cast or a soft bandage. There was no significant difference between the groups in time to bony healing or in the 'modified foot score' (based on pain, gait, function and walking distance). Whilst this study was designed as a randomised controlled trial, no sample size calculation had been performed; therefore, it is not known whether it was sufficiently powered to

identify differences in the modified foot score or time to bony healing. Also, a third of the participants dropped out of the study prior to final assessment at 12 weeks. However, patients managed in the soft bandage were found to return to full activity much earlier than those managed in the short leg cast (33 days vs. 46 days; $p < 0.05$).

Another commonly encountered fracture is a closed fracture of the fifth (or little finger) metacarpal, often called a 'Boxer's fracture'. A small number of randomised controlled trials have been undertaken comparing treatment modalities for managing different metacarpal fractures (Konradsen, Nielsen and Albrecht-Beste, 1990; Sorensen, Freund and Kejla, 1993; Braakman, Oderwald and Haentjens, 1998; Hansen and Hansen, 1998; Kuokkanen, Mulari-Keranen, Niskanen *et al.*, 1999). Generally these have compared various functional treatments (neighbour strapping, metacarpal braces and elastic bandages) against rigid plaster casts or splints. The trials varied in size from 29 to 133 patients with the average number being 80. Drop out rates varied from none (Konradsen *et al.*, 1990; Kuokkanen *et al.*, 1999) to only 4% (Braakman *et al.*, 1998), although in the study by Sorensen *et al.* (1993), 29% of patients failed to return for review at three months and instead were contacted by telephone. No sample size calculation was undertaken for any of these trials, so that any or all could be under powered. All treatment types appear to offer clinically acceptable results, however functional treatments appear to produce improved range of movement in early follow-up (Sorensen *et al.*, 1993; Braakman *et al.*, 1998; Hansen and Hansen, 1998; Kuokkanen *et al.*, 1999), which may account for an earlier return to work and less sick leave (Konradsen *et al.*, 1990). Mobility at three-month follow-up saw no difference between functional treatments and rigid splinting techniques (Konradsen *et al.*, 1990; Sorensen *et al.*, 1993; Kuokkanen *et al.*, 1999).

2.9.4 Conclusion

The most commonly detected differences between alternative treatment modalities for the minor injuries described here appears to relate to function and return to work or usual activities (e.g. sport); and these tend to relate to functional treatment options versus rigid immobilisation. Differences in longer term outcomes, such as different functional treatments in the case of fractures or sprains, and different wound closure techniques appear much more difficult to identify. This could result from; under-powered studies, insensitive outcome measures or because no significant differences truly exist. A second common difficulty faced was the problem of reviewing patients.

Drop out rates varied enormously from none in one of the small trials (n=29) examining the management of metacarpal fractures reviewed at six months, to over 50% in trials involving minor ankle sprains contacted by telephone at seven days (Watts and Armstrong, 2001) and likewise minor lacerations on children photographed for review at one year (Barnett *et al.*, 1998). Identifying sufficiently sensitive outcome measures and encouraging participants to remain in these types of clinical trial appears to be a challenge.

2.10 Client Characteristics

Studies of surgical wounds have suggested that an increased likelihood of wound infection and impaired wound healing is associated with factors such as extreme age (old and young), diabetes mellitus, chronic renal failure, obesity, malnutrition and the use of immunosuppressive medications such as corticosteroids and chemotherapeutic agents (Cruse and Foord, 1973; 1980). In a cross-sectional study of 5,521 patients (Hollander *et al.*, 2001) with traumatic lacerations, conducted over a four-year period, an increased likelihood of infection was associated with age (adjusted odds ratio 6.7; 95% C.I. 1.7 to 26.4), history of diabetes mellitus (adjusted odds ratio 6.7; 95% C.I. 1.7 to 26.4), laceration width (adjusted odds ratio 1.05 per mm; 95% C.I. 1.02 to 1.08), and presence of foreign body (adjusted odds ratio 2.6; 95% C.I. 1.3 to 5.2). The overall wound infection rate was 3.5%. Healing can also be impaired by other factors including inherited and acquired connective tissue disorders, such as Ehlers-Danlos syndrome, Marfan's syndrome, osteogenesis imperfecta, and protein and vitamin C deficiencies (Singer, Hollander and Quinn, 1997).

2.10.1 Seeking medical attention

For some injuries and conditions it is more important for a patient to present earlier than others. Wounds which are not closed within 19 hours of injury are significantly more likely to have a poorer healing rate ($p < 0.01$) (Berk, Osbourne and Taylor, 1988). Wounds which are at a higher risk of infection should be closed earlier, probably within six hours (Singer *et al.*, 1997). Whereas, the long term outcome of a mild ankle sprain is unlikely to be affected by presenting late or not at all (see Section 2.9.2).

Thirty per cent of patients attend an A&E department more than 24 hours after their accident or the onset of symptoms (Walsh, 1990). Safer, Tharps, Jackson *et al.* (1979) examined the attendance delays of 93 patients with predominately non-traumatic

conditions attending at clinics in a major, inner-city hospital in the USA. They suggest that the delay times of patients can be divided into three phases: 1) appraisal time (the time between first becoming aware of a symptom and deciding it signified a health problem); 2) illness delay (the time between deciding that there is a health problem and the need to see a doctor); and, 3) utilisation delay (the time between deciding to see a doctor and attending). Using these three phases, Walsh (1993a) interviewed a sample of 200 patients (100 male and 100 female) aged between 16 and 60 attending a minor injuries section of a large inner city A&E department. Only two patients refused to be interviewed. Walsh (1993a) found that the combined illness and utilisation times for minor trauma and non-trauma patients was significantly different with non-trauma patients taking longer to decide they need to see a doctor and, once that decision was made, longer to attend A&E. Walsh (1993a) found that patients with a wound decided they needed to seek attention quicker and attended sooner than those with closed injuries ($p < 0.001$).

The relative wealth of an individual is likely to affect the transport options open to them to convey them to A&E. Walsh (1993a) found the mode of transport also exerted a significant effect on the utilisation time. Twenty-eight per cent of the patients in this study walked or used public transport which took a median time of 2.55 hours. Of the remainder, 65% came by private transport, 5% used a taxi and 2% arrived by ambulance. Their mean utilisation time was 1.2 hours ($p < 0.05$). No significant difference was found between the utilisation times of patients who had to make special arrangements before they attended A&E (e.g. child care etc.) and those who did not.

2.10.2 Patients' expectations

Patients' expectations might also have an effect on outcomes. In studies of diabetic patients, it was found that expectations which were met correlated with patients complying with treatment regimens (McCaul, Glagsow and Schafer, 1987; Boykin, 1996). However, patients with minor injuries are not always good at predicting the treatment they require, which makes it more difficult for expectations to be met. In a second study by Walsh (1993b), the same sample of 200 patients were asked about how they thought their injury or problem would be treated. The prediction by each patient was then compared with the A & E clinical documentation following the consultation. One hundred patients (50%) thought they would be x-rayed and just under half of these were correct (48%). Conversely, of the patients who did not mention x-ray

investigations, 16% did have an x-ray. Twenty-two patients thought they would need a plaster of Paris cast, but only 4 (18%) actually did. Nineteen patients thought their problem would need surgery or manipulation and a third (32%) were correct. Forty-four patients predicted they would be prescribed medication 43% were correct, while 52% of the 46 patients who thought they would require a sling or support bandage were correct. The best predictions came from patients who expected wound closure with sutures or steri-strips, 71% of these 35 patients were correct.

2.10.3 Compliance with agreed treatment

Non-compliance has been identified as a major public health problem imposing a considerable financial burden upon health-care systems (Morris and Schulz, 1992; Donovan, 1995; Vermeire, Hearnshaw, Van Royen *et al.*, 2001). Poor compliance can have a major impact on clinical outcome (Melnikow and Kiefe, 1994). For example, the wound infection rate is likely to be higher in patients who do not take the correct dosage of antibiotics, at the correct time for whatever reason (Madsen, Neumann and Andersen, 1996), although this same trial highlighted the fact that some antibiotics can cause gastro-intestinal upset which may have an effect on compliance. Rates of medication compliance have been variously estimated at between 10% and 90% and depend on many factors, including the enthusiasm of the doctor, the disease being treated, and the patient's perception of the importance of the disease (Madsen *et al.*, 1996). Compliance with other treatment regimens for certain minor injuries may be of less importance, for example, where the standard treatment and no treatment appear to have little effect on long term outcomes in grade 1 and grade 2 ankle sprains (Watts and Armstrong, 2001) (see Section 2.9.2).

Since the 1970s there have been a large number of studies, of varying quality, conducted which have in part examined patient compliance. Since 1975, more than 200 variables have been studied (Vermeire *et al.*, 2001), these have included disease variables, demographic variables, social factors, patient beliefs and various communication factors. However, none of the variables can be considered as consistently predicting compliance: neither can socio-economic or pathology related factors (Donovan and Blake, 1992; Donovan, 1995; Haynes, McDonald, Garg *et al.*, 2003). One of the earliest trials examining compliance showed that doctors could not predict their patients' compliance more accurately than chance (Caron and Roth, 1968).

Non-compliance with scheduled appointments can create problems for health-care delivery and may also have a detrimental effect on health outcomes. Patient factors which have been investigated and have been shown to improve compliance with appointments include: older age, higher educational levels, higher socioeconomic status, married, retired, patient and provider speaking the same language, continuity of care, patient-initiated appointments, patient satisfaction, shorter intervals between referral and appointment, shorter clinic waiting and pre-payment/third party payment (Vermeire *et al.*, 2001). Postal and telephone reminder (odds ratio 2.2; 95% C.I. 1.7 to 2.9 and odds ratio 2.9; 95% C.I. 1.9 to 4.3 respectively), an 'orientation statement' explaining the reason for an appointment and how the clinic was organised (odds ratio 2.9; 95% C.I. 1.5 to 5.6), 'contracting' with the patient (odds ratio 1.9; 95% C.I. 1.04 to 3.5), and prompts from physicians (odds ratio 1.6; 95% C.I. 1.4 to 2.0) all appear to have a positive effect on reducing missed appointments, and are possible methods of improving compliance (Macharia, Leon, Rowe *et al.*, 1992).

One of the most commonly advocated ways to improve compliance is to improve the doctor-patient (or nurse practitioner-patient) relationship (Donovan, 1995). Different aspects of this relationship have been suggested as being conducive to improving compliance: the doctors' friendliness and approachability, encouraging doctor-patient co-operation, the enhancement of patient-centeredness, the improvement of doctors' teaching skills, taking into account spiritual and psychological dimensions which are of primary importance to patients, and the accurate recognition of the patient's problem by the doctor (Donovan, 1995).

2.10.4 Conclusion

Patients' underlying medical conditions, age, and expectations may all play a part in determining the eventual outcome of their treatment, as well as compliance with prescribed treatment and medication regimens. It is therefore important that any evaluation process which compares different treatment options, or examines the care provided by different clinician groups to minor injury patients should ensure random allocation of patients to treatment groups, wherever it is feasible to do so.

2.11 Outcomes

According to the QHOM (see Figure 2.1), outcomes can either be directly related to the system (process outcomes) or to the client (patient outcomes). Evaluations of nurse

practitioner studies have tended to measure process outcomes. This may be because process outcomes are generally easier to measure, alternatively, it could be related to the main reasons that nurse practitioners have been introduced into the health service, i.e. to improve certain process outcomes such as waiting times (Head, 1988; Burgess, 1992; Burgoyne, 1992; National Audit Office, 1992a; Woolwich, 1992). This section will examine the literature on ENP evaluations concentrating on studies which have compared the existing service provision by medical staff with ENPs.

There are a multitude of different process outcomes which could be and have been measured to evaluate ENPs with existing service delivery. The following sections will examine many of these in more detail, in the order that a patient, progressing through an A&E department, may experience them. Commonly measured process outcomes such as waiting times and consultation length will be examined first (see Sections 2.11.1 - 10), outcomes which have a greater patient focus will be explored in later sections (see Sections 2.11.11 - 14).

2.11.1 Waiting times

One of the most commonly cited reasons, for the introduction of nurse practitioners into the emergency department has been to help reduce waiting times (Crinson, 1995; Neades, 1997). However very few studies have examined this variable in spite of a large number of authors reporting that one of the perceived benefits of ENPs is a reduction in waiting times for patients (Head, 1988; Burgess, 1992; Tye and Ross, 2000).

Waiting times in A&E vary enormously from one department to another (Audit Commission, 2001). Waiting times depend on: 1) the number and medical priority of patients in the department at any moment in time; 2) the staffing resources (medical and nursing) to care for those patients; 3) the physical layout of the department in terms of space available to examine patients; 4) availability of support services (laboratory and radiology); and, 5) the availability of beds within the rest of the hospital (Audit Commission, 2001). If beds are not available in the rest of the hospital for patients awaiting admission, then the A & E department often can end up becoming a holding area. These patients are usually resource intensive, as they require nursing staff to monitor and care for them, trolleys to wait on and cubicles to wait in (or corridor space). All of these factors have an impact on waiting times, and in particular the lowest medical priority patients – the minor injuries – wait the longest.

In 2000, only 57% of all A&E patients attending major A&E departments in England and Wales were seen by a doctor or nurse practitioner within one hour of arrival (Audit Commission, 2001). In the same year, in Scotland, the median time to wait to see a doctor was 28 minutes for a 'trolley case' and 40 minutes for the 'walking wounded' (ISD Scotland, 2001b), however, times varied from one department to the next.

No studies have rigorously examined the impact ENPs might have on waiting times. Burgess (1992) estimated that there was a reduction in waiting time of 50% when an ENP was on duty. Heaney and Paxton (1997a) have demonstrated that a suitably staffed nurse-led minor injuries clinic, in Edinburgh, was capable of minimising waiting times for patients with minor injuries. Over the two-year period of their evaluation the average waiting time for patients was only eight minutes. This figure is slightly misleading as 18% of the patients seen during this period had to be referred to the local A&E department for assessment, as the ENPs at the nurse-led unit were not able to treat patients with injuries which were not covered by protocols. This group of referred patients had to travel across the city centre to the main A&E department where they would be triaged and wait a further amount of time to be seen by a doctor. As part of this study, the attendance figures at the local A&E department after the nurse-led unit opened were compared with the same months the previous year. Overall, 'walking wounded' attendances at the local A&E department dropped by 5% (equating to 629 patients over a three-month period, the equivalent of just under seven patients a day), which, provided resources were not changed, should have had an impact on waiting times for other A&E patients. An examination of official government statistics suggests only a small improvement in waiting times for all A&E patients. The month the nurse-led unit opened (November 1994) the percentage of 'walking wounded' patients who saw a doctor within 90 minutes at that local A&E department was 68%, the same month one year later this had improved only slightly to 69% (ISD Scotland, 1998). Similar numbers of patients were seen during both these surveys (n=1607 and n=1682). However, as this department manages approximately 91,000 new patients per year (ISD Scotland, 1997; 2001a; 2002) which equates to 250 patients per day, it is perhaps understandable why the reduction of approximately seven patients per day appears to have made only a small impact on their waiting times for 'walking wounded' patients.

2.11.2 Consultation length

Tham, Richmond and Evans (1995) conducted an observational study of SHOs daytime work activities at a large inner-city A&E department in Wales (Cardiff Royal Infirmary). A total of 96.1 working hours were observed and recorded by one observer, over a four week period after the SHOs had been in post for five months. The majority of patients seen by the SHOs were walking wounded patients (57%). On average it took an SHO 10.4 minutes to assess each of these patients. The paper does not specify, but in UK A&E departments it is normal practice for A&E nurses to call patients into rooms, prepare them for the reviewing doctor, and then conduct any prescribed treatments afterwards which may include time consuming treatments such as suturing and plastering. It is therefore likely that the figure of 10.4 minutes relates predominately to the consultation required for the doctor to make a diagnosis and formulate a treatment plan. It should also be noted that the SHOs in this study were probably at about their most experienced being in the fifth month of a six-month post. SHOs earlier in their post might be expected to take longer.

Heaney and Paxton (1997a) in their evaluation of Edinburgh's Western General Hospital nurse-led minor injuries unit measured the length of time it took an ENP to completely manage a patient's whole care episode, which on average was 28 minutes. There was no comparison with medical staff as none work there. In a separate evaluation of 20 nurse practitioner pilot sites, which included four A&E departments (two general, one paediatric and one ophthalmic), the management consultancy Touche Ross (1994) found that between 48% and 70% of ENPs consultations took longer than 15 minutes.

Medical practitioners and ENPs were compared in a randomised controlled trial of SHOs and ENPs (Sakr *et al.*, 1999), which will be discussed in more detail in Section 2.12.2. As part of this trial both SHOs and ENPs were observed whilst they took a history, examined the patient, interpreted any x-rays and recorded their findings for 94 patients (ENP n=46, SHO n=48). Both experienced and new junior doctors (SHOs) were observed. The junior doctors had shorter consultations than ENPs. On average the ENPs took 10.89 minutes and the SHOs 9.02 minutes ($p=0.04$). Whilst SHOs might be faster than ENPs at history taking, examination and documentation, it is not clear whether one person (e.g. an ENP) is faster at managing a patient's complete care episode than an SHO and nurse working together.

This difference in consultation times between ENPs and doctors is supported by further evidence from a systematic review of RCTs and prospective observational studies comparing nurse practitioners with doctors (Horrocks *et al.*, 2002). This review identified five studies which contained data on consultation length. Combined, these studies involved 4,563 patients (2277 NPs; 2286 Drs), the mean consultation time for a nurse practitioner was 14.89 minutes and 11.14 minutes for a doctor ($p < 0.001$). Prescott and Driscoll (1980) argue that spending more time-per-patient could be interpreted as a sign of high quality or that it could represent reduced efficiency, insecurity or incompetence on the part of the practitioner. Therefore, consultation times should be interpreted with caution.

2.11.3 Ability to request appropriate radiographs

Radiography is an important tool in managing many minor injuries. Thurston and Field (1996) conducted a multi-centre randomised trial that compared the levels of peripheral limb x-ray requesting by experienced A&E nurses (not ENPs) who had had local training on x-ray requesting and A&E medical staff. In total, 1,833 patients were recruited into this four centre study. Overall, nurses referred 4% more patients for x-ray than medical staff ($p = 0.05$). Although in one of the four departments the nurses actually requested 8% less.

Other studies have compared the number of x-rays requested by ENPs and A&E SHOs (Freij *et al.*, 1996; Mann *et al.*, 1998; Allerston and Justham, 2000). Allerston and Justman (2000) undertook a retrospective review of patients who had been initially assessed for x-ray by either an ENP or a medical practitioner for a recent ankle injury. The ENPs assessed 187 patients and medical staff 158. ENPs requested x-rays on fewer patients (62%) than the medical practitioners (80%) ($p < 0.001$). A number of patients initially assessed by ENPs (x-ray triaged) were later seen by medical staff. Four of these patients were later sent for x-ray and found to have a fracture. No patients in either group re-attended the department within two months which the authors felt suggested that no further fractures were missed. These results have to be interpreted with caution as the two groups may have been different, as there was no random allocation of patients to treatment groups in this study. It is possible that ENPs selected the more straightforward cases to see, and this may account for a reduced need to x-ray. Secondly, it is also possible that the ENPs may have had a higher threshold to x-ray in patients they were triaging as opposed to when they were responsible for the complete

management of a patient's care. However, this is not supported by evidence from the Thurston and Field trial (1996). In a larger study conducted by Mann *et al.* (1998) ENPs triaged 1,365 recent ankle injuries for x-ray using the decision making Ottawa Ankle Rules (Stiell, Greenberg, McKnight *et al.*, 1993). When 698 patients were assessed by doctors not trained in the use of these decision making rules a much higher proportion of patients were x-rayed (91%) ($p < 0.05$). However, no significant difference was detected between these two groups in terms of the proportion of patients deemed to require x-ray examination when doctors used the same decision making rules on a further 700 patients (NPs 73%, Drs 74%; $p > 0.05$). Both these studies only investigated ankle injuries, which are relatively straightforward to examine.

Freij *et al.* (1996) designed a study to compare the appropriateness of ENP and SHO decisions to x-ray distal limbs and their ability to interpret those x-rays. The ENPs worked in a nurse-led minor injuries unit (MIU) and the SHOs worked in a nearby A&E department. The clinical notes of 150 patients in the MIU were randomly selected and fifty A&E records of patients with injuries to similar areas as the MIU patients were randomly selected from the first, second and third two-month periods of the SHO's six-month appointment. Records were photocopied and were reviewed by three assessors who were blind to whether it was an ENP or SHO who saw the patient. The assessors were an A&E consultant, a registrar and an ENP. X-ray requests were deemed to be appropriate or inappropriate on the basis of recorded clinical information, regardless of the final x-ray result, making the assumption that all relevant clinical information was recorded equally well by ENPs and SHOs. X-ray interpretation was assessed, by comparing the ENP or SHOs decision with a consultant radiologist's reporting of the x-ray. ENPs requested x-rays on 71% of their patients and SHOs on 83%. There was no significant difference between the two groups in terms of correctly deciding whether to request an x-ray or not ($p > 0.05$). Whilst the ability to appropriately request an x-ray is important, it is also important that the clinician who requested the investigation originally can correctly interpret the films.

2.11.4 Ability to interpret radiographs

Data from a number of studies suggests that experienced ENPs appear to be at least as good as A&E SHOs in interpreting distal limb x-ray films. As part of the study by Freij *et al.* (1996) the ability of ENPs and SHOs to interpret distal limb x-rays was examined.

The sensitivity¹ of the ENPs' radiological interpretation was 93.9% (31/33; 95% C.I. 79.8% to 99.3%) and that of the SHOs was 93.2% (41/44; 95% C.I. 81.3% to 98.6%). Specificity² was 93.2% for the ENP (68/73; 95% C.I. 84.7% to 97.7%) and 92.5% (74/80; 95% C.I. 94.4% to 97.2%) for A&E SHOs. Similar levels of sensitivity (96%, 89/93) and specificity (87%, 181/207) were identified in a study by Bengner (2002), for emergency nurses working in a remote unit following a short period of training.

Meek *et al.* (1998) conducted a multi-centre study comparing ENP's ability to interpret x-rays with SHO's. The study was conducted in 13 A&E departments or MIUs. A total of 43 experienced SHOs (i.e. in their 6th month), 41 inexperienced SHOs (i.e. in their 1st or 2nd month) and 58 ENPs were shown 20 x-rays of distal limbs with a brief history and examination findings, and asked to record their interpretation. No indication of the experience of the ENPs was given. The ENPs performed significantly better than the inexperienced SHO group, whilst the experienced SHO group performed better than the ENPs, however the difference was not significant. The authors conclude that ENPs were able to interpret x-rays to a standard equal to SHOs with 3-5 months' experience, and ENPs actively interpreting x-rays as part of their role in MIUs are able to interpret x-rays to the same standard as SHOs with more than 5 months' experience. However, the researchers warned that training for ENPs and doctors in x-ray interpretation was inadequate and both should perform better with improved training.

Overton-Brown and Anthony (1998) examined seven ENPs, seven experienced SHOs (in their 5th or 6th month in post) and seven inexperienced SHOs (at the start of their six-month post). Each clinician was given 50 x-rays (with case histories) to view and asked to rate on a five-point confidence scale whether the x-rays were definitely normal to definitely abnormal. Comparing the ENPs with the two groups of SHOs together, no statistical differences were seen with respect to sensitivity or specificity. Using a statistical technique, the Receiver Operating Characteristic, they found a very small difference existed between doctors and ENPs. Experienced SHOs did slightly better than experienced ENPs, but both these groups performed better than inexperienced ENPs and SHOs. Inexperienced SHOs performed the worst.

¹ The proportion of x-rays with positive findings (e.g. fractures) which were correctly identified.

² The proportion of normal x-rays which were correctly identified.

A study spanning the whole six-month post of a group of SHOs, Sakr *et al.* (1999) (see Section 2.12.2) as part of their RCT examining ENP-led care, compared the interpretation of x-rays of ENPs and SHOs with the formal reports from a consultant radiologist. They found that both groups were similarly accurate in their interpretation. The ENPs interpretation was different (in a clinically significant way) from the radiologist's report in 2.8% of cases (n=12) and the SHOs in 3.6% of cases (n=16) (p=0.5).

All of these studies, support the view that ENPs are as competent as SHOs in assessing extremity x-rays following training. However, both groups may be able to perform even better with further training and experience.

2.11.5 Internal referrals and advice sought

In A&E the diagnosis or management of a patient may be discussed with more senior medical staff, alternatively patients may be referred directly to another specialty. Discussion with a more senior colleague could be interpreted as a form of referral. Few studies have reported the amount of advice ENPs or SHOs seek. In their observational study of A&E SHOs, Tham *et al.* (1995) found that 4.6% of their time was spent either seeking or giving advice. However, no indication on the proportion of patients seen for whom they needed to seek advice for is given.

In a randomised controlled trial of ENPs and A&E SHOs, Sakr *et al.* (1999) found that the ENPs were as likely as the SHOs to ask for advice from senior staff whilst the patient was in the department (8.7% vs 8.3%) and also found no significant difference in the number of patients for whom follow-up was arranged (44.7% in the ENP group vs 41.6% in the SHO group).

2.11.6 Clinical management plan

One of the earliest studies of the ENP role, undertaken in the UK, examined how experienced A&E nursing sisters would manage walking wounded patients. In an observational study James and Pyrgos (1989) compared the clinical management, planned by one of three A&E sisters, of 397 walking wounded patients with the actual management by one of six 'middle grade' A&E doctors. Four hundred patients were initially approached to participate in the study, 332 of these were assessed by the nurses, 65 were directly referred by the nurses to a doctor and three patients refused to take part

in the study. Patients saw the nurse first and were examined. The nurse recorded her diagnosis, treatment and whether any x-ray would be requested. The patient then returned to their original place in the queue. The doctor who eventually saw the patient was blind to the nurse's assessment. On comparing the management decisions by the nurses and the doctors, 12 of 397 patients (3%) were considered to have been mismanaged. Examining these cases in more depth; four were missed fractures, one was a missed ganglion on a flexor tendon, and all the other seven related to either failure to prescribe medication (n=5) or prescribing drugs to which the patient was allergic (n=2). As the nurses in this study had no specific training for the role, it would be reasonable to assume that the proportion of inappropriately managed cases might fall with suitable training.

In the most rigorous study comparing ENP-led care with conventional SHO-led care, Sakr *et al.* (1999) (see Section 2.12.2), examined clinically significant errors of ENPs and SHOs relating to 1,453 patients initially managed by ENPs or SHOs. Errors in the history taking, examination, interpretation of x-rays, treatment or planned follow-up were deemed clinically important if they would have altered the management of a particular patient. They found no statistical difference in clinically significant errors between ENPs and A&E SHOs (ENPs 9.2%, SHOs 10.7%, $p=0.2$). Out of the 1,453 patients in this trial, only one patient had a clinically very important injury which was missed by a junior doctor (a missed flexor tendon injury).

2.11.7 Prescribing patterns

Relatively little work has been undertaken examining prescribing by ENPs in A&E departments. This may, in part, be due to considerable confusion over the legalities concerning the supply of medication by nurses in the UK (Jones and Gough, 1997). One study (Marshall *et al.*, 1997), which has examined the supply of medication by ENPs to A&E patients in the UK, found that ENPs supplied medication to only 15.5% of their patients. When the clinical notes of these patients was compared with local protocols the researchers identified no breaches of protocol in any of the 455 patients supplied medication. When they compared the supply of two specific drugs against locally agreed standards they found 94-100% compliance with standards for the administration of tetanus immunisation and 71-100% compliance with standards for emergency contraception. As the study did not involve a comparison with medical staff, any differences between prescribing patterns between ENPs and SHOs are unknown.

2.11.8 Clinical documentation

Clinical documentation originally began as a personal 'aide-mémoire' for doctors who often had caseloads spread across several hospitals (Audit Commission, 1995). Much has changed, in current practice many different health-care professionals use a patient's clinical documentation to record diagnosis, investigations and treatment. Documenting care is often the only way of communicating vital information about an individual's care to colleagues who are also involved with and responsible for a patient.

Clinical documentation now has additional functions, many of which are not clinical. For example, the documentation can be used for teaching, research, audit, epidemiological information and for managerial purposes. Accurate information is essential for the proper care of patients and for the effective management of the NHS (Audit Commission, 1995). Good notes are often said to imply good practice (Montague, 1996), hence it is vital that both doctors and ENPs accurately record details on every patient they treat.

Clinical documentation can be called as evidence before a court of law, a Health Service Commissioner or a Professional Conduct Committee (UKCC, 1998). Hospitals need good records to defend themselves against claims of negligence (Audit Commission, 1995). Accurate documentation written by clinicians can act as protection for both patients and staff (Read, 1999), similarly poor, missing or altered documentation (Masson, 1991) will make it difficult to defend a hospital in a clinical negligence case (Tingle, 1995).

The quality of medical records has been much criticised over recent years, not only for clinical detail, but also for their legibility (Williams, Kingham, Morgan *et al.*, 1990; Wallace, Gullan, Byrne *et al.*, 1994; Audit Commission, 1995). Consequently, the Audit Commission in their report on A&E services called for 'better and more complete recording of clinical information and the times of each key stage of treatment' (Audit Commission, 1996). The Audit Commission (1995) identified three serious consequences of not keeping accurate and comprehensive documentation: patient care may be compromised; the hospital may lose protection against negligence claims; and the quality of coded information can suffer, thereby jeopardising the contracting process and clinical audit. Comprehensive, accurate and timely clinical documentation is therefore necessary for high quality health care.

The clinical documentation of ENPs has been examined in two studies (Heaney and Paxton, 1997a; Macduff *et al.*, 1999) and was generally demonstrated to be of high quality. Heaney and Paxton (1997a; 1997b) in their two-year evaluation of a nurse-led MIU, used an A&E consultant, a senior nurse and two GPs to audit a sample of 810 sets of notes. The majority of the clinical notes (70%) were assessed as 'very satisfactory', 28% as 'satisfactory' and 2% as 'unsatisfactory'. This 2% were extracted and examined by the study's authors. It was found that there were differences between the auditors. On occasions auditors commented on missing details which the researchers found were actually present on the notes. The study authors made the assumption that as the notes were so comprehensive these details had probably been missed by the auditors.

Macduff *et al.* (1999; 2001) took a different approach and audited notes from ENPs in nine community hospitals using a very structured *pro forma*. Clinical notes from nine community hospital casualty departments of patients who had been managed by ENPs were audited with a tool developed for the study (Macduff, West, Lawton *et al.*, 2001). This tool consisted of two parts and two scores. The first part examined how comprehensively the *pro forma* part of the clinical documentation, used in these departments, had been completed. The second section rated the quality of information recorded against the treatment protocol used to treat a specific patient. Notes were rated comprehensive, satisfactory to unsatisfactory. The average score across the sites for the first part (completion of the *pro forma* section) was 69% (range for departments 20% to 99%). Wide variation existed in results relating to the second section, from no notes having been judged as unsatisfactory in one department to a worrying 65% in another department (Macduff *et al.*, 2001). The tool used in this study was very specific to both the protocols used in these research sites and to the style of documenting care, which was closely based on the protocols. This tool would not be suitable to evaluate SHO documentation unless they were to change from the traditional style of medical documentation to a specific protocol driven style of recording clinical information and using the specific protocols used in this study.

No study has directly compared the quality of ENP documentation with that of medical practitioners. In the RCT of ENPs conducted by Sakr *et al.* (1999) the clinical documentation of ENPs and SHOs was compared with standardised notes written by a research registrar who saw the same patients as the ENP or SHO. The 'adequacy of care' was assessed by searching for omissions between the set of notes written by the

ENP or SHO and the research registrars. The design of the study by Sakr *et al.* (1999) relied on the both the ENPs and SHOs writing comprehensive notes to a similar standard, however, there is anecdotal evidence to suggest that ENPs probably write better notes. In a case study evaluation of the ENP's role in one A&E department in the South Thames region, Tye and Ross (2000) undertook a series of interviews with a number of key stakeholders including A&E consultants, ENPs, a nurse manager, a junior A&E sister, an A&E SHO, the Director of Nursing Services and the Trust Chief Executive. One of the findings from this study was the suggestion that the standard of ENP documentation was seen as far superior to that of medical staff partly as a result of the nursing background of ENPs, but also perhaps because of a greater awareness of potential litigation associated with an emerging role.

2.11.9 Return consultations

Most patients are discharged from the A&E department with the expectation they will require no further follow-up. A proportion (0% to 65%), which varies from department to department, of patients are asked to return to hospital follow-up clinics for further assessment or review (Dasan and Hashemi, 2003), and a number of patients are asked to seek further advice or follow-up from their own GPs (both are forms of planned follow-up). However, a number of patients find it necessary to seek further advice or treatment following their attendance in A&E (i.e. unplanned follow-up).

A patient may re-attend the original A&E department where they were seen, attend another A&E department, seek a consultation with their GP, attend an out-of-hours GP emergency service, visit their occupational health service etc. Patients may seek unplanned follow-up for a variety of reasons including worsening symptoms, failure to improve or dissatisfaction with the treatment received (Guly and Grant, 1994). A study of patients seeking unplanned follow-up, at a second A&E department, showed that 17% had a missed injury (Guly and Grant, 1994). The severity of these missed injuries ranged from missed foreign bodies in wounds to fractures and tendon injuries.

Although many missed injuries may be relatively minor, delays in fracture diagnosis may lead to functional disability, and missed orthopaedic injuries remain the leading cause of malpractice claims in emergency medicine (Gwynne, Barber and Tavener, 1997). A&E departments are often seen as areas of high risk for litigation (Staniforth, 1990). In a study which examined the costs to four A&E departments of various

litigation cases between 1990 and 1993 the average cost of a successful litigation was around £15,000 if the case proceeded to court, and out-of-court settlements cost on average £4,000 (Hulbert, Riddle, Longstaff *et al.*, 1996). Both figures include legal fees. The costs now are likely to be higher.

Injuries are missed in A&E; this is to some extent inevitable (Guly, 1984). However, reducing the incidence of missed injuries is of major importance for raising the quality of patient care and the standards of departments. Patients' expectations of health care are continuing to rise. Some patients have unrealistic expectations and will continue to seek further advice in an attempt to meet these expectations (Guly and Grant, 1994). However, because patients are able to attend different facilities, the extent and nature of the problem remains unknown.

In the RCT of ENPs and SHOs by Sakr *et al.* (1999), patients who saw ENPs were less likely to seek unplanned follow-up in the month following their attendance in A&E than patients who were seen by SHOs (ENPs 8.6%, SHOs 13.1%, $p=0.03$). Out of the 11% of patients in the trial who sought unplanned follow-up, 2.7% reported attending A&E for their unplanned follow-up visit. Six per cent sought unplanned follow-up from a GP and the remainder from other health-care providers including physiotherapists. No indication was given why patients sought unplanned follow-up and whether these additional visits were justified.

2.11.10 Health service costs

Touche Ross (1994) in their evaluation of 20 different pilot nurse practitioner projects, four of which were based in A&E, calculated that the salary costs per SHO were close to that for high grade nurses. Coupled with the fact that the ENPs had longer consultations with patients, they concluded that there were no clear cost savings for ENPs identified in any of these A&E pilot sites at that time.

A very rough cost comparison of ENPs and A&E SHOs was conducted as part of the RCT of ENPs conducted by Sakr *et al.* (1999). An additional observational study was undertaken following the main trial. A total of 46 patients seen by the ENPs and 48 by the SHOs were observed to record the time it took to take and record the patient's history. The ENPs took a mean of 10.89 minutes (s.d. 4.6 mins) and the SHOs took 9.02 minutes (s.d. 4 mins) ($p=0.04$). The hourly cost of an ENP (F-grade) was between

£12.18 and £19.44 depending on the day of the week and time of the day. The hourly cost of a SHO was calculated as £14.91. The authors concluded that ENPs were more expensive than junior doctors mainly because of the increased costs at night and at the weekends. However, they did not take into consideration several important factors (Cooper and Kinn, 2000). First, the fact that ENPs often undertake their own treatments whereas junior doctors usually delegate these tasks to other nursing staff. Second, that ENPs are available for other nursing duties when not attending to their own patients. Third, the time taken for treatment after assessment was not included. Fourth, self-reported unplanned follow-up was greater for SHOs than for ENPs. Finally, the role of the ENP often includes health education to a greater extent than that of the SHOs.

Without agreed outcome measures and a greater understanding of the differences between ENP-led care and SHO-led care it appears to be difficult to quantify the cost effectiveness of ENPs. Coupled with the fact that there currently still remains no nationally agreed definition of what an ENP is, what level of educational preparation they require or the parameters to which they can practise, it will remain very difficult to produce any meaningful cost comparisons.

2.11.11 Patients' perception of being well cared for

A growing number of studies have compared patient satisfaction with ENPs and medical practitioners within the emergency department (Powers *et al.*, 1984; Rhee and Dermeyer, 1995; Chang *et al.*, 1999; Sakr *et al.*, 1999; Byrne *et al.*, 2000). Only one of these studies detected any statistically significant differences between ENPs and medical practitioners (Byrne *et al.*, 2000) who found that patients who had seen ENPs were more satisfied in relation to four specific aspects: they were more likely to receive health and first aid advice ($p < 0.05$), more likely to have been told whom to contact if they needed further help and advice following discharge ($p = 0.01$), more likely to have written discharge instructions ($p = 0.01$), and less worried about their health after seeing an ENP ($p = 0.05$). This study was conducted within three different emergency care settings (a nurse-led minor injury unit, a 'Minor Accident Treatment Service' within an A&E department, and a traditional A&E department). To some extent the results are probably more likely to reflect patient satisfaction with the type of service delivery rather than with ENPs and medical practitioners *per se*.

One potential explanation for patients' higher satisfaction with nurse practitioners may relate to the longer consultation times (Kinnersley, Anderson, Parry *et al.*, 2000; Shum, Humphreys, Wheeler *et al.*, 2000; Venning, Durie, Roland *et al.*, 2000) often seen in nurse practitioner studies. None of the studies explored what effect waiting times might have on satisfaction. Perceived lengthy waiting times in A&E are a source of dissatisfaction amongst patients (Thompson, Yarnold, Williams *et al.*, 1996).

2.11.12 Demonstration of health promoting behaviours

Only one trial of ENPs has examined compliance with recommended health activities and appointment keeping by patients following a consultation with an ENP or a medical practitioner (Powers *et al.*, 1984). This was a small scale study involving 62 patients attending an emergency department in the USA. Patients were alternately allocated to either the nurse practitioner or one of a number of medical practitioners. Compliance with recommended health activities was assessed by telephone interview at two weeks and at three months. A difference was not detected between either group. Similar results were found for appointment keeping. Whether this was due to the small size of this trial or the method of assessment is not speculated upon by the study's authors. The most commonly given reasons, in over a third of cases, for non-compliance were patients forgetting or ignoring it. This study did not report the length of consultation of either the nurse practitioner or any of the medical practitioners. Therefore, no inference can be made between the length of consultation and levels of compliance.

2.11.13 Achievement of appropriate self-care and symptom management

Few ENP evaluations have attempted to measure any form of patient outcome apart from patient satisfaction. Two studies which have examined patient-reported improvement following assessment and management by ENPs, are the UK trial conducted by Sakr *et al.* (1999) and an American study by Powers *et al.* (1984). In the RCT of ENPs and SHOs undertaken by Sakr *et al.* (1999) (see Section 2.12.2) patients were sent a questionnaire 28-days post consultation for a minor injury. Two-thirds of patients in the study returned the questionnaire (n=922). No difference was detected between the two groups in reported levels of improvement (p=0.41) or in reported activity levels (p=0.45). Similarly, in a much smaller (n=62) and less rigorous experimental field study conducted by Powers *et al.* (1984) patients were asked in a telephone interview three months after their attendance in the emergency room whether

their health-care problem had resolved. No statistical difference was identified in the resolution of health-care scores between the group managed by the ENP and the group managed by one of the medical practitioners.

2.11.14 Health related quality of life

No studies examining ENPs have included health related quality of life measures, probably because the injuries within the remit of most UK ENPs are self-limiting and unlikely to have any long-term effects (Mushlin and Appel, 1980). Quality of life is only likely to be affected if a serious injury is missed or mismanaged. To establish whether there is a difference in health related quality of life after being seen by an ENP or medical practitioner for a minor injury is likely to require very large numbers of patients.

2.11.15 Conclusion

The empirical research which has examined the ENP role has increased in recent years. However, a great deal of the evidence relating to consultation length, advice sought, referrals made, management plans and return consultations, comes from a single randomised controlled trial (see Section 2.12.2) whose results were published after much of the data presented later in this thesis (see Chapters 5, 6, and 7) had been collected. Evidence exists in a number of different, well-designed studies to demonstrate that ENPs are able to interpret distal limb x-rays to a similar standard as junior medical staff. Whilst a number of studies have examined patient satisfaction, only one identified differences between patients managed by ENPs compared with medical staff. As these clinicians worked in different departments, it is difficult to know whether the results are related to the clinicians or the type of department where the service was provided. The importance of well written clinical documentation has been acknowledged in several studies, however no study has directly compared the quality of clinical documentation written by ENPs and junior doctors. Finally, patient outcomes have only been examined in two studies and neither has specifically examined whether any patient had an injury missed or had an injury inappropriately managed at initial presentation.

2.12 Randomised Controlled Trials Comparing ENPs and Medical Staff

As previously mentioned, only two randomised controlled trials comparing ENP-led care with care led by doctors appear to have been conducted anywhere in the world and published. The smaller which involved 169 patients, was a pilot study conducted in Australia in 1995 (Chang *et al.*, 1999), and the largest involved 1,453 and was conducted in Sheffield in the UK in 1997 (Sakr *et al.*, 1999). Both of these studies were published after the studies described in this thesis were initiated.

Prior to this work, a trial had been proposed and developed by Read and George (1994), but the researchers abandoned it because of practical difficulties in recruiting sufficient patients into the trial and difficulties in attempting to measure outcomes. In 1994, they reported on their pilot work for a randomised controlled trial of ENP-led care. A clinical site had been identified, a trial protocol developed, and plans to invite patients back for review by a senior doctor were made. Based on the possibility, demonstrated in the Lincoln study (James and Pyrgos, 1989) (see Section 2.11.6) that 3% of ENP patients would be inappropriately treated, a sample size calculation was undertaken. A total of 2000 patients (1000 in each arm) would be required to detect a difference of more than 50% either way from the 3% figure (i.e. a range of 1.5% to 4.5%) (Read and George, 1994).

During the course of this pilot work the researchers observed the site chosen for the trial. It became clear that there were a number of potential problems. Firstly, the ENPs were seeing far fewer patients than would be required to conduct the trial in the time-scale available for the study. Secondly, because of lack of senior clinician time and shortage of space in the department, it would not be practical for a senior clinician to review all the patients. Thirdly, there were concerns that due to the common nature of the pathway of care, some minor injury patients (e.g. patients seen by either ENPs or SHOs who had lacerations requiring suture, and patients with minor fractures, after initial assessment by the ENP or SHO), could be treated by the same staff. This would make it difficult to be confident that the resulting outcome related to the antecedent care of the ENP or SHO. Finally, there were concerns that the department chosen as the research site was probably not typical of ENP schemes in other hospitals.

To address the problem of not being able to review every patient, the researchers developed an alternative method of assessing patient outcomes: a patient-completed diary. The necessity of identifying measurable responses in relation to identified criteria, to allow confident attribution to the antecedent care has been acknowledged by a number of authors (Levine, Morlock, Mushlin *et al.*, 1976; Mushlin and Appel, 1980; Lohr, 1988). The content of the diary was developed from criteria used in earlier studies which appeared to be both measurable and related to antecedent care (Levine *et al.*, 1976; Lohr, 1988). Three versions of the diary were developed and piloted with 102 patients. The third version, the shortest and most structured, produced an excellent response rate of 82%. However, to achieve this, considerable effort was required on the part of the researchers to encourage the diary keepers through telephone contact. Whether such high response rates could be achieved in a large trial requires further evaluation.

The researchers concluded that an experimental research design was desirable; however, it would probably need to be multi-centred and concentrate on specific conditions. These would need to have a high incidence, definitive diagnosis and limited co-morbidity. Indicators would also need to be valid and quantifiable.

This was the nearest to a randomised trial of ENPs published prior to the development of the research detailed in this thesis. Since this time, two RCTs of ENPs have been published, and these are discussed in the following Sections (2.12.1 and 2.12.2).

2.12.1 The Australian trial

A small scale randomised controlled trial of ENPs was conducted in a rural emergency department in New South Wales (Chang *et al.*, 1999) in 1995. The hypothesis tested in this trial was that there would be no significant difference in the quality of care or the level of patient satisfaction between ENPs and medical officers in the trial. Four nurses were trained to work as ENPs on a course developed for the trial by the emergency department at the research site together with a local university. Following the training period, patients over 10 years old, with blunt limb trauma, or wounds to the scalp, lower leg or forearm were recruited into the trial. Consented patients were randomly assigned to either the ENPs or to the resident medical officer (a doctor) for treatment. One hundred and sixty nine patients were randomised, 78 to the ENPs and 91 to the medical officers. The outcomes measured in the trial were: patient satisfaction, measurement of

cosmetic result and function for patients attending with wounds. A 'clinical review' of the ENP records using predetermined protocols was also undertaken and was conducted by the Director of Emergency Services and the Clinical Nurse Consultant (Emergency). Patients were contacted by telephone at some unspecified point after their attendance by a non-health-care professional and asked to rate five items relating to satisfaction on a 5-point Likert scale. Patients with wounds were invited back to a clinic two to three months after their treatment for blind review by a consultant orthopaedic surgeon. The cosmetic result and function were rated on a 10-point linear scale. The majority of patients were contacted by telephone (n=132, 78%). No statistical difference was detected between the two groups in terms of satisfaction. Only 16 patients took up the invitation to return for evaluation of their wounds (ENP n=7, and medical officer n=9). No indication is given in the paper as to the proportion of patients with wounds in the trial or the number invited to return for follow-up, except that the number of patients with 'open and closed' wounds were approximately equally distributed between both groups. No results were given for these patients except that the majority were rated between seven and ten for both cosmetic result and function. The clinical review of the ENPs clinical documentation 'showed that the protocol was followed in all cases by the nurse practitioners'.

As the authors admit, the sample size in this study places limitations on the degree to which results can be generalised. However, they do claim that this pilot study 'met its aims in that it demonstrated that registered nurses working in a nurse practitioner role can be trained in the selected competencies to a point where they can provide a level of service consistent with acceptable standards' (Chang *et al.*, 1999) and that it had developed methodologies for evaluation of ENP care provision.

There are several issues which question both of these claims. At no point do the authors make explicit the 'acceptable standards' to which the ENPs were expected to perform. However, it is implied through the undertaking of a trial and the hypothesis (that there would be no difference between ENPs and medical officers in terms of quality of care or patient satisfaction) that the researchers were looking for equivalence. At no point in the paper on the trial are there results of any sample size calculations, either to justify the size of this trial, or for a future full-scale trial. It is difficult to judge whether the fact that no difference was found between the two groups in terms of patient satisfaction was down to the trial lacking sufficient power or whether no difference truly existed.

Alternatively, the instrument being used may not have been sufficiently sensitive to detect any real differences. With regard to having developed methodologies which could be used in future evaluation of ENP practice, it would be of immediate concern whether a sufficient number of patients with wounds would re-attend two to three months later for re-assessment. No explanation of why patients did not return was given, nor were any suggestions put forward as to how to increase the return rate or how other types of patient could be assessed.

In this trial, the researchers managed to contact 78% of the sample by telephone and ask them a few questions about their satisfaction with the service. One of the reasons why no difference was detected between the two groups may relate to the fact that respondents to satisfaction surveys tend to produce very little variation and most of the respondents express positive satisfaction (Fitzpatrick and Hopkins, 1993). There may be many reasons for this, but one factor may be that patients are often very reluctant to express criticism of health-care professionals (Fitzpatrick and Hopkins, 1983) so-called 'normative effects'. It is conceivable that either the instrument used to measure satisfaction in this trial was not sufficiently sensitive to detect differences between the different health professionals or perhaps patients found it difficult to express any dissatisfaction to a person on the end of a telephone. However, the researchers in this study did use a non-health-care professional to do the interviews which may have minimised the potential problem. Further work on all the instruments used in this study to ensure their reliability and validity would probably be required to justify the claim of having developed methodologies for evaluating ENP provision.

2.12.2 The Northern General Hospital trial

Between February 10th and August 4th 1997, a team from the Northern General Hospital, Sheffield and the Medical Research Unit at the University of Sheffield (Sakr *et al.*, 1999) undertook the largest trial examining ENP-led care published to date. The study site was a large city hospital A&E department managing approximately 62,000 patients per year. A total 1,453 patients who were over 16 years of age and presented at the department with a minor injury were randomly assigned to care provided by an ENP (n=704) or a junior doctor (n=749). Patients were assessed by either the ENP or SHO before being assessed by an experienced A&E physician (the research registrar). Blinded initial assessments by the ENP or SHO were compared with the assessment by the research registrar.

The trial examined 'adequacy of care' as its primary outcome. This was measured by comparing the research registrar's assessment with the ENP's or SHO's assessment on a number of different criteria: record of the patient's past medical history, record of the examination of the patient, request for radiography, treatment decision, advice and follow-up. Differences between the two assessments were judged to be: 'the same'; 'clinically not important' (i.e. if an error or omission was judged as not resulting in harm to the patient or if the treatment would have been the same); 'clinically important' (i.e. if an error or omission should have led to a change in the patient's treatment, e.g. an un-immunised patient with an open wound had not had their tetanus status recorded); and, 'clinically very important' (i.e. where an error or omission was judged to have lead to a high probability that the patient would be harmed, e.g. missing a divided flexor tendon). ENPs were judged to have made at least one 'clinically important error' in history, examination, interpretation of x-ray, treatment or follow-up arrangements in 65 (9.2%) of the 704 patients in their group. SHOs made similar errors in 80 (10.7%) of the 749 patients in the junior doctor's group. This difference was not statistically significant ($p=0.2$). ENPs were, however, better at recording past medical history ($p=0.01$). No difference was detected between the two groups in terms of recording the mechanism of injury ($p=0.38$), examination of the patient ($p=0.26$), advice given ($p=0.18$), x-ray interpretation ($p=0.5$) or arrangements for follow-up ($p=0.2$).

A number of secondary outcomes were also measured in this trial. These included: the patient's satisfaction with the quality of their care, patient reported improvement and return to usual activities, and the need for unplanned follow-up. Satisfaction was measured using a previously validated questionnaire given to patients at the time of their attendance in A&E. Other outcomes were measured by sending a follow-up questionnaire to patients 28 days after their attendance. This questionnaire enquired whether they had needed any further treatment for their injuries (unplanned follow-up); their capacity for work, leisure, and activities for daily living; and to assess their overall satisfaction with the care they had received. A reminder was sent to non-respondents. Patients reported they were satisfied with their care. There was no significant difference between the two groups in terms of overall satisfaction ($p=0.28$). Only 0.8% of the ENP group and 1.9% of the SHO group reported their care was poor or very poor. However the ENPs were judged more courteous ($p=0.04$). There was a significant difference between the two groups in the amount of unplanned follow-up visits: 8.6% of the ENP's patients sought at least one unplanned follow-up visit, compared with 13.1% of the

patients in the junior doctor group ($p=0.03$). There was no difference detected between the two groups in terms of patient expected improvement ($p=0.41$), or return to work, household duties, sport or other activities ($p=0.45$). In summary, Sakr *et al.* (1999) argued that properly trained ENPs, who worked within agreed guidelines could provide care for patients with minor injuries to a standard that was equal or in some ways better than that provided by junior doctors.

There are a number of methodological issues which may limit the findings from this study. Firstly, primary outcomes for the study relied on the ENP or SHO documenting their history taking, examination findings, decision for radiography, treatment decisions, advice and follow-up plans so that these could be compared with the research registrars. This study design relies on the assumption that ENPs and SHOs will be equally as good in documenting their care. Secondly, the sample size calculation for the study was based on detecting an increase in frequency of any inadequacy in care from 2.5% to 5%, however the actual detected inadequacy of care was much higher at around 10% (9.2% for the ENP group and 10.7% for the SHO group). Detecting a 2.5% difference at this level would require substantially more patients in the trial.

Thirdly, as the research design involved an additional consultation with the research registrar, an element of artificiality was introduced into the patients' journey through A&E. It is possible that this may have had some impact on outcomes, for example, patient satisfaction may have been improved by having an additional clinician enquiring after them. Also, with this second consultation, patients may have become aware of important information pertinent to their treatment which was not initially ascertained by the ENP or SHO. However, as the patient returned 'to the routine clinical care for radiography, treatment, advice and plans for further care' the patient might then pass on this new information to their ENP or SHO. This additional information may then have been added to the clinical notes and/or treatment plans altered. The effect of this may have been to decrease the number of potentially important clinical errors made by the ENPs or SHOs and be a possible explanation why no difference was detected between the two groups.

Finally, as Sakr *et al.* (1999) recognise there is no 'universally accepted definition of an accident and emergency nurse practitioner'. However, ENPs differ not only in title, but in training, experience, scope of practice and in the support available to them. The

results from this trial show that ENPs who have had at least four years experience in A&E prior to training on the English National Boards A33 'Development of Autonomous Practice' course, who then use the department guidelines available at this particular study site and have easy access to senior A&E medical staff, perform as well as SHOs who have had at least 18 months work experience after qualifying and working in A&E.

2.13 Conclusions

ENPs have become an integral part of the A&E service in much of the UK, both in major consultant-led and in minor A&E departments. However, relatively little appears to be known about ENP services across Scotland and in particular in the minor departments. A growing number of studies have attempted to evaluate the ENP, predominately with the main provider of minor injury care in major A&E departments: the A&E SHO.

The QHOM (Mitchell *et al.*, 1998) provides a useful framework within which to review the literature on the evaluation of ENP-led care. The complex nature of health-care delivery is clearly demonstrated, and the difficulties faced by any research project attempting to evaluate ENP-led care are clear. The reciprocal influences between the system, client, interventions and outcomes, suggest that altering any single element in the model may have effects on other parts of the model.

To evaluate ENP-led care, either the whole system needs to be involved in the evaluation, or elements of the system should be representative of the wider system. Unfortunately, the A&E system and the ENPs within are not homogenous. There appear to be two distinct types of A&E department: major consultant-led departments with a wide range of supporting services and minor departments with fewer resources. Within both these groups there also appeared to be fairly considerable variation. The ENPs who practise within the departments appear to vary considerably, from nurses with little or no training for the role, to those who have undertaken specific nurse practitioner degrees. The remit of the ENP varies, from the types of condition they are authorised to manage, to whether they can request and interpret x-rays, and what age range of patients they can treat. Whilst a little is known about the situation in major departments, virtually nothing is known about ENP services across Scotland. To generalise from the

results of any individual study would be difficult without a comprehensive knowledge of how the system differs in departments.

The influence that many different client (patient) characteristics can have on outcomes suggests that only a randomised trial design could have any prospect of controlling these factors to any degree. However, the difficulties identified by Read and George (1994) in their planned trial, underline the difficulties faced. The very variable follow-up rates achieved in studies which have compared a variety of different minor injury treatment modalities, suggest that measuring outcomes can be difficult.

Many minor conditions are self-limiting in nature and to some extent it does not appear to matter what diagnostic or therapeutic services are rendered, unless harmful, most patients will get better (Mushlin and Appel, 1980). Identifying outcomes suitable for measurement in a large scale trial, where it may be difficult to ensure patients return for follow-up, is a challenge. The diary developed by Read and George (1994) appears to be a promising instrument, achieving a response rate of 82% and measuring outcomes such as return to work, analgesia use, and activity levels. These parameters have been shown to be sensitive to differences in some common treatment options for certain minor injuries.

The quality of clinical documentation is often claimed to be much better if written by an ENP (Tye and Ross, 2000). However, studies which have examined the clinical documentation of ENPs have not compared it to that written by medical staff and have also used fairly non-specific tools. The information, which should be documented in any given injury, will vary with the type of injury and its severity. Clinical documentation is not only important for communicating a patient's condition to other colleagues and for legal purposes, but in many studies it is used as a record of the care given. Assumptions are often made about the quality of care provided by ENPs based on this written record (Heaney and Paxton, 1997b; Sakr *et al.*, 1999). The quality of written documentation requires further evaluation and in particular the claim that the quality of ENP documentation is higher requires testing.

Very few empirical studies have examined ENP-led care and even fewer involved randomisation. The number of trials involving primary care nurse practitioners appears to be much greater and spans three decades. However, Horrocks *et al.* (2002) in their systematic review of RCTs and observational studies evaluating primary care nurse

practitioners point out that none of the studies included in their systematic review was sufficiently powered to detect potentially serious illness at an early stage (which is an important function of primary care). In the same vein, an important function of minor injury management is to detect the more serious underlying injury which may be easily missed. Sakr *et al.* (1999) calculated the proportion of ‘clinically very important errors’, i.e. where an error or omission would have a high probability of the patient being harmed. Only one ‘very important error’ was identified in the study (in the junior doctor group). In the same study unplanned follow-up was reported at 11% with 2.7% reported to re-attend an A&E department. Examining re-attenders and unplanned follow-up would seem an important outcome to measure as Guly and Grant (1994) found 17% of patients who attended a second A&E department had a missed injury and Armstrong, Pennycook and Swann (1991) found that 2.5% of patients re-attend A&E and approximately half of these required a significant change to their original treatment.

The programme of research described in this thesis will set out to:

- Explore the extent and nature of ENPs services across Scotland in both major and minor departments, and changes over a three year period.
- Describe the development of an instrument to measure the quality of clinical documentation written by ENPs or SHOs.
- Undertake a randomised controlled trial to test instruments to measure the quality of ENP-led care (in terms of patient satisfaction, quality of clinical documentation, unplanned follow-up and missed injuries) and to calculate the required trial size to detect differences in potentially serious missed injuries or inappropriately managed patients between ENPs and SHOs.
- Explore unplanned follow-up in minor injury patients treated by a range of different clinician groups in an A&E department.

Chapter 3

Literature Pertaining to the Methods

3.1 Introduction

In this thesis, a mixed method approach was used to explore the diversity and effectiveness of ENP services in Scotland. A descriptive research method was used in Phase 1 to examine the nature and extent of ENP services in Scotland, and both descriptive and experimental methods were utilised in Phase 2 to explore methods to evaluate an ENP service.

In Phase 1, a cross-sectional study design, namely, a postal survey was employed to examine the extent and nature of ENP services in Scotland. The survey was repeated three years later to examine how services had developed. In Phase 2, a number of different methodologies were used to explore how an ENP service could be evaluated. These methods included a consensus methodology (the nominal group technique), a randomised controlled trial, the use of routinely collected data and a second cross-sectional study of minor injury patients. In this chapter each of the methods used are discussed.

3.2 Research Designs

Grimes and Schultz (2002) describe a simple hierarchy to categorise most clinical research. Most clinical research can be divided into two broad categories: experimental research and observational research. The choice of category is dependent on whether the investigator has assigned the exposure (e.g. treatments) or whether usual practice was observed. Experimental research can then be sub-divided into a further two groups: randomised controlled trial (see Section 3.5) or a non-randomised controlled trial, this time dependent on whether exposures were assigned using a random technique or whether some other allocation scheme was used, such as alternate assignment.

Observational research can be further divided into descriptive studies and analytical studies, which are dependent on whether the study involves a comparison or control

group. If no comparison or control group is involved then the study can be described as a descriptive study. If a comparison or control group is involved then the study may be described as analytical. Dependent on the temporal direction of an analytical study they may be described as cross-sectional, case-control or cohort. A cross-sectional study will examine 'exposures' and 'outcomes' at one point in time. This type of study provides data on the prevalence, distribution and inter-relations of a study population at one time point (see Section 3.3). A cohort study begins with an 'exposure', for example, patients identified as having a myocardial infarction, and follows these patients for a period of time to measure outcomes (e.g. mortality) (Pedley, Bissett, Connolly *et al.*, 2003). In comparison case-control studies begin with an outcome, for example, food poisoning and look back in time for an exposure (e.g. eating out) (Leman and Strachan, 2001).

In any type of clinical research there are a number of important considerations. If a study involves patients such as the RCT reported in Chapter 7, or the study of unplanned follow-up in minor injury patients which uses a case note review, routinely collected data and a cross-sectional survey (see Chapter 8) it is imperative that the research is ethically acceptable and approved. If patients are participating in experimental research then they should be adequately informed about the study and give their consent to participate.

3.2.1 Ethical considerations

Every clinical trial requires careful assessment of whether it is ethically acceptable for patients to participate in the manner proposed (Pocock, 1983). A balance has to be struck between ensuring a high quality scientific experiment is conducted which contributes to the advancement of knowledge and ensuring individual patient care.

During the Second World War, doctors and nurses in German concentration camps were involved in some of the most shocking experiments on human subjects ever witnessed. Following the Nuremberg trials, the Nuremberg declaration was published to try and avoid a repeat of these Nazi atrocities. In 1964, the World Medical Association at the 18th World Medical Assembly in Helsinki adopted a code of ethics relating to human experimentation, this became known as 'The Declaration of Helsinki', and was recently amended at the 52nd World Medical Assembly in Edinburgh in 2000. One requirement of the 'Declaration of Helsinki' is:

'The design and performance of each experimental procedure involving human subjects should be clearly formulated in an experimental protocol. This protocol should be submitted for consideration, guidance, and where appropriate, approval to a specifically appointed ethical review committee, which must be independent of the investigator, the sponsor or any other kind of undue influence.'

Para 13 Declaration of Helsinki, World Medical Association (2001)

In most NHS Trusts, this 'specifically appointed ethical review committee' is the Local Research Ethics Committee (LREC). Prior to conducting clinical research in the NHS, an application must be made to and approved by the LREC. Ethical approval was sought and granted by the LREC before patients were involved in either the *RCT of ENP-led care* (see Chapter 7) or the *Unplanned Follow-up Study* (see Chapter 8).

3.2.2 Subject recruitment and consent

The Declaration of Helsinki (World Medical Association, 2001) states that for clinical research 'the subjects must be volunteers and informed participants in the research project' and that 'each potential subject must be adequately informed of the aims, methods, sources of funding, and possible conflicts of interest, institutional affiliations of the researcher, the anticipated benefits and potential risks of the study and the discomfort it may entail'. Finally 'the subjects freely given informed consent, preferably in writing' should be obtained.

Informed consent can be defined as 'as a voluntary uncoerced decision made by a sufficiently competent or autonomous person, on the basis of adequate information and deliberation, to accept or to reject some proposed course of action which will affect him or her' (Singleton and McLaren, 1995, p103). Gillon (1986) describes four elements which must be present for consent to be acceptable: competence, information, understanding of that information, and 'voluntariness'. Beauchamp and Childress (1989) suggest a person is competent 'if and only if that person can make reasonable decisions based on rational reasons'. There must be sufficient and unbiased information so that a substantially autonomous decision can be made (Hewlett, 1996). 'Voluntariness' refers to the notion of fully voluntary. Beauchamp and Childress (1989) describe 'voluntariness' as being independent of controlling influences exerted by others, for example *coercion* (the intentional use of a credible threat), *manipulation* (of information to influence a decision) and *persuasion* (convincing by presenting rational reasons).

Prior to ethical approval being granted by a LREC to allow research to be conducted within the NHS, patient information leaflets explaining any clinical trial as well as proposed consent forms must be seen and agreed by the committee.

3.2.3 Reliability and validity of research instruments

Another important consideration in any research study relates to the reliability and validity of any research instruments used. Validity refers to whether an instrument measures what it is supposed to measure. External validity refers to the generalisability of the findings from a research study to other settings and sample groups (Polit and Hungler, 1995). Hence it is important that a sample group used in the research study is representative of the population from which the sample is drawn. Internal validity refers to the extent to which the results of the study can be attributed to the treatment conditions rather than to the design of the study (Polit and Hungler, 1995). It involves the degree to which sound conclusions can be drawn about the results of the study. For example, could the results have occurred by chance, or by some other mechanism not recognised by the researchers. Internal validity can be further sub-divided into *face validity*, *criterion related validity*, *construct validity* and *content validity*. Face validity is concerned with how a measure or procedure appears. Does the measure seem like a reasonable way to gain the required information? Criterion related validity is used to demonstrate the accuracy of a measure by comparing it with another measure of the same phenomena. Construct validity seeks agreement between a theoretical concept and a specific measuring device, and content validity is concerned with the sampling adequacy of the content area being measured (Polit and Hungler, 1995).

Reliability of an instrument is the degree of consistency with which it measures the attribute it is supposed to be measuring (Polit and Hungler, 1995). Reliability of an instrument can be assessed in several different ways. The most appropriate method will depend to a certain extent on the nature of the instrument and on the reliability concept that is of the greatest interest. *Stability* (the degree to which the same results are obtained on repeated administrations of the instrument also known as test-retest reliability), *internal consistency* (the subparts of an instrument all measure the same characteristic) and *equivalence* (either when different observers obtain the same results – *inter-rater reliability* or when an instrument which has two equivalent forms, identical in every way except for content of the items, are compared) (Polit and Hungler, 1995).

For example, in this thesis, face validity of the questionnaires used to measure the extent and nature of ENP services across Scotland was assessed by independent A&E researchers reviewing the questionnaire prior to piloting. The stability of the *documentation audit tool* was assessed when the instrument was used to score the quality of a sample of clinical documentation on two separate occasions more than a year apart, similarly inter-rater reliability was assessed by comparing the scores obtained using the tool by different assessors. The internal consistency of the patient satisfaction questionnaire was assessed by comparing subparts of the questionnaire with each other. Criterion validity was assessed by comparing statements related to different dimensions of satisfaction with a general statement of satisfaction and the stability (or reproducibility) was assessed by comparing related positive and negative statements. The reliability and validity of other instruments used in the various studies described in this thesis are discussed at the end of sections 3.6.4, 3.6.6 and 3.6.7.

3.3 Cross-sectional Studies

Cross-sectional studies involve the collection of data at one point in time (Polit and Hungler, 1995). They are particularly appropriate for describing the status of a phenomena at a particular time point (Polit and Hungler, 1995). However, since phenomena are measured at the same point in time, the temporal relationship between different phenomena may be unclear (Grimes and Schulz, 2002). Data may be collected using a number of different techniques. Three methods were used in this thesis to collect cross-sectional data: surveys using questionnaires, case note reviews and routinely collected data.

3.3.1 Surveys

A survey is designed to obtain information about the prevalence, distribution and interrelations of variables within a study population (Polit and Hungler, 1995). A survey which covers the entire study population can be termed a census. The three main sources of error in survey research are sampling error, non-response error and response error (Atkinson, 1991).

Sampling error or bias can be introduced if the characteristics of the sample identified for the survey, differ from the study population as a whole. This could occur if certain individuals with particular characteristics are more likely to be selected for the sample. A rigorous selection system is required to ensure that factors extraneous to the research

do not have an influence on the selection procedure. A random selection from a population of individuals may result in reducing any sampling error. Another way to avoid sampling error is to sample the entire population as in a census.

If some of the sample refuse to participate or are not contactable, then a non-response error can be introduced. Every effort should be made to encourage a high response rate particularly with regard to postal questionnaires (see Section 3.6.2).

Response error can take two forms: random error and systematic error. Random error relates to mistakes in either the measurement or the recording of data. A respondent may misread a question and tick the wrong box or the researcher may incorrectly enter the data into the study database. Systematic error, on the other hand, relates to how the phenomena of interest are measured. For example, if a question is worded in such a way as to make the respondent overestimate the number of patients they see, then the outcome of this would be to systematically overestimate the numbers of patients seen in the whole sample. Careful testing of questions for use in questionnaires needs to occur prior to the survey to guard against systematic error from the outset (Atkinson, 1991).

3.3.2 Case note review

The review of case notes has been a common approach to collecting data for audit and medical research (see for example Dundas, Murphy, Soutar *et al.*, 1999; Aly, McDonald, Leathley *et al.*, 2000; Spencer, Knight and Will, 2002). Data which were not primarily collected for research purposes, but later utilised in research are often referred to as 'secondary data'. This term, defined by Glaser (1963), is broad enough to encompass: personal diaries, official statistics, literature, and raw research data, which can be re-analysed. Given the variety and amount of potentially useful secondary data, it is perhaps not surprising to find that many nursing studies draw upon it, although it rarely constitutes the sole source of data (Reed, 1992). Case notes provide a cheap and useful source of data and the subsequent abstraction of the data involves minimal use of clinical staff and disruption to their work (Hale, Thomas, Bond *et al.*, 1997). A further advantage is that data from clinical notes tends not to be influenced by the specific study questions or any associated data collection instruments and could therefore be seen as 'unbiased' (Hale, Thomas, Bond *et al.*, 1997).

However, some caution needs to be exercised when using data collected from clinical notes for a number of reasons. First, information documented in notes may be inconsistent or missing (Waters, 1987). Hale *et al.* (1997) for example, found that whilst some elements of care were consistently well documented others were poorly documented. Pain management in patients with myocardial infarction, and prevention of pressure sores in patients with fractured neck of femur, were comparatively well documented in the study of nursing notes by Hale *et al.* (1997), whereas nutrition, anxiety and patient education were poorly documented. Second, the abstraction of data from notes has potential problems. For example, quantitative values such as vital signs and blood gas values tend to be abstracted with higher reliability than variables which require judgement, such as the character of vital signs or the history of a disease (Herrmann, Cayten, Senior *et al.*, 1980).

3.3.3 Routinely collected data

Routinely collected data such as the information collected by medical records personnel, primarily for clinical records, can be termed 'secondary data' (Glaser, 1963). If routinely collected data is stored electronically then easily accessible, large data-sets which can offer significant statistical power through their large size, can be made easily available to researchers (Safavi, 1998). The benefits of using standardised data to extend, for example, audit across hospitals to increase sample sizes has been recognised (Black and Moore, 1994). However, caution has to be exercised when using large data-sets of routinely collected data, as often many different people may have been involved in data entry, and the resulting coded data may at times be inaccurate (Safran, 1991). Clinical data in routinely collected data-sets can be ambiguous, as different terms may be interpreted differently by different people. For example, the commonly used term 'finished consultant episode' has been illustrated to be almost meaningless (Clarke and McKee, 1992). Unfortunately, there is often disagreement over diagnosis. In 1965, a study showed that three cardiologists could only agree on a diagnosis of angina in 75% of cases in men with chest pain (Rose, 1965), and in a study which examined two senior surgeons, who used the same set of criteria to judge the success of an operation for peptic ulcers agreed on the success of the operation in less than two-thirds of cases (Hall, Horrocks, Clamp *et al.*, 1976). Such disagreements arise partly as doctors use different diagnostic criteria and their decisions are subject to a variety of personal biases (McKee, Dixon and Chenet, 1995). Wherever there are disagreements on what

diagnostic codes represent, there will be potential problems with studies that utilise this form of data.

On the positive side, routinely collected data are often well structured. Structured data collected from using a *pro forma* or directly from computer collected information has been shown in a number of studies to improve data recording (Walters and McNeill, 1990; Chua, Cordell, Ernsting *et al.*, 1993; Wallace *et al.*, 1994; O'Connor, Finnel and Reid, 2001). In addition, data collection systems that are 'owned' by a clinical team have been shown to contain higher quality data than general patient administration systems (Cleary, Beard, Coles *et al.*, 1994a; 1994b).

3.4 A Consensus Methodology: the Nominal Group Technique

One mechanism of synthesising information in areas where published material is inadequate or non-existent, is to use a method which harnesses the insights of appropriate experts. These methods are termed consensus methodologies (Jones and Hunter, 1995). Consensus methodologies include nominal groups, focus groups, Delphi techniques and interviews.

The nominal group technique (NGT) is 'a structured meeting which seeks to provide an orderly procedure for obtaining qualitative information from target groups who are most closely associated with a problem area' (Van de Ven and Delbecq, 1972, p338). The technique was originally developed by Delbecq and colleagues in the mid 1960s (Delbecq, Van de Ven and Gustafson, 1975) from an analysis of group decision-making in aerospace, environmental and industrial fields. It has since been applied and widely used in health care (see for example McKee, Priest, Ginzler *et al.*, 1992; McKee and Black, 1993; Gibson and Soanes, 2000).

The purpose of the nominal group process is to generate ideas, which are then discussed and ranked by the group (Moore, 1987). Following the selection of the group, the group meets and generally proceeds through a number of steps: 1) introduction to the nominal group process; 2) silent generation of ideas in writing; 3) round-robin listing of ideas; 4) discussion of ideas on to a flip chart; 5) rank ordering of ideas; 6) calculation of total ranking; 7) further discussion; and, 8) conclusion (Butterfield, 1988).

The whole process is tightly controlled with discussion only occurring during the latter stages of the group process. The group is guided by a facilitator, who controls the group process and has been described as acting essentially as a collector of ideas rather than leading the discussion (O'Neil and Jackson, 1983). The NGT is a qualitative technique which aims to develop creative group problem solving by drawing on the best characteristics of brain storming, voting, the Delphi process and committee work. The technique is specifically designed to avoid many of the known problems of group interviews or committee work, for example, where some participants may be silent or overridden by more articulate or dominant group members, particularly in groups where there are real or perceived hierarchies, as all members have an equal opportunity to contribute (Carney, McIntosh and Worth, 1996).

The modified nominal group technique has evolved from the nominal group technique, and has been attributed to Glaser (1980) by several authors including Scott and Black (1991b), Hunter, McKee, Sanderson *et al.* (1994); and Jones and Hunter (1995). The modified technique involves the incorporation into the nominal group process, a literature review of background material for the topic under discussion (Jones and Hunter, 1995). The literature review and a questionnaire asking panel members to rate the various ideas or items identified from the literature are then sent to panel members prior to their meeting. At the meeting panel members are: 1) given feedback on the groups overall ranking or rating; 2) the ideas or items are discussed in turn; 3) panel members are then given the opportunity to reconsider and alter their initial rating; and, 4) the final ratings are analysed for agreement using pre-agreed rules (Scott and Black, 1991a).

3.5 Randomised Controlled Trials

Randomised controlled trials (RCTs) are a form of experimental research and are considered to be one of the most rigorous ways to determine whether a cause and effect relationship exists between a treatment and an outcome (Sibbald and Roland, 1998). They are much less susceptible to bias than non-randomised studies (Chalmers, Celano, Sacks *et al.*, 1983; Petitti, 1994) and utilise quality standards which have been extensively evaluated (Altman and Dore, 1990; Altman, 1991; Schulz, 1995; Schulz, Chalmers, Hayes *et al.*, 1995). A limiting factor for conducting RCTs is that they are generally more costly and time consuming than other studies. Careful consideration therefore needs to be given to their use and timing (Sibbald and Roland, 1998).

In experimental research design the researcher actively introduces some form of intervention (Polit and Hungler, 1995). The aim, to understand the nature of the relationship between different phenomena, is achieved by the researcher observing the phenomena under question under tightly controlled conditions. A true experiment can be defined as a scientific investigation characterised by manipulation, control and randomisation (Polit and Hungler, 1995).

Manipulation involves the experimenter doing something to at least some of the subjects in the study, for example, the experimental treatment or intervention. Control usually relates to a group which did not get the experimental treatment, but perhaps received a standard treatment.

3.5.1 Randomisation

Randomisation involves allocating the subjects into the experimental group or the control group on a random basis. Random assignment means that every subject has an equal chance of being assigned to any of the groups in an experiment. If subjects are placed into groups randomly, then there is no systematic bias within those groups with respect to attributes that may affect the dependent variable under investigation (Polit and Hungler, 1995). This, however, will only be true for large groups and implies the groups will not differ substantially on average. In small-scale clinical research it is not uncommon to find some large differences in important characteristics even when participants were assigned to groups randomly (Morgan, Gliner and Harmon, 2000). Randomisation is considered to be the most crucial aspect of the design of a controlled trial (Schulz *et al.*, 1995).

Randomisation contributes three major advantages. First, it eliminates bias in the assignment of treatment. Treatment comparisons will not be prejudiced by selection of particular patients. Second, randomisation facilitates various devices for blinding the identity of treatments to investigators and participants. Third, random assignment permits the use of probability theory to determine whether any differences seen in outcome between the treatment groups may be due to chance alone (Schulz, 1998).

Randomisation can be achieved in a number of different ways. *Simple randomisation* is where every participant has an equal chance of being in any study group. However, in small trials simple randomisation can result in groups which differ relatively in size

(Schulz, 1998). Further variations on randomisation include *stratified randomisation* (which controls for the effects of important factors, e.g. age, sex), *blocked randomisation* (which ensures roughly equal sized treatment groups), and *cluster randomisation* (where groups of individuals are randomised rather than individuals, e.g. all patients attending hospital A) (Petrie and Sabin, 2000). *Systematic randomisation* is where individuals are allocated to groups systematically, perhaps by the day of their visit or their date of birth. This method of randomisation should be avoided as it makes concealment of allocation virtually impossible.

3.5.2 Blinding

Preventing selection and confounding bias in trials depends largely on two interrelated processes: 1) generating an unpredictable assignment sequence and 2) concealing that sequence until allocation occurs (Schulz, 1998). Knowledge of the next assignment could lead to exclusion of the participant, because they would have been allocated to the ‘wrong’ group. Alternatively, other participants may be selected and directed towards ‘desired’ groups. This could occur simply by delaying a participant’s entry into a trial.

Schulz *et al.* (1995) assessed the quality of 250 RCTs from 33 meta-analyses and then analysed the associations between those assessments and estimated treatment sizes. They found that in trials where the allocation sequence had been inadequately concealed, larger estimates of treatment effects were found compared with trials where the authors reported adequate allocation concealment. In the same study the authors also found that studies which did not have adequate sequence generation yielded estimates of treatment effects similar to those derived from trials with adequate sequence generation. This led the authors to conclude that adequate sequence generation appears to play a smaller role overall in the prevention of bias than the approach to allocation concealment. However, adequate sequence generation is also important in reducing bias. When the same authors restricted their analysis to trials with adequate allocation concealment, they found that those with inadequate sequence generation yielded larger estimates of effects than trials with adequate sequence generation.

Where possible, blinding should also be utilised to reduce *assessment bias*. Assessment bias may occur if participants, and/or the assessors involved are aware of the treatment allocation. A trial in which both the participant and the assessor are unaware of the treatment allocation is a *double blind trial*, and a trial in which it is impossible to blind

the patient may be *single blind* providing the assessor is blind to the treatment allocation.

Depending on the individual circumstances of a clinical trial it may not always be possible to blind either the patients or the assessors. Pocock (1983) describes four areas for consideration before blinding can be applied to any clinical trial:

1. *Ethics*. The blinding procedure should not result in any harm or undue risk to the patient (e.g. it would be unethical to subject control group patients to an incision under anaesthetic in a surgical trial).
2. *Practicality*. For some treatments it would be totally impossible to arrange a double-blind trial (e.g. it may be impossible to blind clinicians or patients to whether a fracture is immobilised in a plaster of Paris cast or using external fixation).
3. *Avoidance of bias*. Careful consideration of how serious any potential bias might be without blinding.
4. *Compromise*. Sometimes partial blinding (e.g. using independent blinded evaluators) can be sufficient to reduce bias in treatment comparison.

3.6 Methods of Data Collection

3.6.1 Questionnaires

Questionnaires are the most commonly used form of data collection tool in nursing research. Studies by Brown, Tanner and Padrick (1984) and Jacobsen and Meininger (1985) who between them examined 571 nursing studies in a number of different nursing journals over selection of years from the 1960s, 1970s and 1980s, found that the questionnaire was the most commonly used instrument in nursing research. Arguably, questionnaires are still the most common method of data collection (Parahoo, 1993).

Questionnaires are also commonly used in many other areas of research and daily life as a way of assimilating information: from pollsters predicting the outcome of elections, to customer questionnaires in shops and banks. As such, people are familiar with this technique. Questionnaires have been described as ‘a series of questions for the purpose

of obtaining information' (Oppenheim, 1992), and 'that the world is full of well-meaning people who believe that anyone, who can write plain English and has a modicum of common sense, can produce a good questionnaire' (Oppenheim, 1992). However, a questionnaire can only be regarded as a research tool if it has been designed and administered for the purposes of collecting data, in a rigorous and systematic manner, with due attention given to the relevance of the questions to the research objectives (Polit and Hungler, 1995). Questionnaires take considerable time and effort to develop in order to ensure that they are reliable and valid instruments to answer the research questions they were designed for (Mead, 1993).

There are two main types of questionnaires: those with pre-determined and standardised questions, or those with questions which can be expanded upon (Parahoo, 1993). The former type are usually self-administered (self-administered questionnaires), whereas the second may be used by the researcher during an interview (as an interview schedule). The degree of involvement with the researcher will largely depend on the research design. Self-completion questionnaires may be administered to subjects in person or can be used as postal questionnaires.

The most common question types used in questionnaires are open-ended and closed-ended. Open-ended questions allow the respondent to formulate their own response. They can provide useful illustrative material and allow for responses which the researchers may not have foreseen, however they do place a considerable burden on respondents, particularly for respondents who have difficulty in articulating their views or writing things down (McColl, 1993). With closed questions (forced choice or pre-coded questions) respondents are presented with a range of possible answers and asked to choose the most appropriate response. One advantage with this form of question is that the respondent has their attention focused on the type of information required and misunderstanding is reduced. Closed questions also facilitate data processing and analysis. Rigorous pre-testing and piloting are essential, to ensure that all possible options have been included and ambiguity in the question is removed.

In a questionnaire, the wording of individual questions is vital for obtaining reliable and valid answers (see Section 3.2.3). Respondents should be expected to be able to know the answers to questions; therefore questionnaires should be relevant to the study population group and use a level of language appropriate to the group as a whole.

Simple short vocabulary with short uncomplicated questions appropriate to the target population should be used. Wording of questions should be clear, unambiguous and inoffensive (McColl, 1993).

The sequence the questions are presented in is important. There should be a smooth, logical flow of ideas. If certain questions are used as filter questions (where the relevance of further questions depends on the answer to previous questions) then instructions to skip questions has to be made very explicit. Sensitive and difficult questions are usually placed toward the end of a questionnaire, allowing a rapport to be built up with the respondent and for the respondent to feel more confident about answering these types of question (McColl, 1993). Questionnaires should be designed to make them appear clear and easy to complete. A well presented questionnaire is likely to make the task of the respondents easier and to improve response rates.

In order to ensure both the validity of questions and the reliability of the questionnaire, it is important that any newly developed questionnaire is rigorously pre-tested and piloted. Several revisions of questions and alterations to the questionnaire layout may be required to ensure ambiguities are removed, all possible answers have been catered for, and instructions are clear.

3.6.2 Postal questionnaires

Edwards, Roberts, Clarke *et al.* (2002) conducted a systematic review of RCTs which examined methods to influence the response to postal questionnaires. Two hundred and ninety-two trials which had utilised 258,315 participants were included in the review. A total of 75 different ways of increasing the response rate were identified. The odds of a response were more than doubled when monetary incentives (for example see Camunas, Alward and Vecchione, 1990; Berk, Edwards and Gay, 1993) and recorded delivery (for example see Del Valle, Morgenstern, Rogstad *et al.*, 1997; Gibson, Koepsell, Diehr *et al.*, 1999) were used. Shorter questionnaires, providing a second copy of the questionnaire at follow-up, 'user friendly' questionnaires and university sponsorship substantially improved response rates (Edwards, Roberts, Clarke *et al.*, 2002). Pre-notification, non-monetary incentives, follow-up contact, personalised questionnaires, use of coloured as opposed to blue or black ink on questionnaires, use of stamps as opposed to franked envelopes and outward first class mailing all improved response (Edwards *et al.*, 2002). Response rates were adversely affected when the

questionnaire included questions of a sensitive nature, when questionnaires began with the most general questions or when participants were offered the opportunity to opt out of the study (Edwards *et al.*, 2002).

Advantages to postal questionnaires include the low cost of data collection and processing, the avoidance of interviewer bias and the ability to reach respondents who live at widely dispersed addresses (Oppenheim, 1992).

Presenting the self-administered questionnaire directly to the respondent has a few advantages over postal questionnaires. Instructions can be explained in person and misunderstandings corrected. Accurate sampling is more likely and minimal interviewer bias is likely to occur as interaction between the researcher and respondent is kept to a minimum. However, even limited personal contact can increase the chances of the respondent completing the questionnaire, and the questionnaires response rate.

As with any research methodology, questionnaires have their limitations. Perhaps the most serious limitation with questionnaires, and in particular with postal questionnaires, is the problem of non-respondents. There are inherent difficulties when attempting to make generalisations from the data if a sizeable proportion of the sample do not respond introducing a bias to the responses. Non-respondents' views are of equal importance to those who do respond. Questionnaires are also not suitable for respondents of poor literacy, physical impairment to reading or writing, or who do not understand the language the questionnaire is written in (Oppenheim, 1992).

Questionnaires rely on respondents accurately reporting their attitudes, thoughts, behaviour or actions. Mechanic (1989) has reported that 'there is an exhaustive literature on the gap between measurement attitudes and intentions, and subsequent behaviour'. A respondent's memory and/or perspective can make the reporting of past events unreliable. Other respondents may have a tendency to distort their responses in order to present a favourable image of themselves: a social desirability response bias (Polit and Hungler, 1995). Other response biases include respondents who are found to agree to statements regardless of the content, sometimes referred to as 'yea-sayers' and the less common 'nay-sayers' who have the opposite tendency. Together these are known as the 'acquiescence response set' (Polit and Hungler, 1995).

Other disadvantages include the fact that there are no opportunities to correct misunderstandings or to probe respondents' answers. The researcher has no control over the order in which questions are answered, who has completed the questionnaire, incomplete responses or incomplete questionnaires (Oppenheim, 1992).

3.6.3 Patient satisfaction questionnaires

Patients are the consumers of health care and their evaluation of the service they receive is important. It could be argued that if a new service is introduced it is of vital importance that the service is acceptable to patients, particularly if patients have the option of seeking care elsewhere: as is the case in the field of minor injuries. Therefore patient satisfaction has been seen to have 'common sense' appeal as evidence in support of practice (Walsh, 1998). However, patient satisfaction has also been demonstrated to be an important predictor of whether patients comply with treatment (Kincey, Bradshaw and Ley, 1975; Larson and Rootman, 1976), whether patients re-attend for treatment (Roghamann, Hengst and Zastowny, 1979) or change their provider of care (Weiss, McLain and Fullerton, 1988). Evidence also exists to demonstrate that patient satisfaction is related to improvements in health status (Fitzpatrick, Hopkin and Harvard-Watts, 1983; Fitzpatrick, Bury, Frank *et al.*, 1987). Patient satisfaction can also be a useful way of assessing consultations and patterns of communication (e.g. the success of information giving; involving the patient in decision making; and of reassurance) (Savage and Armstrong, 1990).

Measuring satisfaction is a surprisingly complex task (Carr-Hill, 1992). Patient satisfaction is multi-dimensional (Fitzpatrick, 1991b). Patients might be satisfied with one element of their care, but not another. The Health Policy Advisory Unit (HPAU) discuss six underlying dimensions to patient satisfaction (Sutherland, Lockwood, Minkin *et al.*, 1989): satisfaction with 1) medical care and information; 2) food and physical facilities; 3) non-tangible environment; 4) quantity of food; 5) nursing care; and, 6) visiting arrangements. However, these are dimensions of satisfaction relating to inpatient care which do not necessarily apply to other areas of health care. Fitzpatrick (1991a) lists 11 different dimensions of patient satisfaction: humaneness, informativeness, overall quality, competence, bureaucracy, access, cost, facilities, outcome, continuity, and attention to psychosocial problems. These 11 dimensions are based on the different aspects of patient satisfaction identified in a meta-analysis of 221 predominately American studies by Hall and Dorman (1988). These, however, relate to

dimensions of satisfaction which have been quantitatively measured in the studies reviewed and therefore may not be an exhaustive or all encompassing list.

Not only are there many different dimensions to satisfaction, but health care is often provided by a team of people from porters and reception staff to highly qualified nurses and medical consultants. Patients might be satisfied with all dimensions of satisfaction relating to their contact with their surgeon, but not with the receptionist who took their details on arrival. Therefore measuring satisfaction is very subjective.

Whenever patient satisfaction is measured, typically high levels of satisfaction are reported (Carr-Hill, 1992). Walsh and Walsh (1999) argue that in the UK there is a strong attachment of the British public to both the nursing profession and the NHS, this may help to explain why patient satisfaction studies consistently show high levels of satisfaction.

Many instruments exist to measure patient satisfaction (McDaniel and Nash, 1990; Wilkin, Hallam and Doggett, 1992; Scardina, 1994; Kinnersley, Stott, Peters *et al.*, 1996; McColl, Thomas and Bond, 1996). However, few are appropriate to the A&E setting where contact with the service is usually both sudden and urgent, and where there is unlikely to be an expectation of continuing care (Byrne *et al.*, 2000).

Fitzpatrick, Davey, Buxton *et al.* (1998) undertook a review of 'patient-based outcome measures'. Major databases were searched including Medline, CINAHL, PsychLIT and Sociofile. From an initial 5621 abstracts and articles identified as potentially relevant, 391 key references were selected as relevant to the objectives of the review. One of these objectives was to identify the criteria investigators should use when selecting patient-based outcome measures for use in a clinical trial. Evidence was synthesised, critiqued and then evaluated by a panel of ten experts. These experts were recruited to represent a wide range of areas of expertise (which included clinical medicine, clinical trials, health economics, health services research, social sciences and statistics). Eight criteria were identified: *appropriateness, reliability, validity, responsiveness, precision, interpretability, acceptability* and *feasibility*.

One of the first and most fundamental considerations when selecting a patient-based outcome measure, such as patient satisfaction, is its appropriateness to the aims of the particular trial. The instrument must be fit for purpose (*appropriateness*). As with any

instrument it should be both reliable and valid. *Reliability* relates to whether the instrument produces results that are reproducible and internally consistent. *Validity* of an instrument is concerned with the instrument measuring what it is supposed to measure.

If an instrument is measuring health status, it is essential that it can detect important changes over time within individuals (*responsiveness*). This might, for example, reflect therapeutic effects. However, this will only be of importance if an instrument is to be administered on more than one occasion to the same group of patients.

Instruments vary in their *precision* or sensitivity. At one extreme, patients may be able to give a 'yes' or 'no' response, but these binary responses do not allow for measurement of degrees of satisfaction with various statements. Likert scales are often used in many instruments to measure some graduation of response.

The *interpretability* of an instrument relates to how meaningful the scores from the instrument are. Fitzpatrick *et al.* (1998) make the point that the interpretability of scores has only relatively recently begun to receive attention in the literature. It has been noted that patient-based outcome measures do not have the same interpretability that other measures, for example, blood pressure or blood sugar levels have for clinicians (Deyo and Patrick, 1989; Greenfield and Nelson, 1992). Fitzpatrick *et al.* (1998) argue that this may, to some extent, be due to lack of familiarity with use. As instruments are more widely used in trials they will become more widely known and more familiar (Greenfield and Nelson, 1992). Other methods have been undertaken such as calibrating scores from an instrument against other life events, such as the loss of a job (Testa, Anderson, Nackley *et al.*, 1993) or identifying a plausible range within which a minimally clinically important difference falls (Juniper, Guyatt, Willan *et al.*, 1994). A different approach uses 'normative' data from the general population with whom scores can be compared. In practice this only occurs with a few widely used instruments like the Short Form-36 (SF-36) where 'normative' data exist (Jenkinson, Layte and Lawrence, 1997).

It is essential with any patient-based outcome measure that it is acceptable to patients. An acceptable instrument will help to ensure high response rates and will minimise avoidable distress to patients. Fitzpatrick *et al.* (1998) report that the acceptability of outcome measures has often not been examined and that there is little consensus as to

what constitutes acceptability. They recognise that pragmatically, investigators are concerned with obtaining as complete data from as many participants as possible. Various methods to increase response rates from questionnaires, has been discussed in Section 3.6.2.

Finally, the chosen instrument should be easy to administer and to process (*feasibility*). Data from patients in clinical trials is often collected within the context of normal clinical care. Excessive burden on clinical staff to administer long and complex questionnaires may jeopardise the conduct of the trial or patient care. Simple, short instruments are less likely to need as much staff supervision to administer and therefore will be more effective. With all these criteria in mind patient satisfaction instruments were examined for their suitability for use with minor injury patients.

Bisset and Chesson (2000) identified over four thousand entries on Medline alone between 1995 and 2000 which were related to the assessment of 'patient satisfaction'. The measurement of patient satisfaction has been one of the most common evaluation activities undertaken in the NHS, and there were a myriad of patient satisfaction questionnaires to select from (McDaniel and Nash, 1990; Wilkin *et al.*, 1992; Scardina, 1994; Kinnersley *et al.*, 1996; McColl *et al.*, 1996). However, many were specifically focused on in-patient care (see for example La Monica, Oberst, Madea *et al.*, 1986; Bruster, Jarman, Bosanquet *et al.*, 1994; McColl *et al.*, 1996; Meredith and Wood, 1995) or specific patient populations such as the elderly (Cryns, Nichols, Katz *et al.*, 1989) or surgical patients (Williams, Ash, Pararajasegaram *et al.*, 1991) and therefore were not suitable. Similarly out-patient or primary care questionnaires which specifically examined aspects related to two or more consultations (see for example Ware, 1978; Chao, 1988; Baker, 1991; DiTomaso and Willard, 1991) were excluded as care in A&E tends to be related to a single episode.

As the proposed trial (see Section 4.7) aimed to specifically compare ENP-led care with SHO-led care, an instrument was required which explicitly explored how patients felt about their consultation with the clinician who was primarily responsible for their care. Instruments which examined dimensions of satisfaction outside of the consultation were excluded. The rationale for this was related to the trial design and the fact that patients were to be randomised to either ENPs or SHOs within the same environment. All other factors such as the physical environment, access etcetera would be the same for both

groups. This meant that a number of questionnaires designed for use in A&E were not included as they contained questions which related, for example, to the waiting room environment or registration by reception staff (see for example Buckles, 1990; Lewis and Woodside, 1992; Maitra and Chikhani, 1992). Questionnaires which had been used in other studies to examine patient satisfaction with single episode out-patient consultations with nurse practitioners were examined in detail (Touche Ross, 1994; Heaney and Paxton, 1995). Ultimately they were excluded as neither questionnaire had been formally evaluated for either reliability or validity. In addition the questionnaire developed by Heaney and Paxton (1995) contained a large number of open-ended parts to questions which would have made analysis much more complex in a large study.

Two specific questionnaires were identified which were designed to assess patient satisfaction with a single out-patient consultation and which had been subjected to formal reliability and validity testing (Bowman, Herndon, Sharp *et al.*, 1992; Jenkins and Thomas, 1996). The North Worcestershire Patient Satisfaction Questionnaire developed by Jenkins and Thomas (1996) was eventually selected as it was associated with a higher response rate (85% vs 70%) and slightly better reliability scores (Cronbach's Alpha 0.84 vs. 0.80) than the Patient-Doctor Interaction Scale (Bowman *et al.*, 1992). The questionnaire selected for the *RCT of ENP-led care* will be discussed in detail in the next section 3.6.4.

3.6.4 North Worcestershire Patient Satisfaction Questionnaire

The North Worcestershire Vocation Training Scheme's Patient Satisfaction Questionnaire was designed to measure patient satisfaction with GP registrars' consultations, and was originally developed by Jenkins and Thomas (1996). Criteria were chosen for the questionnaire based on a published prioritised list of what patients wanted from consultations with their doctors (Gray, 1992). The top requests were all related to better communication. A group developed a small number of criteria which they agreed were related to a patient-centred consultation and centred around communication skills. The developed questionnaire consisted of a statement relating to each of these criteria, three reciprocal (negative statements) and a global statement relating to the level of patients' general satisfaction with the consultation producing a total of 11 statements. The level of agreement or disagreement with each statement was measured using a 5-point Likert scale. Using the Likert scale allowed a degree of precision in the measurement of agreement or disagreement with each statement.

The reliability and validity of this questionnaire was assessed during the development process when the questionnaire was piloted on 500 patients. No patient refused to participate in this study. Eighty-five per cent of the questionnaires were returned fully completed which demonstrated that patients found the questionnaire acceptable. The reliability of the questionnaire was assessed using a test of internal consistency (Cronbach's Alpha) and reproducibility (Weighted Kappa Statistic). A high level of internal consistency was demonstrated (Cronbach's Alpha 0.84), indicating a good strength of relationship between the statements, and that they shared much in common for measuring the degree of patient satisfaction.

Reproducibility was assessed using the Kappa statistic. A fair to moderate agreement was found between each of the positive statements and their reciprocals (Kappa (κ) 0.34, 0.44, 0.45). This weighted Kappa statistic is a measure of the strength of agreement. It has been suggested that values between 0.21 and 0.4 are said to show fair agreement and those between 0.41 and 0.6 demonstrate moderate agreement (Landis and Koch, 1977). This suggests that patients generally understood and completed the questionnaire accurately.

As a measure of criterion validity each of the ten statements was compared with the statement on general satisfaction using the Spearman correlation coefficient (r_s). All statements were found to be significantly associated with the statement exploring general satisfaction with the consultation ($p < 0.0001$) and therefore demonstrated evidence of criterion validity ($r_s = 0.26-0.61$). Although the statements relating to patient understanding ($r_s = 0.61$), ease of problem sharing ($r_s = 0.54$) and time adequacy ($r_s = 0.52$) were more closely related, than statements relating to listening ($r_s = 0.47$), information imparted ($r_s = 0.43$) and health education ($r_s = 0.26$), and are similar to findings found by Baker (1993) and Fitzpatrick and Hopkins (1993). The questionnaire therefore appears to be acceptable to patients and to be a reasonably reliable and valid instrument for measuring aspects of patient satisfaction with GP registrars' consultations.

There are limitations which relate to this questionnaire. Firstly, as with any short instrument that aims to measure patient satisfaction there will be, by necessity, dimensions of satisfaction which are not included. Using the dimensions of patient satisfaction identified by Hall and Dornan (1988) statements relating to humaneness, informativeness, and overall quality, were included in the questionnaire, but measures

of competence, bureaucracy, access, cost, facilities, outcome, continuity, or attention to psychosocial problems, were not directly explored. Whether these dimensions are important to measure in a particular study will depend on the aims of the particular study in question (appropriateness) (Fitzpatrick, Davey, Buxton *et al.*, 1998). Secondly, this instrument was developed for use in a primary care setting and in particular with GP registrars. Prior to its use for patients of other clinicians, similar reliability and validity testing would be required.

3.6.5 Diaries as a research tool

Diaries have been used extensively in social and business research but less often in health and related research (Freer, 1980a). Diaries have been used in health-care research since the 1930s and 1940s (Burman, 1995). Where they have been used in health research they have tended to be used for one of three main reasons: 1) as a comparison with other reporting tools; 2) as memory aids to improve recall of health events in later interviews; and, 3) as a primary data resource (Verbrugge, 1980).

Diaries have been used with healthy people (Banks, Beresford, Morrell *et al.*, 1975; Freer, 1980b; Woods, 1985; Duffy, 1986), families (Roghamann and Haggerty, 1972; Keleher and Verrinder, 2003), children (Butz and Alexander, 1991), and elderly people (Rakowski, Julius, Hickey *et al.*, 1988). They have also been used with patients suffering a variety of conditions from headaches (Porter, Leviton, Slack *et al.*, 1981) and asthma (Avery, March and Brook, 1980; Rachelefsky, 1984; Janson-Bjerklie and Shnell, 1988; Hyland, Kenyon, Allen *et al.*, 1993) to patients with cancer (Musci and Dodd, 1990; Oleske, Heinze and Otte, 1990; Nail, Jones, Greene *et al.*, 1991; Dodd, Dibble and Thomas, 1992). In experimental research, diaries have been used to record the experiences of patients who have undergone different treatments. For example diaries were used in an experiment to test the efficacy of chest physiotherapy with or without positive expiratory pressure in patients with chronic bronchitis (Christensen, Nedergaard and Dahl, 1990).

Diaries have been found to be a useful means for data collection relating to the daily events of short-term acute illnesses and minor symptoms (Roghamann and Haggerty, 1972). Higher data quality can be obtained from diaries than from frequent phone calls to collect the same information (Dahlquist, Wall, Ivarsson *et al.*, 1984). Another advantage of diaries is that they collect information on events which have occurred in

the actual context of everyday life and are less likely to be affected by memory recall or idealised (Lawson, Robinson and Bakes, 1985).

Diaries have traditionally been paper based but recently handheld computers (Stone, Shiffman, Schwartz *et al.*, 2003), e-mail diaries (Garry, Sharman, Feldman *et al.*, 2002), web-based diaries (Baer, Saroiu and Koutsky, 2002), and touch-tone telephone systems (Harding, Hamm, Ehsanullah *et al.*, 1997) have been tried. Basically, there are two broad types of health diary (Burman, 1995). The first is where subjects enter data each time a specific event has occurred. This type of diary is often referred to as a ledger type diary. For example, in a study (Janson-Bjerklie and Shnell, 1988) examining asthma management, patients were asked to document each episode of asthma symptoms in a ledger diary. Patients documented the type of symptoms, date, time and precipitating factors. No information was recorded on symptom free days.

The second type of diary is a journal diary where entries are made at specific time intervals, for example, daily, independent of whether an event has occurred or not. Garry *et al.* (2002) used a journal diary to record the sexual behaviour of college students, although these were in an electronic e-mail format rather than paper based.

These two types of diaries have their advantages and disadvantages. Ledger diaries are less burdensome on subjects, as they are only updated when a specific event occurs. In comparison, journal diaries provide daily information which cannot be ascertained from a ledger diary (Burman, 1995). For example, if there is no entry in a ledger diary for a specific day, perhaps it was because no recordable event was experienced by the diary holder that day or perhaps it was because the diary was not completed and the information is missing. Therefore with a journal diary, the researcher may be able to differentiate more definitively the absence of an event from missing data (Rogghmann and Haggerty, 1972).

In a study which involved participants being given a paper based diary with a hidden light sensor which recorded whether the diary had been opened or not, 32% of the days contained no diary openings (as recorded by the sensor) yet 92% contained written entries for these days (Stone, Shiffman, Schwartz *et al.*, 2002). This phenomenon of retrospectively adding entries was termed as 'hoarding' by the researchers. Stone *et al.* (2002) identified that three-quarters of the patients in their study 'hoarded' the diary for at least one day.

Diaries can vary considerably in their complexity, with some being only a single page, where others are multiple pages. The complexity of a diary depends on its purpose, however, the burden on respondents has to be taken into consideration. As with any questionnaire, the questions in a diary can be open-ended or closed. Open-ended questions allow more discretion by the respondent and may reduce bias, but will increase the time required for coding and analysis (Burman, 1995) and may reduce the response rate to the diary. Closed questions lessen participant burden and reduce the time spent in coding (Rakowski *et al.*, 1988). These different types of question can also result in over or under reporting of symptoms. In a study of perimenstrual symptoms, open questions resulted in lower estimates of symptoms compared to closed question symptom lists (Woods, Most and Dery, 1982).

The length of time subjects are expected to complete diaries varies considerably, and will depend on the diary's purpose. Studies have asked subjects to complete diaries from over a period of a few days (Miller, Pinnington and Stanley, 1999) to several years (Verbrugge, 1980). However, long diary periods (e.g. up to six months) may lower participation and completion rates (Turner, Smedley and Cherry, 2001). The frequency with which subjects are expected to complete a diary also varies greatly. Diaries can be completed each time an event occurs (ledger diary), every few minutes to every few days. Alternatively, participants may be asked to complete the diary on a random selection of days, as in the study by Norman, McFarlane, Streiner *et al.* (1982) where subjects were asked to complete the diary for only three randomly selected days during a two-week period.

Problems related to compliance with diary keeping have been noted in a few studies. Stone *et al.* (2002) found that patients had written entries into their paper-based diaries claiming to be written on a specific day or at a specific time, when the diaries had not actually been opened. Retrospective diary completion was also found in a study which examined asthma patients recordings of their peak flow measurement when a computer-based diary (which recorded time of entry) was compared with a paper-based diary (Hyland *et al.*, 1993). Hyland *et al.* (1993) also noted that three-quarters of patients in their study made at least one discrepancy between their hand-written entries in the paper-based diaries and entries on the computer.

Diaries are an effective method of gathering data on recent acute health conditions and minor symptoms (Verbrugge, 1980). They are less useful for collecting data on infrequent, major life events or crises (Burman, 1995). In older adults, chronic problems may be inconsistently reported in health diaries in comparison with interview data (Rosner, Namazi and Wykle, 1992), as single chronic problems were reported more often in diaries than at interview and the reverse was seen for multiple chronic problems. Rosner *et al.* (1992) argue that symptoms perceived as not serious or which do not interfere with normal activities of daily living are under-reported in diaries. Symptoms that are more difficult to conceptualise or describe may also be under-reported in diaries (Gold, Weiss, Tager *et al.*, 1989). Recall of events becomes more difficult after one week (Dahlquist *et al.*, 1984; Pramming, Thorsteinsson, Bendtson *et al.*, 1991) and interviews may be affected by social desirability (Carp and Carp, 1981), for example, participants may not remember, or may not wish to tell an interviewer, about every minor symptom they had experienced in order to avoid the appearance of moaning.

Generally, subjects appear not to mind agreeing to complete a diary. Rates of between 86% and 98% have been reported (Verbrugge, 1980). Completion rates vary, but rates of 80% are not uncommon (Roghamann and Haggerty, 1972; Verbrugge, 1980). Participants with higher educational levels, positive attitudes about participation, adequate reading and writing skills, higher incomes, and self-reported good health, are more likely to participate (Carp and Carp, 1981), as are older and married individuals (Norman, McFarlane, Streiner *et al.*, 1982).

Telephone contact with participants, rather than posted reminders improves completion rates (Norman *et al.*, 1982; Dahlquist *et al.*, 1984), as does collecting diaries from participants rather than expecting them to post them back (Verbrugge, 1980).

Diaries can be a useful method of collecting data from subjects, however careful thought must be given to the format, types of questions, and how often subjects are to complete the diary, if participant burden is to be minimised. Closed questions will reduce respondent burden, but may result in over-rating of symptoms. It is essential to pilot any diary to evaluate completion rates with a target population, as participation rates can vary considerably in diary studies. Telephone contact and other methods to

enhance completion should be used where possible. If diaries are posted this may result in lower completion rates.

3.6.6 Minor injury patients' diary

Read and George (1994) developed a diary specifically for minor injury patients. There were three main dimensions assessed in the diary: symptoms, patients' activities and additional treatment. The final version of the questionnaire consisted of nine questions. Four of these assessed patients' symptoms and were to be completed by patients on the first day and then every seventh day until the 28th day. The remaining five questions were to be completed on the 28th day, or earlier if the patient had fully recovered before then.

Read and George (1994) piloted the final version of their diary in a large A&E department. The diary was distributed to patients at their initial A&E attendance and patients were asked to return the completed diary by post. Patients were telephoned once during the course of the month to remind and encourage them to complete the diary. Reminders were sent to non-respondents. A total of 45 patients were involved in this pilot and 37 diaries were returned (a response rate of 82%). However, six diaries were incomplete. Seventy-one per cent of this cohort were successfully contacted by telephone during the month which was felt by Read and George (1994) to have played an essential part in achieving a successful response rate.

Although no formal tests of validity or reliability were conducted by the developers (Read and George, 1994) for their diary, the reliability and validity of diaries has been examined by a number of authors, and has been described as complicated (Burman, 1995). Burman (1995) makes the point that data collected in diaries may be 'unique' which therefore makes the assessment of validity more problematic because of the absence of comparable measures. Despite these difficulties a few studies have examined the reliability and validity of diary data. In another study diary information on sleep patterns was compared with more objective data from polysomnographic monitoring, a measurement of consistency (Kappa) was found to be good ($\kappa = 0.87$) (see Section 4.9.15), demonstrating that this particular diary was a reliable measure of sleep/wake patterns (Rogers, Caruso and Aldrich, 1993).

Criterion-related validity has been examined in a few studies by examining the relationship between daily health and social experiences, with functional, health-related and social measures, collected during interviews (Carp and Carp, 1981; Norman *et al.*, 1982; Montgomery and Reynolds, Jr., 1990). For example, Norman *et al.* (1982) reported correlations of 0.20 to 0.35 between scores from a symptom distress scale and diary variables, such as the number of symptom days. Laboratory observations of Parkinson's symptoms were moderately correlated (ρ values = 0.58 to 0.67) with symptoms reported in diaries (Montgomery and Reynolds, Jr., 1990). Predictive validity of health diary data was supported by examining the effect of relocations on social contacts using diaries (Carp and Carp, 1981).

Whilst the diary developed by Read and George (1994) can provide some insight into the patient's recovery, there are a couple of important limitations. First there is insufficient objective detail contained within it to: attempt to link a delay in healing or the occurrence of new problems to shortcomings in 1) diagnosis or treatment in the A&E department; or 2) whether these problems were related to the nature of the initial injury; or 3) from lack of compliance with instructions. Second, considerable effort is required to contact patients by telephone to encourage patients to complete and return the diaries.

3.6.7 Misdiagnosis Severity Score (MSS)

The *Misdiagnosis Severity Score* (MSS) was developed by Guly (1997a) as a method of describing the severity of diagnostic errors related to A&E patients. The Score indicates the severity of an error on a scale of 1 to 7, and is obtained by adding two scores which indicate the additional treatment which a patient would have received (the additional treatment score) and the follow-up which would have been organised (the patient disposal score) if the correct diagnosis had been made initially.

The MSS is calculated by adding the additional treatment score (see Table 3.1) to the difference between the patient disposal score (see Table 3.2) relating to what would have been done had the injury been correctly diagnosed and what was actually done. For example, if an un-displaced fracture of the radial head had been missed, but the patient had been treated with a sling and referred to their GP, this misdiagnosis would be assigned a MSS of 2. This would be calculated by adding the additional treatment score for this injury which as it had been managed acceptably in a sling, would be 1 (i.e.

no specific additional treatment required). Plus the difference in patient disposal scores, in this case 1 (the patient should have been referred to an outpatient clinic [1] minus, they were referred to their GP [0] equalling 1). The severity of any misdiagnosis is scored between 1 and 7. No error scores zero, as all errors have implications for patient care. Even the most minimal error can cause distress and upset for a patient if they know an error has been made.

Additional Treatment	Score
No specific treatment other than advice	1
Support bandage / sling / simple medication / physiotherapy	2
Plaster of Paris / splint / IV insertion (for fluid or drugs) / procedure under local anaesthetic or digital nerve block	3
Surgery under general or regional anaesthetic or other invasive procedure including chest drain, skeletal traction	4
Urgent surgery which should have been done immediately, for example extradural haematoma, abdominal trauma	5

Table 3.1: Misdiagnosis severity score: additional treatment score

Patient disposal	Score
Discharged or referred to general practitioner (GP)	0
Referred to outpatient clinic (including A&E clinic)	1
Admitted or referred to other hospital	2

Table 3.2: Misdiagnosis severity score: patient disposal score

The validity of the MSS has been assessed by comparing the MSS with senior A&E doctors’ perceptions of the severity of various misdiagnoses. In a study by Guly (1997b) 14 scenarios of commonly misdiagnosed presentations to A&E were distributed to 12 A&E consultants. They were asked to grade the severity of the diagnostic error on a scale of 1 to 10 (nine of these scenarios were injuries which are commonly managed by

many ENPs). Although there was a wide variation among individual doctors with a few scenarios, for example an epiphyseal fracture of the distal radius was scored from 2 to 8, the concordance between doctors' ranking of the severities of missed injuries was highly significant ($p < 0.001$). The score generated from the MSS for each misdiagnosis was calculated and compared with the median severity as assessed by the consultants. There was a highly significant correlation between the MSS and the consultants' median score ($r_s = 0.902$, $p < 0.001$). The authors concluded that this demonstrated that the MSS was an acceptable measure of the severity of diagnostic errors. However, the use of a correlation coefficient has been shown to be an inappropriate method of comparing two different measurement techniques as it can be misleading (Bland and Altman, 1986). This is primarily because it cannot detect situations in which one set of readings is systematically lower or higher than the other (Sackett, Haynes, Guyatt *et al.*, 1991). What the correlation result does show, is that both the MSS and the consultants' median scores appear to relate to each other in a positive linear way.

The wide variability of doctors' assessment of the severity of some injuries demonstrated in this study, provides a reason for using a more objective severity scale to assess the severity of a misdiagnosis, rather than the subjective judgement of senior medical staff. This would improve the reliability of assessing the severity of misdiagnosis, although the MSS had not been formally subjected to reliability testing.

It is important to note that the MSS is a non-linear score, produced by adding two non-linear scores together which could compound any difference. For example, the referral of an anxious patient to a follow-up clinic for reassurance who had originally been discharged adds a point to the MSS score, as does prescribing the same patient paracetamol tablets. This patient would therefore have an MSS score of 2. Whereas, a patient with a missed toe fracture may only score 1. A second limitation relates to the way injuries may be managed in different hospitals. For example, one department may routinely manage certain fractures in plaster of Paris casts (e.g. base of fifth metatarsal or minimally angulated fifth metacarpal fractures) whereas another department may manage these conservatively in supporting bandage. Therefore it is important that the score is applied consistently, perhaps basing the 'correct' management on local written protocols, for example, local ENP protocols. Another limitation of the tool is that it has not been designed to measure more than one diagnostic error, or to cope with misdiagnosed injuries whose corrective management may change over time. For

example, a comminuted fracture might be treated surgically if identified early (and be awarded a high score), but if identified later it may be managed conservatively and receive a lower MSS score.

3.7 Conclusion

There were a range of different research methodologies used in this thesis and a number of different instruments utilised. The reliability and validity of instruments published by other authors has been explored in the relevant sections. The next chapter details how the research methodologies and instruments discussed in this chapter were used to answer the research questions posed following the review of the literature presented in the preceding chapter.

Chapter 4

Materials and Methods

4.1 Introduction

This chapter outlines the procedures and methods that were used in the preparation and conduction of the two phases of this research programme. Phase 1 examined the extent and nature of ENP services across Scotland and how they developed over a three year period. Phase 2 examined instruments and methods which could be used to evaluate services, and tested them under trial conditions in a RCT.

4.2 Research Questions

As already outlined in Chapter 1, the research questions that were formulated for this work were:

- How widespread are ENP services throughout the different types of A&E departments in Scotland?
- What are the commonalities between ENPs in different departments?
- How have ENP services evolved over a three-year period?
- How does ENP-led care compare with SHO-led care (in terms of patient satisfaction, quality of clinical documentation, unplanned follow-up and missed injuries)?
- What is the extent and nature of the unplanned follow-up sought by patients, following an attendance in A&E with a minor injury?
- What proportion of patients, who return to A&E are subsequently found to have missed injuries?

In order to answer these questions the research programme was split into two phases. Phase 1 involved surveying Scottish A&E departments once in 1998 and again three

years later in 2001. Phase 2, considered different methods and tools to evaluate ENP-led care. This evaluation of ENP-led care was examined in three separate, but related, studies namely:

- The development of a tool to measure the quality of clinical documentation relating to minor injuries.
- The conduct of a small-scale RCT to test the procedures and methods to examine evaluation of ENP-led care, and to examine the quality of clinical documentation, patient satisfaction, and missed injuries.
- The examination of unplanned follow-up in minor injury patients.

4.3 Design and Plan of the Research

The first phase of the research utilised a postal survey design. The second phase involved a number of different methods including:

- A consensus methodology: the modified nominal group technique (used to develop an instrument to measure the quality of clinical documentation relating to minor injuries).
- A randomised controlled trial (used to evaluate ENP-led care compared with SHO-led care for the management of minor injuries primarily examining clinical documentation and patient satisfaction).
- A cohort of patients who attended for minor injuries were monitored using routinely collected data for re-attendance to A&E. Re-attenders had their case notes reviewed to identify missed injuries or inappropriate initial management and all patients in the cohort were sent a postal questionnaire to explore unplanned follow-up.

The two phases of the study were conducted concurrently. The key stages of the research and the timetable are outlined in Figure 4.1.

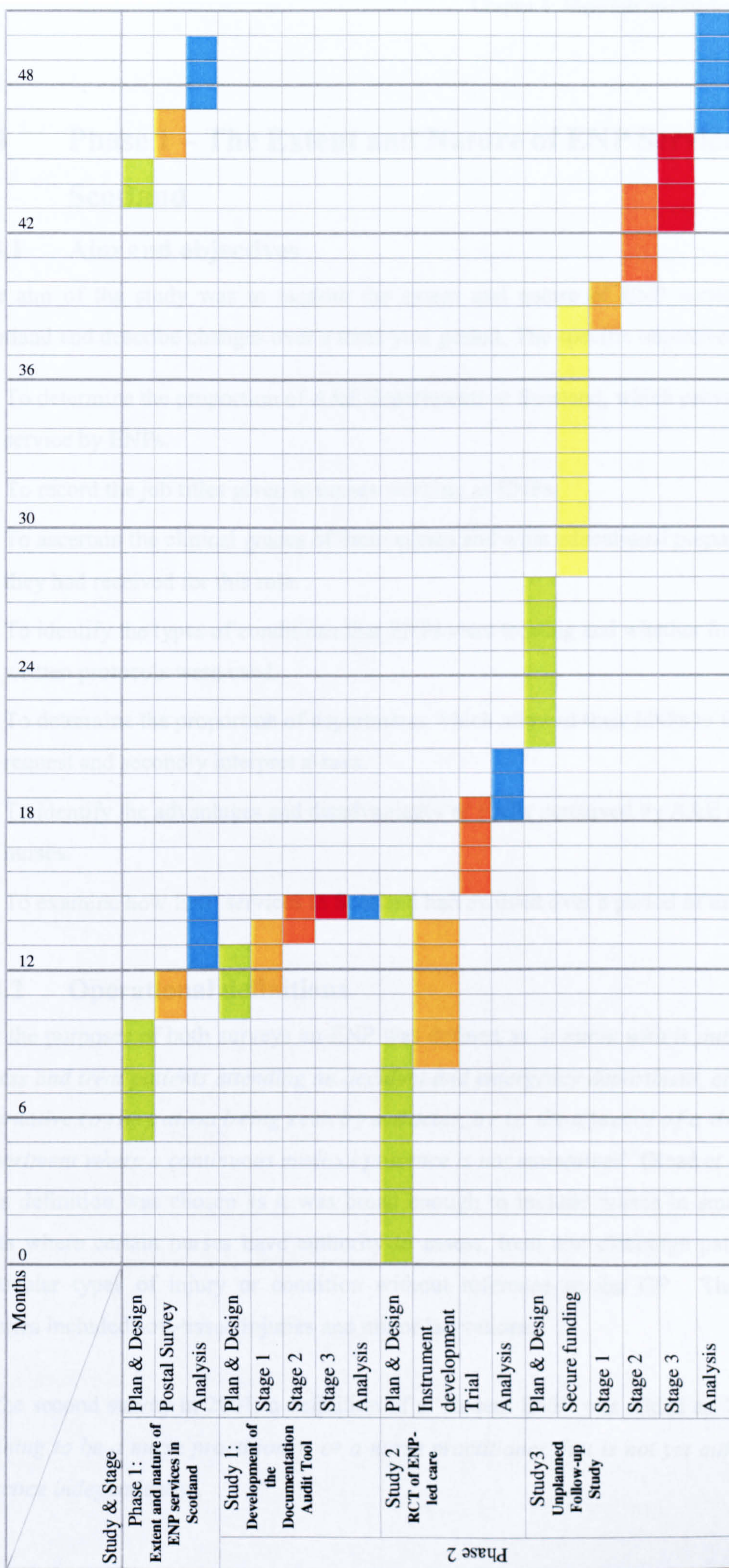


Figure 4.1: Design and time plan of research

4.4 Phase 1 – The Extent and Nature of ENP Services in Scotland

4.4.1 Aim and objectives

The aim of the study was to explore the extent and nature of ENP services across Scotland and describe changes over a three year period. The specific objectives were:

- To determine the proportion of A&E departments in Scotland, which provided a service by ENPs.
- To record the job titles given to nurses working as ENPs.
- To ascertain the clinical grades of these nurses and what educational preparation they had received for this role.
- To identify the types of conditions that ENPs were treating and whether formal written protocols were used.
- To determine the proportion of departments which allowed their ENPs to firstly request and secondly interpret x-rays.
- To identify the advantages and disadvantages of ENPs perceived by A&E senior nurses.
- To examine how ENP services in Scotland had evolved over a period of three years.

4.4.2 Operational definitions

For the purposes of both surveys an ENP was defined as *'a nurse who is authorised to assess and treat patients attending an accident and emergency department, either as an alternative to the patient being seen by a doctor, or in the absence of a doctor in a department where a continuous medical presence is not maintained'* (Read *et al.*, 1992). This definition was chosen as it was broad enough to include nurses in small GP-led units where certain nurses have authority to assess, treat and discharge patients with particular types of injury or condition without reference to the GP. These minor injuries included soft-tissue injuries and minor lacerations.

In the second survey in 2001, a definition of a 'student ENP' was added as *'a nurse in training to be a nurse practitioner, or a nurse practitioner that is not yet authorised to practice independently'*.

4.4.3 Identification of departments

The hospitals which provided some form of A&E service, were identified using the 1998 edition of the *Directory of Emergency and Special Care Units* (CMA Medical Data, 1998) (n=39) and the 1997 edition of the *Scottish Health Services Costs* book (ISD Scotland, 1997) (n=94). One department only treated dental patients and was excluded before the questionnaire was distributed. A total of 94 departments were identified from the two lists. For the second survey, the list was updated using the *Directory of Critical Care* (CMA Medical Data, 2001) (n=38) and the 2000 edition of the *Scottish Health Services Costs* book (ISD Scotland, 2000) (n=94). The dental hospital was again excluded. Three departments were known to have closed and one new department opened. An additional department was identified from the *Directory of Critical Care* (CMA Medical Data, 2001). A total of 92 departments were identified.

4.4.4 Questionnaire development – 1998 Survey

A structured questionnaire was developed for the postal survey of all the A&E departments in Scotland (Appendix IIIa). The questionnaire covered three areas: whether the department any had nurses who functioned as ENPs, what specific training each ENP had received to prepare them for this expanded role, and the type of ENP service that they provided. The questionnaire was short, consisting of 14 questions (11 closed and 3 open questions). This facilitated completion of the questionnaire by busy clinical staff.

To establish content validity, the questionnaire was examined by two independent A&E nurse researchers. A number of small changes were made to the questionnaire to improve clarity. For example, a question related to what ‘training’ ENPs had received was changed to ‘what specific preparation for practice’, to avoid some ENPs excluding themselves as they may not have felt they had been ‘trained’. One additional question was added to balance the questionnaire, this asked what disadvantages ENPs brought to a department to balance a question related to the main benefits of ENPs.

4.4.5 Questionnaire development – 2001 Survey

The questionnaire for the second survey (Appendix IIIb), was based on the instrument used in the *1998 Survey* (Cooper, Hair, Ibbotson *et al.*, 2001) (Appendix IXa). A number of additional questions were added. These were designed to elucidate further information about the types of department where ENPs were practising.

The final questionnaire consisted of 29 questions (26 closed questions and 3 open questions). The questions covered four areas: the type of A&E department; whether the department had nurses who functioned as ENPs; the type of service provided by these ENPs; and, the level of training required by the department before nurses could practise as ENPs.

The questionnaire was reviewed by an independent A&E nurse researcher to ensure content validity. A few minor changes were made to the questionnaire to improve clarity. For example, a question relating to the Manchester triage category (Manchester Triage Group, 1997) and types of patients managed by ENPs was altered to remove triage categories as not all departments used the same triage system, and some of the smaller departments had so few patients they had no need for a formal triage system.

4.4.6 Piloting of questionnaire – 1998 Survey

The 1998 questionnaire was piloted in six English A&E departments. Different types of department were chosen for the pilot (one inner-city teaching hospital, two city district general hospitals and three rural district general hospitals). Departments were chosen where the researcher knew that ENPs practised. Five were returned, one questionnaire stated that the department did not have ENPs, however the researcher had worked there with their ENPs in the past. This illustrates one of the potential limitations of self-completed questionnaires (see Section 3.6.1).

One or two minor changes to question wording were introduced following the pilot to further improve clarity. For example, a question relating to the number of ENPs in a department was split into two subsections. The first part asked for the number of full time equivalent ENPs, and the second part for the number of staff. This avoided the potential problem of some respondents misinterpreting the original question which only asked for the number of ENPs in a department.

4.4.7 Piloting of questionnaire – 2001 Survey

The *2001 Survey* questionnaire was piloted in five A&E departments in Scotland. For the purposes of the pilot the questionnaires were addressed to specific individuals who would not be sent a questionnaire as part of the main survey. Four were returned. Following the pilot, a number of small changes were made to the questionnaire, for example, the questionnaire was printed as a booklet rather than on separate A4 pages,

and the definition of a 'student' ENP was added to clarify the question on how many ENPs the department had. Data from the pilot questionnaires were used to test the database constructed for the survey. Several minor problems relating to data entry were resolved and coding numbers were added to the questionnaire next to each tick box to facilitate data entry.

4.4.8 Administration of questionnaire

In both surveys, the questionnaire was posted to the nurse-in-charge of each Scottish hospital department which provided an A&E service. A follow-up letter and a second questionnaire were sent out to non-respondents after four weeks. Stamped addressed envelopes were enclosed for respondents to return completed questionnaires. The first survey was conducted in July 1998 and the second three years later in June 2001.

4.4.9 Data analysis

Summary statistics were generated for each question. As virtually all data contained in the questionnaire were categorical, the differences between the types of A&E department were analysed using the Chi-square test (see Section 4.9.9).

4.5 Phase 2 – Evaluating an ENP Service

4.5.1 Research setting

The research setting chosen for the second phase was the A&E department at Glasgow Royal Infirmary. This department had introduced ENPs towards the end of 1996. These ENPs were trained to manage the same types of minor injuries seen by many ENPs across Scotland, and the ENPs managed sufficient numbers of patients for an RCT to be conducted. The hospital was situated in the east end of Glasgow and was surrounded by some of the most deprived areas in the city. At the time of the trial, this department had approximately 68,000 new patients attending every year (ISD Scotland, 1997). Minor injury patients were managed by three A&E consultants, six 'middle grade' A&E medical staff, twelve A&E SHOs, and nine ENPs who between them provided a 24-hour service, 365 days a year.

The department was split into two main areas: the 'north-side' which mainly deals with acutely unwell patients, emergency admissions and life threatening emergencies and a 'south-side' which deals predominately with minor injuries and non-urgent problems. The 'south-side' was usually closed at night at around 10 p.m. and re-opened the

following morning at about 11 a.m., although this is dependent on patient volume and staffing levels. When the 'south-side' was closed minor injury patients were managed over in the 'north-side'.

At the time of the *RCT of ENP-led care* (see Section 4.7) there were eight ENPs practising. Seven of the ENPs were initially educated for the role on a one-week in-house course which has since been accredited by Glasgow Caledonian University (Appendix VIIIa). The course was primarily taught by A&E consultants, and was followed by four months of supervised practice. Students then had a final assessment with the A&E consultants before they could practise autonomously. All of these ENPs had been practising for one year prior to the start of the RCT. The eighth ENP had undertaken a similar course provided at Southend Hospital in Essex (a course which has prepared many ENPs across the whole of the UK and was one of the earliest ENP courses available). This ENP had been practising in the department for four months prior to the start of the trial.

Three years later when the *Unplanned Follow-up Study* (see Section 4.8) was undertaken there were 14 ENPs trained on a variety of ENP courses, including the in-house course now validated by Glasgow Caledonian University, the Southend Hospital Course (Appendix VIIIb), and the Western General Hospital/Queen Margaret University College course (Appendix VIIIc).

All of the ENPs at the research site had more than five years experience in A&E before undertaking their ENP training, were employed at F-grade or above and used the title of 'Emergency Nurse Practitioner' when treating patients in this role. ENPs at the research site at the time of the *RCT of ENP-led care* (see Section 4.7) were able to manage patients who were older than one year who had: minor wounds; finger pulp injuries; sub-ungal haematomas; pre-tibial lacerations; superficial burns and scalds; minor head injuries; injuries distal to the elbow or knee; restricting rings; embedded earrings; and, where repair or replacement of plaster casts was required (Appendix VIIa). ENPs were also able to request x-rays of the limbs or skull. However at this time they were not permitted to interpret these x-rays. Instead they had to ask a senior doctor to interpret the x-rays for them. At the time of the trial ENPs were able to dispense paracetamol, co-codamol, ibuprofen and administer tetanus immunisation independently. By the time of the *Unplanned Follow-up Study* (see Section 4.8) ENPs were also authorised to manage

injuries to the knee and elbow, and were able to interpret x-rays they requested with the exception of skull x-rays (Appendix VIIb).

4.5.2 Access

Permission to undertake all of the studies in Phase 2 was granted by the clinical nurse manager, and the A&E consultants. Written permission to involve the various follow-up clinics in the *RCT of ENP-led care* was given by the clinical director of the orthopaedic directorate, which included A&E services at the time of the RCT. Formal approval from the NHS Trust to undertake the study was sought and granted as part of the application for ethical approval (see Section 4.5.3).

4.5.3 Ethical approval

An application for ethical approval for the *RCT of ENP-led care* (see Section 4.7) was prepared and submitted to the Local Research Ethics Committee (LREC) at Glasgow Royal Infirmary NHS Trust. Ethics approval was granted on the February 9th 1998 (Appendix IIa). The proposal complied with the Declaration of Helsinki (see Section 3.2.1) and conditions laid down by the NHS Trust. The approval also contained permission to use A&E clinical documentation in the development of the *Documentation Audit Tool* (see Section 4.6).

A second application for ethical approval was prepared and submitted to the LREC at Glasgow Royal Infirmary, North Glasgow University Hospitals NHS Trust for the *Unplanned Follow-up Study* (see Section 4.8). The study was approved on September 1st 2000 (Appendix IIb).

4.6 Phase 2 – Study 1 – The Development of a Documentation Audit Tool (*DAT*)

The *Documentation Audit Tool* was developed in three stages (Figure 4.2). For Stage 1, items considered important to record in the A&E documentation of patients with minor injuries were identified from the literature. In Stage 2, a modified nominal group technique (NGT) was used to achieve consensus on the importance of documenting each item. Finally in Stage 3, items considered by the expert panel as essential for inclusion in the A&E documentation of patients with minor injuries were incorporated in the final *Documentation Audit Tool*.

4.6.1 Aim and objectives

The aim of the study was to develop an instrument to measure the quality of clinical documentation written by ENPs or SHOs.

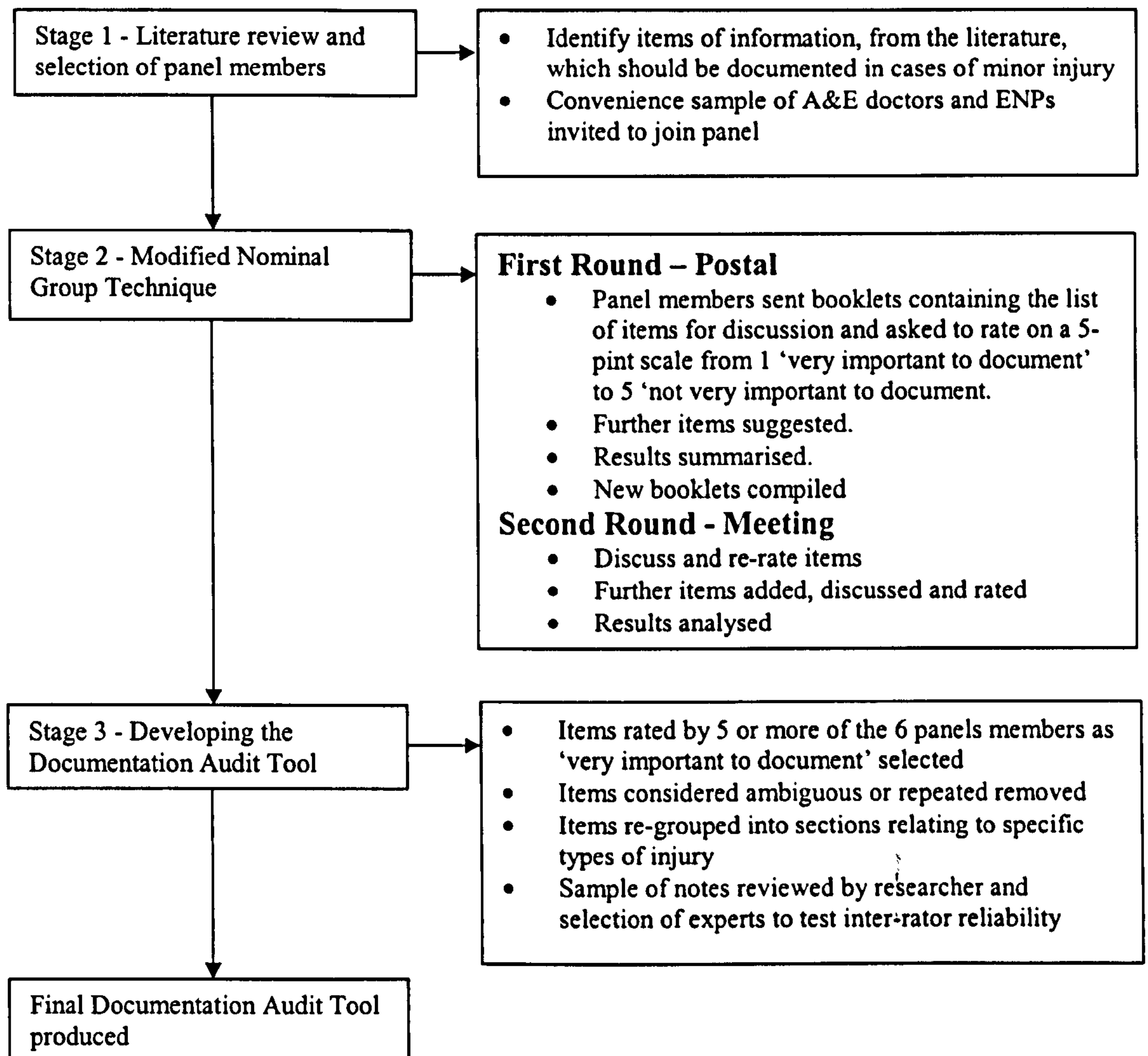


Figure 4.2: Stages of *Documentation Audit Tool* development

4.6.2 Selection of panel members

For the NGT, no criteria exist which relate to who should be included as panel members, except that each must be justifiable as in some way 'expert' on the matter under discussion (Jones and Hunter, 1995). For the purpose of this study, the 'experts' for the panel were considered to be experienced doctors or ENPs practising in the field of minor injuries, for example senior A & E doctors, or ENPs with at least two years

experience. A total of seven A&E doctors and six ENPs were invited to join the panel. This represented a convenience sample of A&E experts from the Glasgow locality.

4.6.3 Stage 1 – Literature review

Medline and CINAHL were searched for papers which related to clinical documentation. Medline (1966 to August 1998) was searched using the OVID interface and the search terms [(documentation OR medical records systems, computerised OR nursing records OR medical records) AND (emergency nursing OR nurse practitioners OR wounds and injuries OR emergency service, hospital)]. The search was limited to papers published in English. CINAHL (1982 to August 1998) was searched using similar search terms. All appropriate articles were retrieved and further searched for relevant references, which in turn were retrieved. These papers were supplemented by information from the grey literature. For example, from textbooks on documentation, emergency medicine, care of minor injuries and finally government reports or reports from professional bodies which were concerned with record keeping (Appendix IVb).

Lists of potentially important items to document (e.g. symptoms, clinical findings, investigation findings, etc.), and relevant to the types of minor injuries seen by ENPs at the research site were collated. Items were grouped in sections according to the type of injury. These sections were then compiled into a booklet (Appendix IVa). A separate booklet containing extracts from the literature and references to support the listed items was also compiled (Appendix IVb).

4.6.4 Stage 2 – The modified Nominal Group Technique

The modified NGT comprised of two rounds. Prior to the nominal group meeting each panel member was sent a copy of both booklets. Panel members were asked to rate each of the documentation items listed on a 5-point Likert scale; from 1 (very important to document) to 5 (not important to document). Panel members were also asked to add any further items they felt were important. Completed booklets were returned to the researcher and the results collated. A new booklet was prepared for each panel member. These booklets contained the individual panel member's initial rating together with the collated ratings for the whole panel. All the new items suggested by panel members were incorporated into this second booklet for discussion.

The nominal group meeting represented the second round of the modified NGT. The meeting was held at Glasgow Royal Infirmary. It was chaired by one of the Ph.D. supervisors who is also an A&E consultant (Ian Swann) and facilitated by the researcher. The meeting lasted three hours, was tape recorded and refreshments were provided. After an introductory explanation of the modified NGT, each item in the new booklets was discussed. At the end of the discussion on each item the panel members were asked to re-rate the documentation items on the original 5-point Likert scale. There was no pressure on panel members to achieve consensus.

4.6.5 Stage 3 – Developing the *Documentation Audit Tool*

The *Documentation Audit Tool* was developed from the results of the modified NGT meeting. On the recommendation of the expert panel, only items rated as ‘1’ ‘very important’ were included in the final tool. Only items on which the expert panel agreed were included. Items where less than five of the six panel members agreed were excluded. Included items were grouped into sections relating to specific types of minor injury. Repeated items were removed and a number of items that were identified as ambiguous during the nominal group meeting were also excluded. For example the documentation item – ‘*Any significant* medical history should be documented’ was excluded as this was considered by the panel to be ambiguous, as it would be impossible to define exactly what medical history would be significant in every potential situation. However, specific aspects of medical history were captured in other parts of the tool.

4.6.6 Data analysis

Prior to Stage 3 and after the meeting in Stage 2 the researcher analysed the responses for agreement or disagreement. Agreement was deemed to be present when at least five of the six panel members gave the same rating.

To test inter-rater reliability a 10% sample of the clinical notes of patients who participated in the *RCT of ENP-led care* (see Section 4.7) were randomly selected. This was achieved using random numbers generated by a computer programme, by one of the Ph.D. supervisors not involved with data collection (Sue Kinn). These twenty sets of clinical notes were anonymised and photocopied. The photocopied and blinded notes were then reviewed by the researcher and a panel of six experts (four members of the original panel and two further experts not involved in the development of the audit

tool). Each expert reviewed five sets of clinical notes. The researcher reviewed all the notes. This meant that three people (two experts and the researcher) reviewed each set of notes. A final score for a set of notes was calculated. This was achieved by taking the number of items correctly documented in the notes and dividing by the total number of items the reviewer considered relevant to the particular injury the notes were describing. This figure was then adjusted so the final score was out of 30. The arbitrary value of 30 was chosen as it represented the average number of items assessed in a typical set of notes during the piloting of the tool. This adjustment allowed the quality of different sets of notes to be compared, listing all results out of a maximum of 30. The results were analysed using SPSS for Windows (Statistical Package for the Social Sciences v10.0) and the Intraclass Correlation Coefficient (1,1) (see Section 4.9.13) calculated.

To assess 'test-retest reliability' the same twenty sets of blinded notes were reviewed by the researcher using the tool as described above, and then reviewed a second time 12-months later. Results were plotted and Intraclass Correlation Coefficient (2,1) (see Section 4.9.13) was calculated.

4.7 Phase 2 – Study 2 – Evaluating an ENP Service: A Randomised Controlled Trial (*RCT of ENP-led care*)

The care provided to minor injury patients by ENPs, at the research site, was evaluated by comparison with the care provided by SHOs in the same department. The selected study design was a randomised controlled trial. A number of instruments including the *Documentation Audit Tool* (see Section 4.6) were used in this evaluation.

4.7.1 Aim and objectives

The aim was to undertake an RCT to test instruments to measure the quality of ENP-led care (in terms of patient satisfaction, quality of clinical documentation, unplanned follow-up and missed injuries), and to calculate the required trial size to detect differences in potentially serious missed injuries or inappropriately managed patients between ENPs and SHOs.

The specific objectives were to:

- Compare the quality of ENP and SHO documentation.

- Compare patient satisfaction with ENP and SHO-led care.
- Examine differences in consultation (length of consultation, advice sought by the clinician from senior medical staff, x-ray requests, who provided treatment interventions, and referral rates) between ENPs and SHOs.
- Compare patient reported outcomes related to the patient's experience of their treatment and recovery (time to recovery, level of symptoms, activity level and time off work), including the need for unplanned follow-up visits.
- Calculate a sample size for a full scale RCT to compare adverse events (missed injuries and inappropriately managed cases) between ENPs and SHOs.

4.7.2 Hypothesis

Based on published research, it was hypothesised that significant differences would be seen in patient satisfaction (see Section 2.11.11), the quality of documentation (see Section 2.11.8), and length of consultations (see Section 2.11.2). Patients treated by ENPs were expected to express higher levels of satisfaction, the quality of documentation was likely to be better, and the lengths of individual consultations would probably be longer.

4.7.3 Inclusion criteria

All patients who presented at the A&E department at Glasgow Royal Infirmary, when an ENP, a SHO and the researcher were on duty, were considered for inclusion in the trial. Only patients with a minor injury of the type suitable for treatment by an ENP, using the protocols developed for ENPs at the research site (see Appendix VIIa), were included in the trial. Subjects also had to be:

- Over 16 years old.
- Not unduly distressed at time of triage in A&E.
- Not under the influence of drugs or alcohol.
- Able to understand and read English.
- Resident within the UK.
- Consented to be part of the study.

Patients who did not meet these criteria were excluded. Subjects who had no initial (even brief) contact with the clinician they were randomised to were withdrawn from the trial.

4.7.4 Subject recruitment and consent

All patients who attended the Glasgow Royal Infirmary A&E department were assessed by a triage nurse. Patients with minor injuries were then reviewed by the researcher for suitability for inclusion. Consecutive patients who met the inclusion criteria were invited to participate in the trial. Patients were only recruited when the researcher, a SHO and an ENP were on duty.

Prior to participating in the trial, patients had to provide written evidence of informed consent. An explanation of the trial, what was expected from the patient's involvement and a reassurance that the patient could withdraw at anytime without affecting their care was provided verbally by the researcher prior to written informed consent being obtained and randomisation occurring. A written information sheet (Appendix IIc), approved by the LREC, was also provided to reinforce the information given by the researcher.

4.7.5 Randomisation

Following informed written consent, patients were randomised to either the experimental group (ENP-led care) or the control group (SHO-led care). Sequentially numbered, sealed opaque envelopes containing randomised assignments to the two groups were provided by one of the Ph.D. supervisors (Sue Kinn), who was not directly involved in the clinical part of the trial.

4.7.6 Power calculation

The trial had to be sufficiently large for two reasons: 1) to assess any difference in the quality of clinical documentation between ENPs and SHOs, and 2) to identify sufficient numbers of missed injuries or inappropriately managed cases to calculate a sample size for a future RCT to compare potential differences in these rates. Data from piloting the *Documentation Audit Tool* using both ENP and SHO notes demonstrated that scores ranged from 22.0 to 28.6 (maximum score 30) (mean 26.0, s.d. 2.21). Based on a estimate of a change in score of 1 (3.3%), the sample size required to demonstrate a

change of this size, with 80% power, on a two-sided test was estimated to be 154 in total (i.e. 77 in each arm) (Machin, Campbell, Fayers *et al.*, 1997).

James and Pyrgos (1989) (see Section 2.11.6) estimated that approximately 3% of patients dealt with by untrained ENPs would be inappropriately managed. In order to ensure that the trial was sufficiently large to identify the small number of missed injuries and inappropriately managed cases expected, and to take account of possible attrition in the follow-up phase, the number of subjects to be included in the trial was increased by 30% from 154 to 200 (i.e. 100 in each arm).

4.7.7 Documentation Audit Tool

The quality of clinical documentation was measured using the *Documentation Audit Tool* (Appendix IVc) whose development was described in Section 4.6 and results reported in Chapter 6. This instrument was specifically designed to measure the quality of clinical documentation that related to the types of minor injury which could be included in the trial.

The tool consisted of five sections: 1) core criteria; 2) investigations; medications and discharge; 3) wounds and burns; 4) limb injuries (sprains, strains and fractures); and, 5) minor head injuries. The core criteria were applied to all notes, and criteria from the other sections were applied, as appropriate, to the type of injury being described. Each set of clinical documentation was scored depending on whether items listed in the *Documentation Audit Tool* were present in the clinical notes. The number of items depended on the type of minor injury described. Scores were adjusted to be out of 30, by dividing the total number of items documented by the total number of items in the tool selected as relevant for the minor injury described and multiplied by 30.

4.7.8 Treatment Record

The aim of this tool was to indicate whether the ENP or SHO had sought advice on diagnosis or treatment from another clinician, and on who had conducted any necessary treatment. The *Treatment Record* was completed by the ENP or SHO, and the member of staff conducting any treatment. The *Treatment Record* was developed following discussion with clinical staff, and was completed immediately following consultation. The *Treatment Record* was piloted in the A&E department on three separate occasions with 3, 15 and 10 patients respectively.

On the basis of the results from the piloting the number of items on the *Treatment Record* was reduced. Clinical staff had commented on the duplication of writing information in the patient's notes and also on the *Treatment Record*. The researcher collected the required information directly from the patient's notes, prior to the notes being filed in the department. During pre-testing a number of the *Treatment Records* were lost. To overcome this, the colour of the record was changed to yellow and pink, colours which were distinct from various the forms of clinical documentation. This made it easier for the researcher to track the record forms and to find forms which were subsequently misfiled. The final section on the *Treatment Record*, which collected information on who had conducted any necessary treatments and the time of completion of treatment, was poorly recorded in the first version of the form. This occurred as clinicians often did not know which member of nursing staff actually completed the treatment, their status (staff nurse, pre-registration or post-registration student, enrolled nurse or auxiliary nurse) and the time of completion of treatment. By dividing the *Treatment Record* onto two separate forms A & B, this problem was overcome. Due to the relatively large number of staff who came into contact with the *Treatment Record*, it was found necessary during all three piloting sessions to spend sufficient time explaining to different staff members about the study, how to complete the *Treatment Record* forms and where to place them on completion. This investment of time proved essential to ensure that *Treatment Records* were completed properly and returned.

The final version of the *Treatment Record* (Appendix Vc) consisted of two forms. Form A was completed by the ENP or SHO who assessed and managed the patient's care and Form B was completed by the member of staff conducting any treatment. Form A remained with the patient's clinical notes and was retrieved by the researcher at the end of the day. Form B was collected separately from a box at the nurse's station.

4.7.9 Patient Satisfaction Questionnaire

Following a search and review of a number of different patient satisfaction questionnaires, a short self-completion questionnaire (Appendix Va and Vb) was produced from a previously validated questionnaire produced by Jenkins and Thomas (1996). The North Worcester Vocational Training Scheme *Patient Satisfaction Questionnaire* was originally designed for measuring patient satisfaction with GP registrars' consultations (see Section 3.6.4).

To assess the acceptability of the questionnaire with patients, it was distributed to 24 consecutive minor injury patients, as a pre-test. Completed questionnaires were posted into a sealed box in the waiting room. Patients were assured that their responses were confidential and that no member of staff involved in their treatment would have access to their questionnaires. The questionnaire appeared to be acceptable to patients as the majority (response rate 79%) completed and returned the questionnaire. Patients were able to complete the questionnaire relatively quickly (not measured) and in the privacy of the consulting room. Providing a supply of pens and ensuring that other staff left patients in the consulting room to complete the questionnaire rather than moving them into the waiting room was felt to have contributed to the high response rate.

During the RCT the questionnaire was distributed to all patients in the trial and a reminder letter and new questionnaire were sent to non-respondents one week after their attendance. The patient's 'study number' was included on each questionnaire to allow for non-respondents to be identified and for data from the questionnaire to be matched with data collected from other tools used in the trial.

Whilst the questionnaire had been shown to be both a reliable and valid measure of patient satisfaction with GP registrars' patients (Jenkins and Thomas, 1996), it had not been used with minor injury patients. The reliability of the questionnaire with minor injury patients was therefore assessed using a test of internal consistency, Cronbach's Alpha (see Section 4.9.14), and reproducibility by analysis of three statements and their reciprocals using the Kappa statistic (see Section 4.9.15). Criterion validity was assessed by comparing the general statement on satisfaction using the Spearman Correlation Coefficient (r_s) (see Section 4.9.12).

4.7.10 Clinic Referral Form

The aim of the *Clinic Referral Form* was to collect information on the reviewing doctor's opinion as to the appropriateness of the referral and whether initial management in A&E was satisfactory. The form was completed by the follow-up clinic doctor. The *Clinic Referral Form* (Appendix Vd) was developed after discussions with three A&E consultants and the nurse-in-charge of the clinics. This form was attached to the copy of the A&E notes of each patient referred to hospital follow-up clinics. The form was piloted in one of the follow-up clinics (soft tissue clinic) prior to the RCT. This initial piloting resulted in small revisions, to shorten the form, and to improve the

layout, and facilitate completion. Posters to inform and remind medical staff about the trial were prepared. Consultants responsible for the follow-up clinics were contacted and permission for access granted.

4.7.11 Patient Follow-up Questionnaire

The *Patient Follow-up Questionnaire* was developed from a patient diary originally developed by Read and George (1994) to follow-up minor injury patients. Copies of the diary were distributed to qualified and unqualified A&E nursing staff (n=8) to assess for face validity. Feedback suggested the diary would collect relevant data from patients recovering from a wide range of minor injuries by noting symptoms, activity level and if they had sought additional treatment, but concerns were voiced over the likely response rate.

The original diary (Appendix Ve) was piloted during September 1998, on 38 minor injury patients. A pre-paid envelope was provided for its return at the end of the one-month period following the patient's attendance in A&E. Patients were contacted by telephone approximately two weeks after their attendance to encourage them to complete their diaries (Read and George, 1994). Reminder letters and a new diary were posted out to non-respondents five weeks after attendance. Thirty patients claimed to be contactable by telephone at home, but only 13 were successfully contacted. Seven diaries were returned on time and 31 reminders were posted out. A further two diaries were returned following the reminder, which produced a total response rate of only 24%.

Following the poor results from the first pilot, the diary was modified into the *Patient Follow-up Questionnaire* (Appendix Vf). This was achieved by firstly, modifying the instrument from one where questions were completed once every seven days (until day 28), to one where patients only completed questions on day 28. Secondly, the instrument, instead of being given to patients in A&E to keep for 28 days and return, was posted to patients on day 28. The *Patient Follow-up Questionnaire* was piloted with 35 consecutive minor injury patients one month after their attendance in A&E. A pre-paid envelope was enclosed for patients to return their replies. Reminder letters and a second questionnaire were posted out to non-respondents six weeks after attendance. A 60% response rate was achieved using the revised instrument.

4.7.12 Procedures for the *RCT of ENP-led care*

Following the refinement and development of the different instruments and tools described above (see Sections 4.7.7 to 4.7.11), a small scale RCT comparing ENP-led care with SHO-led care was conducted at the research site to examine the use of the instruments in the 'real-life' situation of a busy A&E department.

The trial was conducted over a two-month period. All patients who attended the A&E department were assessed by a triage nurse (routine practice). Patients with minor injuries were then reviewed by the researcher for suitability for inclusion. Consecutive patients who met the inclusion criteria were invited to participate in the trial. Patients were only recruited when an ENP, a SHO and the researcher were all on duty. Following informed written consent, patients were randomised to either the experimental group (ENP-led care) or the control group (SHO-led care). The patient was then returned to the waiting room, and awaited their turn to be seen.

Demographic information on patients in each arm of the trial was collected by the A&E reception staff. This was done as part of the normal process of registration prior to recruitment, and was stored on the department's computer system (CaMIS). Following the patient's departure from the department the researcher reviewed the clinical documentation and collected data on the type of injury the patient had sustained. The deprivation score was calculated from the patient's postcode using the Carstairs Score (McLoone, 1994). This score is derived from variables from small area Census data and relates to postcode sectors. Scores range from DEPCAT 1 (the most affluent postcode sectors) to DEPCAT 7 (the most deprived). The scores are based on four different variables contained within the Census data: number of people per room, male unemployment, social class and car ownership. The score is a relative measure of the deprivation or affluence which refers to the population of the postcode sector where the patient lives and not to the patient individually.

Patients were seen by the clinician they were randomised to, as soon as the appropriate clinician was available. In addition to writing the usual clinical documentation, each ENP and SHO was asked to record on the trial *Treatment Record* form whether any advice on diagnosis, x-ray interpretation, or treatment, was sought from any other clinician. An A&E 'middle grader' (usually an SHO III or SpR) was available for consultation to both the ENPs and SHOs. ENPs and SHOs could also directly refer

patients to specialities within the hospital for an opinion on emergency treatment or for possible admission.

Both SHOs and ENPs were able to refer patients to a number of hospital follow-up clinics or to the patient's GP. Follow-up clinics available included: A&E soft tissue clinic; orthopaedic fracture clinic; and, a burns clinic run by the regional burns unit. Information on numbers of patients referred to the various clinics was collected from the A&E notes, as was information on any investigations requested. If a patient was referred to a follow-up clinic the *Clinic Referral Form* was attached to the patient's clinical documentation, which was sent to the clinic prior to the patient's appointment. The reviewing doctor completed the *Clinic Referral Form* at the clinic and placed the completed forms in a file in the clinic for the researcher to collect.

Each patient was asked to complete the *Patient Satisfaction Questionnaire* immediately after their treatment had been completed, and prior to their departure. Patients were given the opportunity to remain in the room where they had been treated, in order to provide some privacy when completing the questionnaire. Completed questionnaires were collected from the patients via a sealed post box in the waiting room. Although the questionnaires were not anonymous patients were assured that only the researcher would see the completed questionnaires and no member of staff involved with directly treating the patient would have access to individual questionnaires. A reminder and a new questionnaire were posted out to non-responders within a couple of days of attendance.

Four weeks after their attendance in A&E the *Patient Follow-up Questionnaire* (Appendix Vf) was posted to each patient. Reminders were posted to non-respondents. This questionnaire collected information on: 1) time to recovery; 2) level and frequency of pain patients were still experiencing; 3) level of symptoms and activity; 4) time off work; and, 5) whether any unplanned follow-up was sought.

The quality of the clinical documentation written by the ENPs and SHOs, was measured by the researcher using the *Documentation Audit Tool* (Appendix IVc). Each set of clinical notes was given an adjusted score out of 30 (see Section 4.7.7).

Finally, any study patient who returned to the department was identified through the departmental computer system; their clinical notes examined and reasons for return

noted. Missed injuries were identified by: 1) monitoring return patients; 2) a systematic search of patients through the departments recall register; 3) the 'Clinic Referral Forms' which allowed missed injuries discovered at follow-up clinics to be reported back to the researchers; and finally, 4) formal complaints to the department.

4.7.13 Data analysis

Data from the questionnaires were coded and entered into a Microsoft Access 97 database created for the study. The SPSS (Statistical Package for the Social Sciences v10.0) software was used to analyse the data. Descriptive statistics were calculated for all of the variables and histograms plotted to ensure that the data were normally distributed. The two-tailed t-test (see Section 4.9.7) was applied to continuous variables. For categorical variables the Chi-squared (χ^2) test (see Section 4.9.9) for independent samples was used, or Fisher's exact test (see Section 4.9.10) if expected values were less than 5 in any cell (Bland, 2000). The Mann-Whitney U test (see Section 4.9.8) was used in the analysis of the ordinal data from the patient satisfaction questionnaires.

Analysis was undertaken comparing patients in the groups they were originally assigned to and seen in. The only patients not to have been included in the final analysis were those (in both groups) who were not seen initially by the clinician to whom they were randomised.

Clinically, the most important factor for establishing whether ENP-led care was safe were the number of missed injuries and inappropriately managed patients. These factors were used to calculate the sample size required for a full scale RCT. Sample size was calculated using Sampsize v2.0 (Machin *et al.*, 1997).

4.8 Phase 2 – Study 3 – Exploring Unplanned Follow-up in Minor Injury Patients (*Unplanned Follow-up Study*)

The *Unplanned Follow-up Study* was conducted over three stages. The first stage involved identifying patients with minor injuries over a three-month period. In the second stage patients who returned to the department were identified and unplanned re-attendances or recalls examined, and in the third stage patients were sent a postal questionnaire which asked about follow-up in the month following their attendance in A&E.

4.8.1 Aim and objectives

The aim of this study was to explore unplanned follow-up in minor injury patients treated by a range of different clinicians in an A&E department.

The specific objectives were to:

- Identify the proportion, of adult patients who attended A&E with minor injuries, which could be managed by ENPs using specific protocols.
- Establish the proportion of patients with minor injuries who returned to A&E and identify the proportion who had missed injuries or injuries which were inappropriately managed at first presentation.
- Establish the proportion of patients who sought further unplanned advice or treatment.
- Identify from whom patients sought further advice or treatment.
- Identify the reasons patients sought unplanned follow-up.

4.8.2 Inclusion criteria

Stage 1

All A&E patients who were registered on the A&E department's computer system (CaMIS) were initially included.

Stages 2 and 3

Adult patients were identified during the first stage for inclusion in the second and third stages if they had a minor injury which fell within the ENP protocols (Appendix VIIb).

Patients were excluded if they met any of the criteria listed below:

- Under 16 years old.
- Admitted to a hospital ward.
- Documented as not speaking English.
- If attendance was for post-coital contraception.
- Were documented as being in the custody of a police or prison officer.
- Documented that injuries were as a result of self-harm.
- Documented that there was a possibility of the patient being under the influence of alcohol or drugs.

4.8.3 Subject selection

Patients who met the inclusion criteria were selected by the researcher or one of two researcher assistants trained for the study. Clinical notes from the preceding day were collected by A&E reception staff. Patients were then selected, for the second and third stages of the study, by reading the clinical documentation and judging whether the patient's presenting complaint and subsequent examination would have allowed an ENP to manage the patient based on the research site's ENP protocols (Appendix VIIb). To identify missing patients a list of clinical notes read by the researcher or the assistants was compiled by scanning the bar code of the A&E number on the notes. These numbers were compared with the department's computer record of attendances and missed notes were subsequently searched for and examined.

4.8.4 Sample size

The most important reason to examine unplanned follow-up was to detect any missed injuries. A study of patients seeking unplanned follow-up, by attending a second A&E department, showed that 17% had a missed injury (Guly and Grant, 1994).

If there was an unplanned follow-up rate of 11% (Sakr *et al.*, 1999) then surveying 3,000 patients should detect 330 patients with unplanned follow-up. Assuming a 50% response rate around 165 patients would be identified for the study. A figure of this magnitude would allow examination of the extent and reasons for unplanned follow-up from one department.

4.8.5 Development of study database and bar coding

The unique A&E number for each individual attendance to the department was coded with a bar code. This bar code was scanned into a bespoke Microsoft Access 2000 database using a laser hand-held scanner (Symbol Technologies Inc.). For patients who were entered into the study, additional information relating to the attendance was also scanned into the same database, using a bar coded coding schedule. Demographic data were uploaded from the A&E department's computer system (CaMIS) on a daily basis. The scanned A&E number and the demographic data were matched to provide a list of patients who were entered into the study. A second number, unique to each patient (hospital ID number), allowed patients to be tracked if they returned to the department. This number was also obtained from CaMIS.

Personalised letters were generated from the study database to send with questionnaires to patients in the study. A bar code on the reverse of each reply-paid envelope allowed respondents to be identified and additional personalised letters for non-respondents to be generated. Information from returned questionnaires was scanned into the study database using a bar code wand (Activelook Ltd). This was achieved by scanning the bar code beside the appropriate ticked box on the questionnaire (Appendix VI). Information from returned questionnaires was matched to patients through the unique A&E number.

4.8.6 Development of questionnaire

A questionnaire designed to explore where patients sought unplanned follow-up, and the reasons additional consultations were sought, was developed in collaboration with A&E clinicians. Five clinicians (three ENPs and two A&E consultants) examined the questionnaire for content validity. A number of small changes to the wording of questionnaires and additional options were added. For example, adding boxes to distinguish between additional follow-up visits and telephoning for additional advice. Finally, the questionnaire was piloted with 40 minor injury patients, with 19 returned (48% response rate). The response rate was similar to the rate expected, and consistent with other surveys which sent out postal questionnaires ‘cold’ to A&E patients (de Oliveira, Hassan, Sebewufu *et al.*, 1998; Lam, Stevenson, Britten *et al.*, 2001).

Some minor changes to the questionnaire’s wording were made following the pilot. For example, a question which required patients to ‘number in order’ the places they had sought unplanned follow-up from, appeared to cause confusion and a few patients ticked the boxes instead of numbering. This was felt to be too complex and the question was simplified to ‘tick all that apply’.

4.8.7 Pilot study

All aspects of the study were tested in a small pilot study. The clinical notes for all patients who attended the A&E department over a four-day period were examined by the researcher (a total of 315 notes). There were 40 patients who fitted the inclusion criteria for the study. Four weeks after their attendance a questionnaire was sent to each of these patients along with a business reply envelope. Reminders were sent to non-responders together with a second questionnaire after a further two weeks. A response rate of 48% was obtained. Minor changes were made to the questionnaire following the

pilot (see Section 4.8.6). No changes were made to the bar code tracking system or the study database.

4.8.8 Misdiagnosis Severity Score

The clinical documentation for every patient, identified as returning to A&E because of an injury missed or inappropriately managed on initial presentation, was retrieved and scored using the *Misdiagnosis Severity Score* (Guly, 1997a) (see Section 3.6.7). This non-linear scale allows the severity of a misdiagnosis to be assessed, on a scale of 1 to 7, where 1 is a relatively minor problem and 7 relates to a situation where surgery should have been done immediately. The score is made up of two components: an 'additional treatment score' (see Table 3.1) and a 'patient disposal score' (see Table 3.2).

The score could not be applied to patients who did not re-attend A&E, as their clinical notes were not available.

4.8.9 Stage 1 – Identification of minor injury patients

Clinical notes from the preceding day, were reviewed each day by the researcher or by one of two research assistants. The research assistants were qualified nurses who worked at the study site. Both had been given training in identifying suitable patients for the study. The A&E numbers of all notes reviewed were scanned into the study database, this allowed notes not reviewed to be identified (see Section 4.8.5). Patients over 16, presenting for the first time, with a minor injury, which fell within the ENP protocols at the research site were identified by reading the notes. Identified patients were checked against a list of exclusion criteria (see Section 4.8.2) and suitable patients had their unique A&E number and baseline data entered into the study database.

Demographic data on every patient was collected by reception staff at the time of the patient's registration. Data were entered directly onto the A&E department's computer system, and were periodically uploaded into the research database. System checks within the study database ensured only patients over 16 were included in the study.

4.8.10 Stage 2 – Identification of re-attenders and reasons

Re-attenders to the department were identified by use of the study database which used data from the departmental computer system (CaMIS). Attendances were monitored for

a six week (42-day) period. Recalls were identified from the departmental 'recalls register'.

The clinical documentation for all re-attenders was obtained and read by the researcher. Reasons for re-attendance were catalogued. Patients identified as having missed injuries, had the severity of the missed injury assessed using the *Misdiagnosis Severity Score* (Guly, 1997a) (see Section 4.8.8). The researcher and an A&E consultant (Ian Swann) independently applied the scale to identified patients' records. Where differences in the score were obtained the patient's management was discussed, additional information obtained (if required) and a consensus reached.

4.8.11 Stage 3 – Unplanned follow-up questionnaire

A questionnaire, personalised letter and reply-paid envelope were posted to patients 28 days after their initial attendance. On the reverse of the reply-paid envelope was a bar code which uniquely identified the patient. This bar code was used to trace respondents and to match questionnaire data with the demographic data already collected. Non-respondents were sent a reminder letter, a second questionnaire and a reply-paid envelope.

Data from returned questionnaires were entered into the study database using a bar code wand (Activelook Ltd). Scanning the patient's unique identification number and questionnaire answers was undertaken to reduce the incidence of data entry errors.

4.8.12 Data analysis

The study database was created using Microsoft Access 2000 and data entered using bar code wand or uploaded from the departmental computer system (CaMIS). Data were exported to and analysed in SPSS for Windows (Statistical Package for the Social Sciences v10.0).

4.9 Data Analysis: Statistical Techniques

In this section the statistical techniques that were used in this research programme are described. All statistical calculations were made using SPSS (v10.0) unless otherwise specified.

4.9.1 Categorical and numerical data

Categorical data were used when an individual can only belong to one of a number of discrete categories of a particular variable, for example, Male or Female. Categorical data can be subdivided into two types: nominal or ordinal. Nominal data were used where the categories are not ordered, but simply have names. Blood groups are an example of nominal data. Ordinal data relates to where categories are ordered in a particular way. For example, the degree of pain a person may be suffering can be categorised into an ordinal variable (severe pain, moderate pain, mild pain and no pain).

Numerical data relates to data which has a numerical value. Numerical data can be subdivided into two types: discrete data and continuous data. Discrete data are variables which can only take certain whole numerical values, for example, the numbers of visits to A&E. Continuous data are data where there are no limitations on the value that a variable can take, for example, the height of a person.

The type of statistical test used is determined by the type of variable to be analysed.

4.9.2 Mean

The arithmetic mean or 'sample mean', denoted by \bar{x} , is one of the most commonly used summary statistics. It is calculated by adding up all the values and dividing this sum by the number of values in the set. It, however, does not give any indication of the spread of observations.

4.9.3 Variance and standard deviation

One way of determining spread is to determine the extent to which each observation deviates from the arithmetic mean. The larger the deviations, the greater the variability of the observations and therefore the greater the spread. Variance is one measure of this spread and is calculated by finding the mean of the squared deviations. The units of variance are the square of the units of the original observations. Since the variance describes the spread of the sample about its mean, samples with a large variance are well spread out, while those with a small variance are tightly clustered about the mean.

Standard deviation is the square root of variance and its units are the same as the original observation. The sample size, its mean and the standard deviation provide a basic description of a sample. In addition, the 'standard error' of the sample mean is

often used, and is defined as the standard deviation of the sample divided by the square root of the sample size. This is the standard deviation of the distribution of the sample mean about the population mean, and is a crucial parameter in testing the significance of changes in the mean value of a sample. The ‘standard error’ describes the precision of the sample mean, whereas the ‘standard deviation’ describes the variation in the data values and illustrates the variability in the data.

4.9.4 Median and quartiles

The median is another typical statistic of a sample. If the data are arranged in order of magnitude, then the middle value of this ordered set is the median. Equal numbers of values will lie both above and below it. The median will be similar to the mean if the data are symmetrical, less than the mean if the data are skewed to the right and greater if the data are skewed to the left. The median is less affected by outliers, whereas the mean can be oversensitive to a small number of outliers.

A sample may be further divided into ‘quartiles’ by first dividing it into two sub-samples consisting respectively of all those observations that lie below the sample median and all those that lie above the sample median. The median of these sub-samples together with the median of the full sample divides the observations into quartiles. One quarter of the observations lie in the lowest or 1st quartile, another quarter in 2nd quartile, and the remaining half evenly split between the 3rd and 4th quartiles. The distance between the boundary of the 1st and 2nd quartiles and the boundary of the 3rd and 4th quartiles is called the interquartile range. The interquartile range contains 50% of all observations. Observations that are more than three interquartile ranges below the boundaries of the 1st and 2nd quartiles or above the boundary between the 3rd and 4th quartiles of a sample are called ‘outliers’.

4.9.5 The normal distribution

The normal (or Gaussian) distribution is one of the most common and important (continuous) distributions. It describes the distribution of many random variables which arise in practice. It is completely described by two parameters, the mean (μ) and the variance (σ^2). It is bell-shaped and symmetrical about its mean. The mean and median of a normal distribution are equal. If the mean is increased the distribution is shifted to the right and the shape remains unchanged (providing variance is constant) (Figure 4.3b). If variance is increased then the normal distribution is flattened (Figure 4.3c).

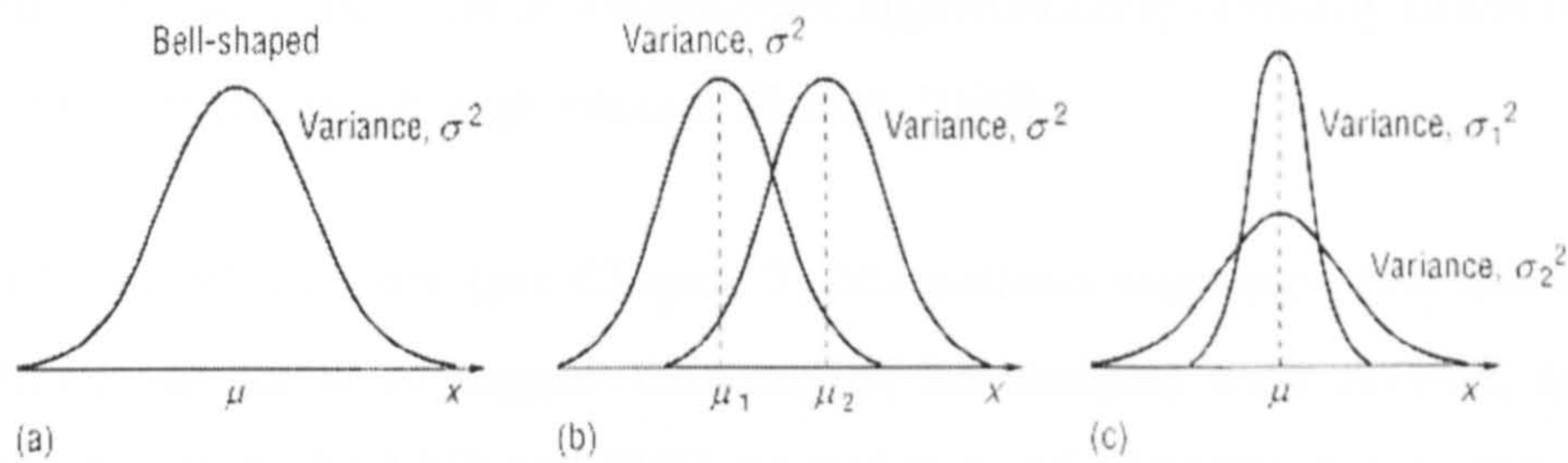


Figure 4.3: Normal distribution a) Symmetrical about the mean μ , variance σ^2 , b) Effect of changing mean ($\mu_2 > \mu_1$), c) Effect of changing variance ($\sigma_1^2 < \sigma_2^2$) (Reproduced from Petrie and Sabin (2000))

The total area under the curve (the probability density function) equals 1 and represents the probability of all possible events. The probability that x lies between two limits is equal to the area under the curve between these two values (see Figure 4.4)

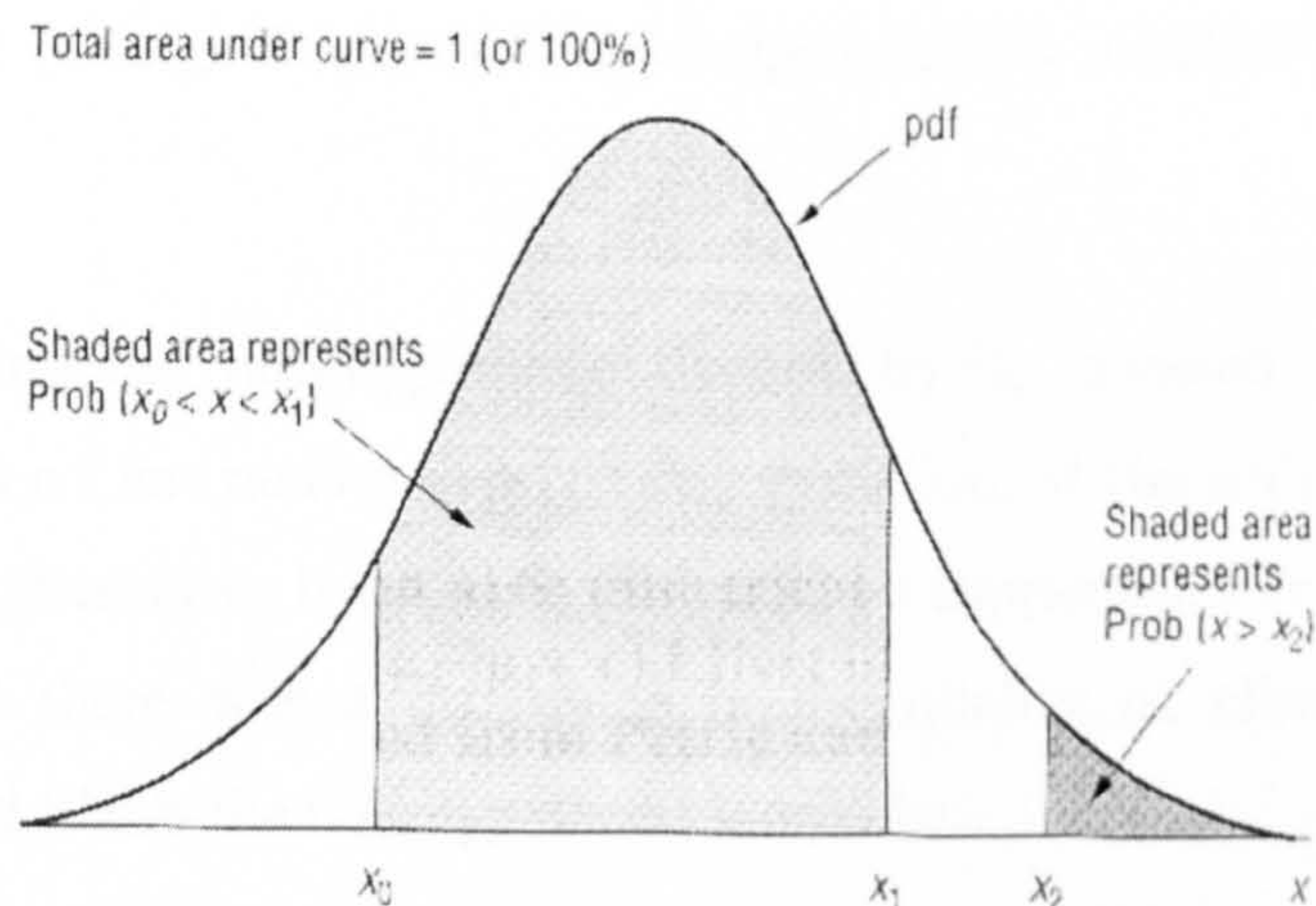


Figure 4.4: The probability density function of x (Reproduced from Petrie and Sabin (2000))

The probability that a normally distributed random variable x , with a mean of μ and a standard deviation of σ , lies within one standard deviation either side of the mean is approximately 0.68. The probability of x lying within 1.96 standard deviations of the mean is 0.95.

The normal distribution is important as many statistical tests are based on the assumption that data are normally distributed. The central limit theorem states that the

sum of random variables of finite variance are approximately normally distributed if the number of observations are large enough (Bland, 2000).

In the *RCT of ENP-led care* (see Chapter 7) 204 patients were recruited into the study. No evidence was found to suggest that any of the samples were skewed, and it was anticipated that both the ENP and SHO groups were of adequate size to test statistical significance, using statistical tests for normal distribution.

4.9.6 Hypothesis testing

During the second phase of this thesis (the *RCT of ENP-led care* and the *Unplanned Follow-up Study*), minor injury patients were cared for by ENPs and SHOs. One objective was to compare outcomes between the two groups and to determine whether or not there was a difference in the quality of care between the two groups, for example, the quality of documentation between ENPs and SHOs. Data were gathered in order to assess how much evidence there was against a specific hypothesis. A process known as hypothesis testing (or significance testing) helps quantify a belief against a particular hypothesis.

In hypothesis testing, the ‘null hypothesis’ denoted by H_0 , is tested. The null hypothesis assumes no effect of an intervention in the population. If the null hypothesis can be rejected, then the alternative hypothesis (H_1) may be supported. For example, if it were hypothesised that there was a difference in the quality of clinical documentation between ENPs and SHOs the null hypothesis would be:

H_0 : the quality of clinical documentation is the same for ENPs and SHOs

The alternate hypothesis H_1 , which holds true if the null hypothesis is not true, would be:

H_1 : the quality of clinical documentation is different for ENPs and SHOs

No direction for the difference in documentation quality is specified to allow for either eventuality (SHOs documentation being better than ENPs or vice versa). This leads to what is termed a ‘two-tailed test’. A ‘one-tailed test’ may be conducted if the direction of the effect is specified in H_1 .

Following the appropriate statistical test being applied to the data, a value for the test statistic can be determined. The test statistic reflects the amount of evidence in the data against the null hypothesis. Usually, larger test statistics favour H_1 .

All test statistics follow theoretical probability distributions. By relating the value of the test statistic to known distributions, the probability or p-value can be obtained. The p-value is the probability of obtaining these results or something more extreme, if the null hypothesis was true.

By convention, H_0 is accepted at the 95% confidence level. This means that if two samples were drawn from the same population 100 times, then on five occasions the null hypothesis would have been rejected when it was true, i.e. there is a 5% probability (p-value=0.05) of rejecting H_0 when it was true. The choice of 5% is arbitrary. In situations where the clinical implications of rejecting the null hypothesis are severe, stronger evidence may be required before rejecting H_0 in which case a p-value of 0.01 or 0.001 might be chosen. The chosen cut off (e.g. 0.05 or 0.01) is the significance level of the test (Petrie and Sabin, 2000).

4.9.7 Independent samples t-test

The independent samples t-test compares the means of two groups of cases. Ideally, the subjects should be randomly assigned to two groups, ensuring that any difference in response is due to treatment and not to other factors. The test assumes that the variable is normally distributed and variances in the two groups are the same. When the sample sizes are reasonably large, the t-test is fairly robust to departures from normality. However, it is less robust to unequal variances. If the assumptions are not satisfied, then it is possible to use a non-parametric test such as the Mann-Whitney U test.

4.9.8 Mann-Whitney U test

The Mann-Whitney U test is a non parametric equivalent to the t-test. It tests if two independent samples came from the same population. It makes no distributional assumptions. The test is based on the sum of the ranks of values in each of the two groups. It is largely a test of location of the median of both distributions. Given two independent samples, it tests whether one variable tends to have higher values than the other (Hart, 2001).

In this study, the Mann-Whitney U test was used to compare the ranked level of agreement relating to statements in the patient satisfaction questionnaire between the ENP-led care group and the SHO-led care group in the *RCT of ENP-led care* (see Section 7.4.1).

4.9.9 Chi-squared test

The Chi-square test (χ^2) is used to compare two samples. Data are obtained as frequencies i.e. the numbers with and without the characteristic in each sample. A contingency table is constructed, the size depending on the number of variables, but frequently 2x2. The cells of the table contain the observed frequencies in each row/column combination. The *expected frequencies* can be calculated. These would be the frequencies expected to be seen if H_0 were true. The test statistic for each compartment of the 2x2 table is calculated by squaring the difference between the observed and expected frequencies and then dividing by the expected frequency. The test statistic (Chi-square) for the entire table is calculated by summing the test statistics for the whole table. Tables of Chi-square values with one degree of freedom are then used to extract a p-value (Bland, 2000).

Chi-square can also be used for large contingency tables ($r \times c$). As in the 2 x 2 table every individual can only be represented once, and can only be represented in one row (r) and one column (c), i.e. the categories of each factor are mutually exclusive. At least 80% of the expected frequencies need to be greater than or equal to five.

4.9.10 Fisher's exact test

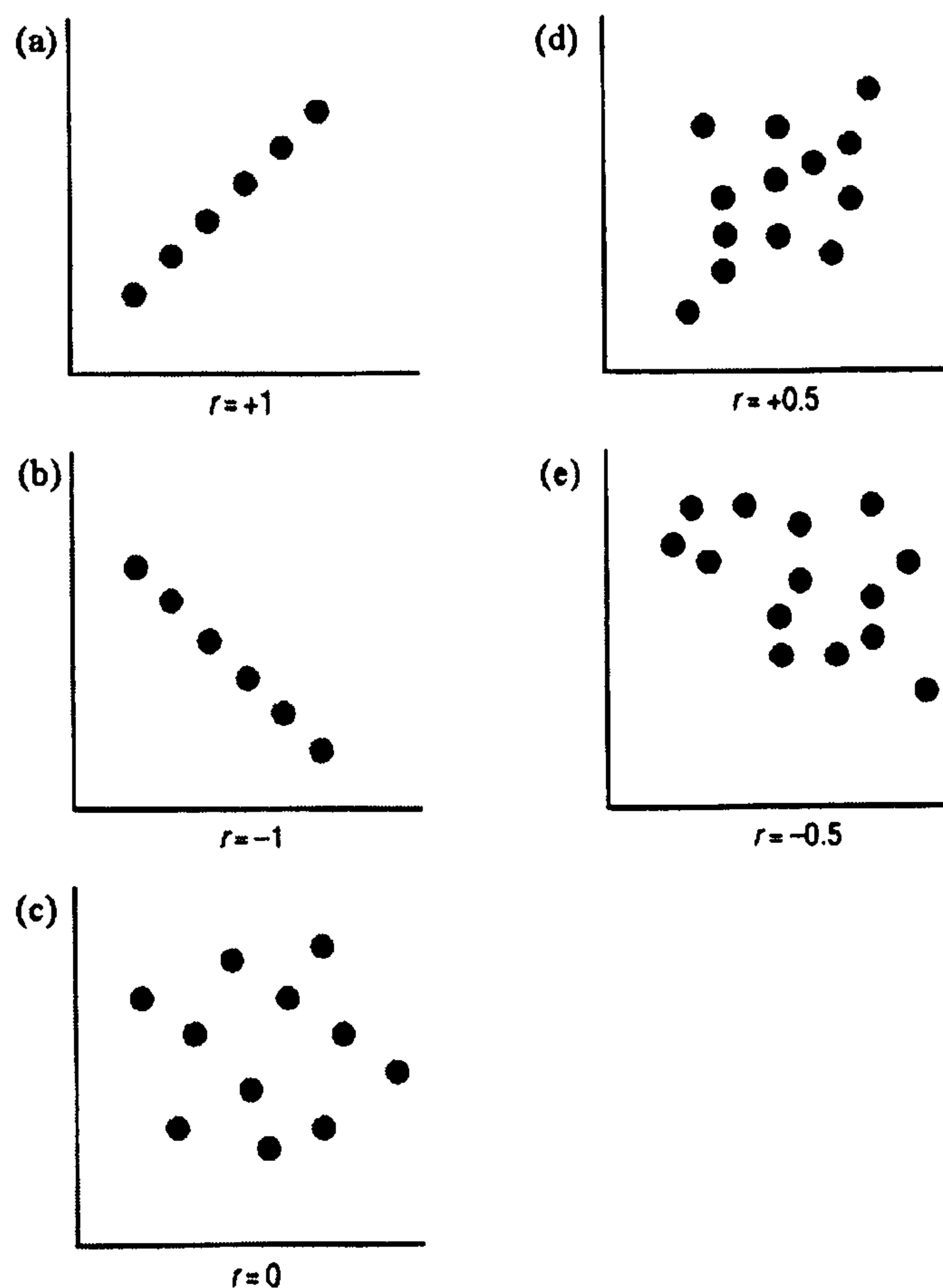
Fisher's exact test is an alternative test to Chi-square, which is used when the smallest expected values are less than 5 in any one cell. It does not rely on the approximation to the Chi-squared distribution, instead it is based on exact probabilities from a specific distribution (the hypergeometric distribution). It is often used as an alternative to the Chi-square test in situations where a large sample approximation is inappropriate.

4.9.11 Pearson correlation coefficient

The Pearson correlation coefficient (r) is used to measure the degree of association between two numerical variables x and y (Bland, 2000). If these two variables are plotted on a graph it may be possible to determine a relationship between the two variables. If a straight line can be drawn between all the points then there is a linear

relationship between the two variables. If the plot is completely random then there is no relationship between the two variables. The Pearson correlation coefficient provides a numeric value which measures the degree of correlation between the two variables.

The Pearson correlation coefficient (r) is based on the sum of the products about the mean of the two variables. It lies between -1 and 1. The sign indicates whether one variable increases as the other increases (positive r) (Figure 4.5a) or whether one variable decreases as the other increases (negative r) (Figure 4.5b). The magnitude indicates how close the points are to the straight line. If $r=1$ or $r=-1$ then there is a perfect correlation with all the points lying on the line. If $r=0$ (Figure 4.5c) then there is no linear correlation between the two variables (although there may be a non-linear relationship). The value r is dimensionless i.e. it has no units of measurement. A correlation between x and y does not necessarily imply a 'cause and effect' relationship. Figure 4.5 illustrates different values of r in different situations.



**Figure 4.5: Five graphs indicating values of r in different situations
(Reproduced from Petrie and Sabin (2000))**

Pearson's correlation coefficient is often advocated for the assessment of the test-retest reliability (stability of an instrument) (Polit and Hungler, 1995) and inter-rater reliability. However this statistic has a particular shortcoming, which makes it less suitable for these tasks than other methods. This shortcoming relates to the fact that the Pearson correlation coefficient cannot detect situations where one set of readings are systematically lower or higher than the other (Sackett *et al.*, 1991). For example, if one rater consistently gives a higher score than a second rater, the Pearson correlation coefficient would show a very high level of agreement with r being close to 1, even though there was a consistent difference between scores. One method of overcoming this problem is to use the intraclass correlation coefficient, as this test penalises systematic errors (see Section 4.9.13).

4.9.12 Spearman's rank correlation coefficient

The Spearman's rank correlation coefficient (r_s) is the non-parametric equivalent to the Pearson correlation coefficient and can be used to assess correlation if at least one of the variables is measured on an ordinal scale; either x or y are not Normally distributed; the sample size is small, or a measure of association is required between two variables when their relationship is non-linear. Although r_s provides a measure for the correlation between x and y , that association may not be linear.

Spearman's rank correlation coefficient was used to test the association between the ordinal data on each statement thought to be related to patient satisfaction and the global statement relating to general satisfaction in the *Patient Satisfaction Questionnaire*.

4.9.13 Intraclass correlation coefficient

The intraclass correlation coefficient (ICC) can be defined as the correlation between any two measurements in the same subject (class), using randomly chosen methods (Armitage and Berry, 1994). It can be used to examine the relationship between pairs of measurements and also for larger sets of measurements (McGraw and Wong, 1996). In this thesis, the ICC was used to assess the relationship between pairs of scores obtained when a series of randomly selected, clinical notes were assessed for quality using the *Documentation Audit Tool* (see Chapter 6), at two separate points in time by a single assessor (test-retest reliability). It was also used to assess inter-rater reliability, when different assessors used the tool to assess the same selection of notes.

In essence the ICC calculates correlation from $2n$ pairs effectively by calculating each point as (x,y) and (y,x) (Armitage and Berry, 1994). This way, each pair is examined both ways round, removing systematic bias. The maximum value of 1 can only be achieved if pairs of all values fall on a straight line through the origin with a slope of unity (Armitage and Berry, 1994). The ICC can be interpreted in a similar way to Kappa (see Section 4.9.13) where values close to zero indicate slight or no linear correlation and values approaching one indicate almost perfect linear correlation (Sackett *et al.*, 1991). Different terms are used to describe the degree of correlation in different textbooks and papers. Frequently the descriptive terms used by Landis and Koch (1977) (see Section 4.9.15) to interpret the strength of agreement using Kappa are used to interpret ICC.

There are a number of different formulas for the calculation of ICC. Short and Fleiss (1979) in their seminal paper on ICC describe six models and corresponding formula. These are labelled (1,1), (2,1), (3,1), (1,K), (2,K) and (3,K). The first digit of these numbers indicates an analysis of variance (ANOVA) model, and the second digit/character denotes whether the observation is composed of one measurement or the mean of K measurements.

There are three ANOVA models used in these ICC models. The appropriate ANOVA model depends on the given situation. The most common situation examined by researchers relates to the reliability of any measurements. The first consideration in the choice of formula relates to whether the objects of measurement (often referred to as 'targets' see Shrout and Fleiss, 1979) can be considered a random sample from the population of targets measured and, second, whether the number representing each measurement is a composite (a mean of K numbers) or represents a single value. In most cases, 1) targets will be considered a random sample from a larger population of targets, and 2) the measurements for each subject will not be composite values. Thus the formula (2,1) is the most appropriate choice of ICC and is calculated from a repeated measures analysis of variance (Denegar and Bell, 1993).

The formulas (1,1) and (1,K) assume the same 'target' measurements are not available on all n subjects and thus a repeated measures ANOVA is not possible. Therefore a one-way ANOVA must be performed. In the assessment of inter-rater reliability for the *Documentation Audit Tool*, six experts and the researcher assessed 20 sets of notes for

quality using the *Documentation Audit Tool*. Each set of notes was rated by three individuals; however different sets of notes were rated by different groups of three raters. The first set of notes may have been rated by Rater 1, Rater 2 and Rater 3, the second by Rater 1, Rater 2 and Rater 4 and so forth. In this instance, because all sets of notes would not have values for all raters, a repeated measures analysis was not possible and formula (1,1) was more appropriate (Denegar and Bell, 1993).

The final formulae (3,1) and (3,K) are appropriate when there has been an arbitrary or fixed selection of targets. For example if inference to a larger population of targets is not intended then formula (3,1) is appropriate (Denegar and Bell, 1993). In other cases where the targets are assumed to be fixed, Shrout and Fleiss (1979) point out that the resulting ICC indicates consistency of, but not agreement between, measures. Bartko (1976) cautioned against the use of consistency as an appropriate reliability estimate. These formulae were not used in this thesis and therefore are not discussed any further.

4.9.14 Cronbach's Alpha

Cronbach's Alpha is a coefficient for assessing internal consistency (a measure of reliability). It measures how well a set of items (or variables) measures a single unidimensional latent construct, for example, a set of statements all relating to patient satisfaction. When a set of items are all used to measure the same thing, they should correlate with one another. Cronbach's Alpha is based on the average inter-item correlation. If all the items are perfectly positively correlated then $\alpha = 1$. If they are all independent $\alpha = 0$. For scales which are used as research tools to compare groups, values of 0.7 to 0.8 are regarded as satisfactory (Bland and Altman, 1997). Higher values indicate greater internal consistency.

A little care needs to be taken when interpreting Cronbach's Alpha, as Alpha values can be artificially inflated by constructing items which are indefensibly similar to one another (Knapp, 1991). An extreme example of this would be that if two items which were identical were used then Cronbach's Alpha would equal 1.

Another way an artificially high Alpha can be obtained is when there are very few 'right answers' or few 'endorsements' by the majority of subjects (Knapp, 1991). If a large proportion of subjects do not mark an answer and are scored as zero, then there can be very high inter-item correlations and therefore a very high alpha.

Although the reliability of a test is theoretically defined as the ratio of the variance of the ‘true’ scores to the variance of the ‘obtained’ scores, and such a ratio can never be less than 0 or greater than 1, Cronbach’s Alpha can be anywhere between minus infinity and +1 (Knapp, 1991). Negative Alphas reflect poor internal consistency and hence a very poor measuring instrument.

In this study Cronbach’s Alpha was used to assess the internal consistency of the *Patient Satisfaction Questionnaire* used in the *RCT of ENP-led care* reported in Chapter 7 (see Section 7.4.1).

4.9.15 Weighted Kappa Statistic

The Kappa Statistic (κ) is used as an assessment of agreement on categorical data. The Weighted Kappa Statistic (Landis and Koch, 1977) is used on ordinal data as it takes into account the extent to which observers disagree as well as the frequencies of agreement. When $\kappa = 1$ it implies there is perfect agreement and when $\kappa = 0$ it suggests that agreement is no better than that which could be obtained by chance. There are no objective criteria for judging intermediate values. However, Kappa is often judged as providing agreement (Landis and Koch, 1977) which is:

- Poor if $\kappa < 0.00$
- Slight if $\kappa \leq 0.20$
- Fair if $0.21 \leq \kappa \leq 0.40$
- Moderate if $0.41 \leq \kappa \leq 0.60$
- Substantial if $0.61 \leq \kappa \leq 0.80$
- Almost perfect if $\kappa > 0.80$

It should be noted that Kappa is dependent on both the number of categories and on the prevalence of the condition, so care must be taken when comparing Kappas from different studies.

In this research programme the Weighted Kappa Statistic was used to assess the level of agreement between specific statements in the *Patient Satisfaction Questionnaire* and their reciprocal statements as a way of assessing reproducibility within the questionnaire.

4.9.16 Calculating sample size

To determine the size of a clinical trial, practical and ethical issues need to be considered along with scientific requirements (Pocock, 1983). These include the

availability of patients, resources and whether patients will volunteer to participate in the trial. The scientific requirements are calculated using power calculations. The most common method is to focus on a single outcome which is dichotomous (e.g. it has or has not happened). The computer software programme Sampsize v2.0 (Machin *et al.*, 1997) was used to calculate samples sizes, where appropriate in this thesis.

4.10 Presentation of Results

Large volumes of data were produced by the different research studies comprising the research programme, and the researcher recognised that data may be presented in a number of different ways. The results are presented in the order that the studies were described in this chapter. Data were analysed using suitable statistical tests, influenced by the information required to answer the research questions.

The main strategy for the surveys was to present the data in terms of the different types of A&E department which exist in Scotland. In the *RCT of ENP-led care* various outcomes relating to care provided by ENPs and SHOs were compared, and in the *Unplanned Follow-up Study* the main strategy was to provide summary descriptive statistics for minor injury patients as a whole group. A range of statistical tests, dependent on the type of variable and the analysis, were used and are described in Section 4.9. These have been noted throughout the presentation of the results. For clarity a summary of key points are presented at the conclusion of each of the results in Chapters 5, 6, 7 and 8.

Chapter 5

Results: Phase 1

The Extent and Nature of ENP Services in Scotland

5.1 Introduction

This chapter presents the main findings from the two national surveys of A&E departments in Scotland conducted in 1998 (Cooper *et al.*, 2001) (Appendix IXa) and three years later in 2001. The deployment, scope of practice and educational preparation of ENPs in Scotland were explored. Comparisons were made between the different types of A&E department.

5.2 Response Rates

In 1998, 94 hospitals which offered an A&E, 'casualty' or 'minor injury service' were identified and sent questionnaires (see Section 4.4.3). A total of 92 replies were received, this included a reply from one hospital which notified that its department had closed in the time between the identification of departments and the survey, thus the total number of relevant hospital departments was 93 with 91 responding to the survey (98% response rate). Three years later in 2001, 92 departments were identified (a further three hospitals had closed and two opened since the survey in 1998). Eighty-four of the questionnaires (see Section 4.4.5) were returned (91% response rate).

5.3 Type of A&E Department

The majority of departments in Scotland classified themselves as 'minor' departments, for example, those that were situated in GP run community hospitals or MIUs. Three were situated in specialist paediatric hospitals and the remainder were in district general hospitals (DGHs) or inner city teaching hospitals (Table 5.1).

Type of department	1998 Survey No. (%)	2001 Survey No. (%)
'Minor' (e.g. GP unit, MIU)	55 (60)	51 (61)
District General Hospital A&E Department	26 (29)	24 (29)
Inner-city Teaching Hospital A&E Department	7 (8)	6 (7)
Specialist Paediatric A&E Department	3 (3)	3 (4)

Table 5.1: Types of A&E department in Scotland

The *2001 Survey*, explored some of the differences between the different types of departments. Almost all the departments (94%) provided a 24-hour service, seven days a week. Only five departments (6%), all 'minor', had restricted opening times. Emergency '999' ambulances were received at all the inner city, DGH and specialist paediatric departments. Almost three-quarters (74%) of the 'minor' departments received emergency ambulances, although in just over half of these departments (54%) emergency ambulances were received only 'very occasionally'.

Whilst all the inner-city hospital departments and specialist paediatric departments were led by A&E consultants, the DGHs were led by a mixed variety of medical practitioners. A&E consultants were the lead clinicians in 14 (58%) of the DGH A&E departments, other grades of A&E doctors in three (13%) and by consultants from other specialties in the remaining seven departments (29%). Most 'minor' departments (n=44, 86%) were led by GPs.

X-ray facilities were available on-site in 80% of departments (n=67). All others had access to facilities off-site. All inner city, DGHs and specialist paediatric departments had x-ray facilities always available on-site. A third of 'minor' departments (n=17, 33%) only had access to x-ray facilities off-site.

All the inner city, DGHs and specialist paediatric departments had dedicated A&E nursing staff. In some of these hospitals (n=4) the staff also covered other areas such as an A&E ward, outpatient departments and theatres. Staffing in the 'minor' departments was considerably more variable. Only nine (18%) of the 'minor' departments had dedicated nursing staff. In eight (16%) of 'minor' departments nurses rotated from the wards (most of their time was spent on the wards). In half of the 'minor' departments

(n=25) nurses were available from an adjacent ward if and when a patient attended the department. The remaining eight departments (16%) had other local arrangements: staff covered outpatient departments (n=2), or part of a shift was spent in A&E and the rest of the time in a ward (n=2), or day shift had dedicated staff and night shift was covered by ward staff (n=3). One department did not provide an explanation of its staffing.

Just under a third of departments (n=26, 31%) had telemedicine links and a further 18 departments (21%) had links planned. Only 27% of ‘minor’ departments (n=14) had telemedicine links.

5.4 Emergency Nurse Practitioners

In 1998, 43 (47%) Scottish A&E or casualty departments provided some form of ENP service. Over the three years this had increased to 53 departments (63%). In both surveys ENPs were to be found in every type of hospitals’ A&E or casualty department, from small community hospitals to large inner-city teaching hospitals.

Type of hospital A&E department	1998 Survey No. with ENPs (%)	2001 Survey No. with ENPs (%)
‘Minor’ (e.g. GP unit, MIU)	30 (55)	32 (63)
District General Hospital A&E Department	9 (35)	15 (63)
Inner-city Teaching Hospital A&E Department	2 (29)	4 (67)
Specialist Paediatric A&E Department	2 (67)	2 (67)
All department types	43 (47)	53 (63)

Table 5.2: Type of department and number of departments with ENPs

An increase in the proportion of departments utilising ENPs was seen over the three years between surveys in all hospital types except in the specialist paediatric A&E departments (of which there were only three nationwide) (see Table 5.2).

In July 1998, 306 nurses were functioning as ENPs in Scottish A&E departments. This had risen to 388 in June 2001, an increase of 27% over three years. A further 56 student ENPs were reported in the 2001 Survey when an additional question enquired about

nurses who were either in training to be ENPs, or were ENPs who were not yet authorised to practise independently.

Additional questions in the *2001 Survey* explored how ENPs were deployed in the different hospitals according to one of three different operational models. Most departments (n=33, 62%) operated their ENP service as ‘an integrated’ role, i.e. where the ENP role was combined with other nursing duties and the nurse worked only as an ENP on an *ad hoc* basis. In ten departments (19%) ENPs worked in a dedicated role, i.e. only ever working as ENPs. In the remaining ten departments (19%) a rotational model was used, i.e. nurses worked as ENPs on some shifts and on others worked in another nursing role.

5.4.1 Title

In 1998, of the 43 departments that provided some form of ENP service, only 16 (37%) differentiated their nurse practitioners from other qualified nursing staff, by the use of a separate title. By 2001, a relatively small increase to 43% of departments using separate titles was seen (n=23). In both surveys the most commonly used title was ‘Emergency Nurse Practitioner’ or ‘Nurse Practitioner’ (1998, n=13 departments; 2001, n=16 departments). Other titles included ‘Treatment Room Nurse’ or ‘Minor Injuries Nurse’. Inner-city hospitals, district general hospitals and specialist paediatric hospitals were more likely to have given their ENPs a title (1998, 85%; 2001, 73%) than the ‘minor’ departments (e.g. GP units and Minor Injury Units) (1998, 17%; 2001, 19%) (1998, $p<0.001$; 2001 $p<0.0001$).

5.4.2 Clinical grading

Nurses who functioned in the ENP role were found on a wide range of clinical grades. In 1998 the lowest clinical grade for an ENP was D-grade (the lowest clinical grade for a first-level registered nurse) through to H-grade. Three years later, the lowest grade was C-grade (a clinical grade usually associated with second-level registered nurses) through to I-grade. In both surveys it was found that in departments where ENPs were differentiated from other nurses (i.e. through the use of a separate title) individual ENPs were more likely to be remunerated at F-grade or higher. ENPs in departments which did not use a different title were more likely to be employed at E-grade or below (Table 5.3) [1998, $p<0.001$; 2001 $p<0.001$].

	1998 Survey		2001 Survey	
Clinical grading	Differentiated role n (%)	Undifferentiated role n (%)	Differentiated role n (%)	Undifferentiated role n (%)
E-grade or below	9 (9)	135 (65)	27 (20)	175 (68)
F-grade or above	89 (91)	47 (23)	103 (78)	80 (31)
Unknown/missing	0	26 (12)	2 (2)	1 (1)
Total ENPs	98 (100)	208 (100)	132 (100)	256 (100)

Table 5.3: Clinical grade by role differentiation

There was a difference in the clinical grading of nurses working as ENPs in the smaller or 'minor' departments (e.g. GP Units), compared to the larger units (e.g. district general hospitals, inner-city hospitals or specialist paediatric hospitals). In the smaller units the majority of nurse practitioners were E-grade or below (1998, 68%; 2001, 90%) whereas in the larger departments a smaller proportion of ENPs were on these grades (1998, 3%; 2001 20%) (1998, $p < 0.001$; 2001, $p < 0.001$). It should be noted that the proportion of ENPs on lower grades in both larger and smaller departments had grown over the three years.

5.5 Scope of Practice

The majority of departments (1998, $n=39$, 91%; 2001 $n=46$, 87%) utilised formal written protocols or guidelines to define the scope of their ENP's practice.

The *1998 Survey* contained an open question about the types of condition or problem ENPs commonly treated. More than half of the departments reported that their ENPs could assess and treat patients with minor wounds, soft tissue injuries distal to elbow or knee, bites, minor head injuries, embedded earrings, and minor eye injuries (including flash burns) (see Table 5.4).

In the *2001 Survey*, a list of 30 conditions based on the responses from the *1998 Survey*, was used to elicit information of the conditions ENPs were managing. More than eighty per cent of the departments reported that their ENPs could manage minor head injuries, close minor wounds with tissue adhesives, treat partial thickness burns, insect and animal bites, and manage injuries to the hand, wrist, forearm, ankle and foot (Table 5.5).

Condition / Problem	Number of departments
Minor wounds	35
Soft tissue injuries distal to knee	32
Soft tissue injuries distal to elbow	31
Bites	29
Minor head injuries	23
Removal of foreign bodies from the earlobe	22
Eye injuries (including flash burns)	20

Table 5.4: 1998 Survey – The number of departments and the conditions which at least 50% of departments reported, in an open question, that ENPs managed

Condition / Problem	Number of departments (%)
Closure of uncomplicated wounds with Steristrips	53 (100)
Treatment of small area superficial burns	53 (100)
Treatment of insect bites	47 (89)
Injuries to the foot and ankle	46 (87)
Injuries to hand	45 (85)
Closure of uncomplicated wounds with tissue adhesives	45 (85)
Injuries to the wrist & forearm	43 (81)
Treatment of animal bites	43 (81)
Minor head injuries	43 (81)
Treatment of partial thickness burns	43 (81)
Treatment of sub-ungal haematomas	41 (77)
Closure of uncomplicated wounds with sutures	38 (72)
Injuries to the elbow	34 (64)
Removal of foreign bodies from nose	33 (62)
Injuries to the shoulder	31 (58)
Removal of foreign bodies from the ear canal	31 (58)
Removal of superficial foreign bodies from eye	31 (58)
Injuries to the clavicle	29 (55)
Treatment of human bites	29 (55)
Injuries to the knee	27 (51)
Flash burns to eye	22 (42)
Minor neck injuries (e.g. whiplash)	18 (34)
Needlestick injuries	16 (30)
Closure of uncomplicated wounds with staples	14 (26)
Treatment of mild headaches	14 (26)
Injuries to the hip	12 (23)
Pulled elbows in young children	11 (21)
Lower back pain	11 (21)
Fast-tracking fractured neck of femur patients	8 (15)
Treatment of migraines	3 (6)
Other conditions (e.g. PoP repair, epistaxis, rib injuries)	8 (15)

Table 5.5: 2001 Survey – Conditions managed by ENPs and the number of departments which allow their ENPs to manage these conditions.

5.5.1 Ages of patient ENPs were managing

In the *2001 Survey*, departments were asked about the age ranges of patients that their ENPs could manage. ENPs were found to be treating patients in all age groups. In 15 departments (28%) no age related limits were set on patients that ENPs could manage. In only five departments (9%) did ENPs solely manage adult patients (i.e. over 16 years) (see Table 5.6).

Age range	Number of departments (%)
Adults only (16yrs and over)	5 (9%)
Over 13 years old	6 (11%)
Over 5 years old	10 (19%)
Over 1 year old	13 (25%)
Less than 12 years only	1 (2%)
No specific age ranges/any age	15 (28%)
No information given	3 (6%)

Table 5.6: 2001 Survey - Age ranges of patients commonly treated by ENPs

5.5.2 X-rays

In 1998, less than half the departments with ENPs (n=20, 47%) allowed their ENPs to request appropriate x-ray investigations and only six departments (14%) trained and permitted their ENPs to interpret a limited range of x-rays.

In 2001, departments were asked about their x-ray facilities and whether ENPs could request and interpret x-rays. Forty-four (83%) of the departments with ENPs had on-site x-ray facilities. ENPs were able to request x-rays within 29 (66%) of these departments. However, not all of these departments which allowed their ENPs to request x-rays allowed them to interpret them. Of the 29 departments where ENPs could request x-rays less than half (n=13, 45%) allowed them to interpret their own x-rays.

5.5.3 Medication

In the *2001 Survey*, departments were asked which common medications their ENPs were able to supply independently to patients. Sixty-two per cent of departments with ENPs (n=33) permitted their ENPs to supply paracetamol, under protocol or patient group direction (PGD), to their patients. Tetanus immunisation was also commonly administered by ENPs under specific protocol (60% departments with ENPs, n=32). Other medications, for example, antibiotics, are available to ENPs in certain departments (see Table 5.7).

Medication	Number of departments (%)
Paracetamol	33 (62%)
Co-codamol	10 (19%)
Ibuprofen	28 (53%)
Penicillin	14 (26%)
Flucloxacilin	17 (32%)
Augmentin	10 (19%)
Tetanus immunisation	32 (60%)
Tetanus immunoglobulin	9 (17%)
Post coital contraception	5 (9%)

Table 5.7: Number (%) of departments with ENPs that are able to supply common medications

5.6 Educational Preparation of ENPs

5.6.1 Educational preparation in 1998

In July 1998, there were a total of 306 nurses who functioned as ENPs in Scottish A&E departments. The majority of these nurses (n=214, 70%) had been educated for the role on: a 'recognised' ENP course; a local in-house course; a university accredited minor injuries course; or, the Royal College of Nursing's nurse practitioner diploma. Thirty five nurses (11%) had received no formal preparation for the role at all and a further 49 (16%) had only received 'on the job' training. The final 3%, a total of 8 nurses, had undertaken other courses in advanced clinical practice.

In eight departments (19%) there were nurses who functioned in an ENP role with no formal preparation or only 'on-the-job' training. In the majority of departments (81.4%) nurses who functioned as ENPs had all undertaken some form of formal educational preparation for the role.

5.6.2 Educational preparation in 2001

In the *2001 Survey*, the questionnaire enquired about the minimum and highest level of training ENPs had undertaken in each department and also what level of training the majority of ENPs had pursued. The minimum level of educational preparation for ENPs in different departments varied from no formal training (6%) through to the need to have completed a university accredited nurse practitioner course (57%) (see Table 5.8).

Education preparation / training	Minimum Level	Highest Level
	Number of departments (%)	Number of departments (%)
No formal training	3 (6)	2 (4)
'On-the-job' training	9 (17)	3 (6)
In-house training course	11 (21)	8 (15)
University accredited course	30 (57)	36 (68)
RCN NP degree	0	2 (4)
Other	0	2 (4)

Table 5.8: Minimum and highest levels of ENP preparation in departments, 2001 Survey

'Minor' departments were more likely to have some ENPs with no training or only 'on-the-job' training than the larger units (e.g. inner-city, DGH or specialist paediatric hospitals) which were more likely to have formally trained their ENPs either on in-house courses or university level courses³ ($p < 0.008$).

In almost three-fifths of departments the majority of each department's ENPs had undertaken a university accredited ENP course ($n=30$, 57%) or the RCN's nurse practitioner diploma/degree ($n=1$, 2%).

In different departments the length of time a nurse was required to have been qualified before undertaking training to be an ENP varied from three months (2%, $n=1$) to five years (33%, $n=17$), however a further twenty six per cent of departments ($n=13$) did not stipulate a minimum time period for nurses to have been qualified prior to undertaking training for the ENP role.

Considerable variation was found between respondents from different departments in the level of training they felt ENPs should receive. The responses ranged from 'on-the-job training' (2%) to Master's degree level (2%) (Table 5.9). The majority of respondents viewed a short university accredited course as the most appropriate level of education.

³ The academic level of courses was not examined. However, all university accredited ENP courses in Scotland are currently at Scottish Degree Level 3 i.e. 3rd year of a 4 year honours degree

Level of Education preparation / training	Number (%)
'On-the-job' sufficient	1 (2)
Short in-house course	7 (14)
Short university accredited course	21 (40)
Diploma	10 (19)
Degree	12 (23)
Masters degree	1 (2)

Table 5.9: Respondents views of the appropriate level of educational preparation for ENPs (2001 Survey)

Respondents were asked in an open question if they had any comments to share on ENP training, and those from 26 departments with ENPs chose to do so (49%). Responses could be grouped into three main categories: departmental plans for training, problems encountered with existing training or resources, and the desire for standardisation of training.

Four departments took the opportunity to explain that they were considering or encouraging their nurses to undertake further education related to ENPs.

Two respondents felt that current training should be more clinically focused and three felt that an ongoing 'updating' programme was necessary. Two respondents took the opportunity to point out that any ENP training course required significant 'on-the-job support'. Most of the problems encountered with existing training courses came primarily from smaller departments. Four reported that they found it difficult to get clinical experience or appropriate clinical supervision, and two commented on the difficulty of justifying the expense of training ENPs for very small departments where usage of the service would not be high. Three respondents commented on the lack of support or resources from the health service for ENPs, and one respondent felt that experienced nurses should be appropriately graded before they began to train as ENPs.

In-house training was felt to be insufficient and a wider based programme required (n=1). The most frequently made suggestion was for training to be standardised and to be nationally recognised (n=5).

5.7 Levels of ENP Practice

From the results of the surveys, it was apparent that there were a number of different levels of ENP practice in Scotland. Data from the *1998 Survey* allowed ENPs to be divided into two distinct groups: trained and untrained. The untrained group were nurses who were authorised locally to see, treat and discharge certain types of patients, effectively working as ENPs with either no training or only 'on-the-job' training (labelled 'Type 1' or 'untrained' in Table 5.10). In 1998 there were eight departments with ENPs in this category; by 2001 this had increased to twelve departments. These ENPs, did not use a title to differentiate themselves from other nurses, were unlikely to be able to request x-rays, or supply medication without a doctor's prescription, and generally did not have protocols to guide practice.

From additional data in the 2001 survey, trained ENPs could be sub-divided into two further levels of practice. At the opposite end of the spectrum described above, a small number of departments allowed their ENPs (Type 3 or full role): to request and interpret x-rays; supply analgesia and antibiotics to patients; had protocols or guidelines in place for ENPs to work to; used a specific title to differentiate these ENPs from other nursing staff; and, had all their ENPs trained on a university accredited ENP course. These courses were either external university courses (n=2) or in-house university accredited courses (n=2) run by that department in conjunction with a local university.

In 2001, the majority of departments (n=37, 86%) in Scotland had nurses working as ENPs somewhere between these two extremes (Type 2 or limited role). All the ENPs in these departments were trained on in-house or university accredited ENP courses. However, their scope of practice was limited and whilst some ENPs in these departments may have been able to request and interpret x-rays, or supply various medications to patients, they were not able to supply analgesics, antibiotics, and request and interpret x-rays (it should be noted that in three of these departments x-ray facilities were not on site) (see Table 5.10).

	Type 1 (untrained)	Type 2 (limited role)	Type 3 (full role)
Title	No title	No title / Title (Just under half the departments used a specific title to differentiate their ENPs from other nurses - n=19, 51%)	Title always used (usually ENP or NP)
Training	No training or only 'on-the-job'	In-house or university accredited NP course	University accredited NP course
Protocols	May not work to protocols (7 depts had protocols for their ENPs to work to – 58%)	Local protocols (The majority of departments had protocols for their ENPs to work to – n=35, 95%)	Local protocols
Scope of practice			
X-ray requesting	May or may not (only 1 department allowed ENPs to request x-rays 8%)	May or may not (14 departments allowed their ENPs to request x-rays 38%)	Yes
X-ray interpretation	No	May or may not (9 departments allowed their ENPs to interpret x-rays 24%)	Yes
Authorised to supply medication	May or may not (2 depts authorised ENPs to supply a very limited range of medication – 17%)	May or may not (31 departments allowed their ENPs to supply medication 84%)	Yes
Authorised to supply analgesics	May or may not (1 dept authorised its ENPs to supply a very limited range of medication – 8%)	May or may not (27 departments allowed their ENPs to supply analgesia 73%)	Yes
Authorised to supply antibiotics	No	May or may not (13 departments allowed their ENPs to supply antibiotics 35%)	Yes
No of departments	12	37	4

Table 5.10: Three different levels of ENP practice in Scotland from 2001 survey

5.8 Advantages and Disadvantages of ENP Services

5.8.1 1998 Survey

The questionnaire contained two open questions that asked the nurse-in-charge of departments with ENPs, to outline the advantages and disadvantages of their ENP service. Of the 43 respondents from the departments with ENPs the majority (n=30, 70%) stated that ENPs had helped to reduce the waiting times for patients. A majority of respondents (n=23, 54%) also felt that the role of the ENP had helped to improve morale, staff development, and develop the role of the A&E nurse. Twenty of these senior nurses (47%) also felt that the ENPs had helped to improve the efficiency of

medical staff time and five (12%) highlighted the increase in patient choice, by providing this service.

Just over half of the respondents (n=22, 51%) did not list any disadvantages related to the introduction of ENPs into their departments. However increased difficulties with staffing and problems related to the need to cover holidays and sick time were reported by six respondents (14%). Five respondents (12%) reported that 'ENPing' involved more nursing time and a greater amount of documentation than previously. A small number of the respondents (7%) reported that their protocols restricted ENP practice and two (5%) were concerned about divisions amongst their staff as a result of the introduction of ENPs.

Five respondents commented on the difficulties of providing an ENP service with no further funding for training or for increasing the salary of nurses who had taken on the extra responsibility of diagnosing, treating and discharging patients.

A number of other points were brought up by individual respondents including: the increased stress of ENP practice; the reluctance of other [nursing] staff to refer to ENPs; some ENPs did not fulfil their roles properly; the ENP service encouraged more inappropriate use of A&E departments; ENP services have led to an increased workload on other nursing staff; and that sometimes there was lack of understanding by patients as to why minor injured patients were seen before ill or more seriously injured patients.

5.8.2 2001 Survey

Three years later, using the same open questions, respondents were asked what they considered to be the main advantages and disadvantages ENPs brought to their departments. Forty-seven respondents (89%) from departments with ENPs, took the opportunity to answer the question related to advantages brought to a department by ENPs. Ninety-six responses were given which fell into five broad categories: reduction in waiting times and improved access to service; improved nurses morale and motivation; decreased workload and interruptions for medical staff; an improved service; and development of the role for nurses.

ENPs were seen to have brought benefits to patients, nurses, medical staff and the service. Of the 47 respondents from departments with ENPs the majority (n=37, 70%) felt that ENPs had helped decrease waiting times in their departments (particularly for

minor injury patients) or had helped to improve access to the service. The next most commonly mentioned benefit was the increase in job satisfaction, morale and motivation amongst staff (n=13, 25%). Decreased workload and interruptions for medical staff was seen as an important benefit by 10 respondents (19%). Seventeen respondents (32%) felt that ENPs had helped to improve the quality of service provided, for example through improving patient satisfaction, increased continuity of care, the provision of greater choice for patients, increased health promotion and advice to patients, and the improvement of clinical documentation. Eleven respondents (21%) described the benefits of ENPs as helping to develop the role of the nurse by expanding their role, creating a [new] career opportunity, and increasing knowledge, skills and autonomy. A number of single respondents suggested that ENPs had helped improve retention of staff, provided a resource to advise junior doctors, helped improve the relationship between nursing staff and medical staff, and had helped attract more funding to their department.

Thirty-six respondents (68%) commented on the open question which enquired about the main disadvantages they considered ENPs had brought to their department (17 departments did not comment). Respondents from 10 departments which had ENPs (19%) stated they felt there were no disadvantages. Disadvantages identified by the remaining respondents primarily fell within six categories: increased workload for nurses (n=3, 6%); clinical grading problems (n=5, 9%); problems staffing other areas of A&E or the wards (n=6, 11%); actual or the perceived risk of disharmony amongst the nursing workforce (n=4, 8%); insufficient resources to support the service (n=11, 21%); or, that the expectations of the service were greater than could be provided because of restrictive locally agreed protocols (n=3, 6%). A number of single respondents listed three other disadvantages. These were that some patients still wanted to see a doctor; more patients were asked to return to the department by the ENPs; and, the number of patients to the department had increased because of what were considered unnecessary referrals by GPs.

5.9 Conclusion

This chapter has presented the results from the first phase of this research programme, which addressed the research questions relating to the extent of ENP services in Scotland, the commonalities between ENPs in different departments and how services developed over a three-year period. The following key points summarise these results.

- Approximately 60% of the A&E departments in Scotland classified themselves as 'minor' departments. The remainder were located in DGHs or inner-city teaching hospitals. In the 'minor' departments, most provided a 24-hour service, were led by GPs rather than A&E specialists, and had nursing staff who worked in other areas of the hospital, not just in A&E.
- There were nurses who worked as ENPs in every type of A&E department from the largest inner-city department (with on-site medical staff for support) to some of the smallest community hospitals where a ward-based nurse would see, treat and discharge the patient. One department in Scotland is entirely nurse-led and its ENPs manage all the patients who attend.
- The number of departments which provided an ENP service grew over the three year period between 1998 and 2001. In 1998, 47% of all the A&E departments in Scotland had nurses who worked in an ENP role. By 2001, this had risen to 63% of all departments. The largest increase was seen amongst the larger departments. The number of nurses practising as ENPs rose by 27% in the same three years. In 1998, there were 306 nurses who functioned as ENPs in Scotland's A&E departments; by 2001 the numbers had risen to 388 with a further 56 in training.
- ENPs were deployed in different ways in different departments. Most departments (62%) operated an 'integrated' service, in 19% of departments ENPs performed in a 'dedicated' role and in 19% a 'rotational' model was used.
- Not all ENPs were known as emergency nurse practitioners. In fact, a title was only used to differentiate nurses working as ENPs in 43% of departments (a rise from 37% in 1998). The most commonly used titles were 'emergency nurse practitioner' and 'nurse practitioner'. 'Minor' departments were less likely to differentiate their ENPs by use of a title, than larger departments ($p<0.001$).
- Nurses who worked as ENPs were paid on all clinical grades for qualified nurses ranging from C-grade to I-grade. Departments which did not differentiate their ENPs from other nurses by use of a title were more likely to employ their ENPs at E-grade or below ($p<0.001$).

- ENPs in Scotland predominantly managed minor injuries. Approximately 70% of departments with ENPs allowed their ENPs to manage injuries distal to the elbow, injuries distal to the knee, manage minor wounds which may require sutures, treat animal bites and manage minor head injuries. ENPs in different departments managed patients of all ages, although most departments (66%) did not specify any specific age range for ENPs to manage.
- The number of departments which allowed their ENPs to request and interpret x-rays had increased over the three-year period between the surveys. By 2001, two-thirds of departments with ENPs and x-ray facilities allowed their ENPs to request x-rays, however not all allowed their ENPs to interpret films. Only 45% of the departments which allowed their ENPs to request x-rays also allowed their ENPs to interpret those films.
- In 2001, over a third of departments (38%) did not allow their ENPs to supply any type of medication to their patients without a prescription from a doctor (this included simple analgesics). ENPs in a limited number of departments could supply various antibiotics and simple analgesics (19% to 32% of departments).
- The educational preparation required by different departments, before a nurse could practise in the role of an ENP, varied from no specific need for additional training (6%) or only on-the-job training (17%) to the need to have formally passed a specific university accredited ENP or minor injuries course (57%).
- Three levels of ENP practice were identified in Scotland. The lowest level (untrained) was where nurses were practising as ENPs without specific additional educational preparation or training for the role. At the highest level (full role) ENPs had been educated on various university accredited nurse practitioner programmes, they worked to a range of protocols and were authorised to request and interpret specific x-rays, and to supply a range of medications to their patients including analgesics and antibiotics. In the majority of departments ENPs operated at a level between these two (limited role). These ENPs were educated on specific in-house or university accredited NP programmes, and could perform some but not all of the tasks performed by ENPs at the highest level.

- Most senior nurses in-charge of A&E departments with ENPs in Scotland (84%) viewed some form of university course as being the minimum level of education preparation an ENP should receive, however, even this varied from a short university accredited course to a Master's degree.

The picture painted by these results is of a developing, but diverse range of ENP services in all types of A&E department throughout Scotland. The majority of departments had trained their ENPs on short courses (by 2003 most courses were university accredited), and employed them on a variety of different clinical pay grades. A title to differentiate ENPs from other nursing staff appeared optional, however, where titles were used, 'emergency nurse practitioner' or 'nurse practitioner' were the most common. ENPs in Scotland, were found to predominantly manage minor injuries which included minor wounds which might require closure, musculo-skeletal injuries distal to the elbow and knee, and minor head injuries. Virtually all (98%) ENPs in Scotland managed adult patients (2% managed only children under 12 years – all in paediatric hospitals). Depending on local variations ENPs may supply certain medications and request x-rays, although relatively few departments (n=13) allowed their ENPs to interpret x-rays.

Chapter 6

Results: Phase 2 – Study 1 Development of a Documentation Audit Tool

6.1 Introduction

In this chapter the results related to the development of the Documentation Audit Tool (DAT) are presented (Cooper, Kinn, Ibbotson *et al.*, 2000) (Appendix IVc). This instrument was developed using the modified nominal group technique (see Section 3.4). Results related to each stage (see Figure 4.2) in the development of the tool are described and the results of formal inter-rater and test-retest reliability testing using Intraclass Correlation Coefficients (ICC) (see Section 4.9.13) are presented.

6.2 Stage 1 – Literature Review and Selection of Panel Members

From the selected literature (Appendix IVb) a total of 123 items were identified which related to the documentation of minor injuries in A&E. Thirteen experts were invited to join the expert panel (seven A&E doctors and six ENPs). All were willing to participate although only eleven (seven doctors and four ENPs) stated they would be able to attend the nominal group meeting on the proposed date. These eleven formed the expert panel.

6.3 Stage 2 – The Modified Nominal Group Technique

Booklets (Appendix IVa) which contained the items selected in stage one and the reference booklet were posted to the eleven panel members. Ten booklets were returned (response rate 91%). One of the panel members was on annual leave and was unable to complete the booklet in time for the meeting. The results from the first round were analysed. Complete consensus, where all members of the panel gave the item the same rating, on a 5-point Likert scale, was achieved in 32 of the original 123 items. In a further 38 items, at least 80% (8 of the 10) experts gave the same rating (Table 6.1). A further 35 additional items for inclusion were suggested by panel members.

Consensus level	No. of items (%)
First round – 123 items rated	
Complete (100%)	32 (26)
High level (80% or more)	70 (57)
Moderate level (60% or more)	98 (80)
Second round - 162 items rated	
Complete (100%)	80 (49)
High level (80% or more)	102 (63)
Moderate (60% or more)	125 (77)

Table 6.1: Consensus level and number of items (%) expert panel reached consensus

Six members of the panel attended the nominal group meeting (three A&E consultants, one staff-grade A&E doctor and two ENPs). The new list of 158 items were discussed and re-rated at that meeting. At times a variety of opinions emerged. The chairman (Ian Swann) kept the discussion to clarification of items and opinions only. During the meeting a further four items were suggested. Consensus (five out of six members (83% agreeing) was achieved in 102 (63%) of the items (Table 6.2). The main areas of consensus were related to items considered as very important to document: 96 (59%).

Documentation Items	No. of items
Stage 1 – Literature Review	
Identified from the literature and rated in 1 st round	123
Stage 2 – Modified NGT	
<i>First Round – Postal</i>	
Number (%) of items given the same rating by 8 or more experts (10 experts returned booklets)	70 (57%)
Further items suggested	35
<i>Second Round – Nominal Group Meeting</i>	
Number of items initially discussed at nominal group meeting	158
Further items suggested	4
Number (%) of items given the same rating by 5 or more experts (six experts at NGT meeting)	102 (63%)
Stage 3 – Development of DAT	
Number of items 5 or more experts rated as ‘1’ very important to document	96
Number of items excluded from final DAT as either repeated or ambiguous	13
Number of items incorporated into final DAT	83

Table 6.2: Identification of documentation items for inclusion in the DAT

6.4 Stage 3 – Development of the Documentation Audit Tool

Only items where there was at least 80% consensus amongst the expert panel during the second round of the nominal group process and rated ‘1’ (very important to document) were considered for inclusion in the DAT. During the final review, by the researcher, 13 items were removed as they were either repeated or were considered to be ambiguous at the nominal group meeting (see Table 6.2). The final 83 items were divided into five sections: 1) core criteria; 2) investigations; medications and discharge; 3) wounds and burns; 4) limb injuries (sprains, strains and fractures); and 5) minor head injuries. An example of part of the DAT is shown in Figure 6.1 and relates to the fifth section.

Section 5 – Minor Head Injuries

Minor Head Injuries

Use these criteria whenever a minor head injury has been sustained

Minor head injuries	Tick if present
Any loss of consciousness. If no loss of consciousness this should be recorded	<input type="checkbox"/>
Any change in consciousness/drowsiness should be documented	<input type="checkbox"/>
Any nausea or vomiting should be inquired about and recorded	<input type="checkbox"/>
Any headache should be inquired about and documented	<input type="checkbox"/>
The GCS	<input type="checkbox"/>
Any associated wounds, bruises etc.	<input type="checkbox"/>
Any signs of a basal skull fracture should be looked for	<input type="checkbox"/>
Whether a responsible adult is able to care for the patient overnight	<input type="checkbox"/>
Enquiry and documentation of post traumatic amnesia	<input type="checkbox"/>
Examination and documentation of pupils	<input type="checkbox"/>
Enquiry and documentation of any visual disturbance	<input type="checkbox"/>
Total	<input type="checkbox"/> <input type="checkbox"/> /11

Figure 6.1: A section from the Documentation Audit Tool

6.4.1 Inter-rater reliability

Twenty sets of case notes written by either SHOs (9) or ENPs (11) were randomly selected from the *RCT of ENP-led care* (see Chapter 7). Each set of notes was reviewed by three people: the researcher and two different members of the expert panel. The Intraclass Correlation Coefficient (1,1) calculated as 0.67 ($p < 0.001$), indicating a substantial level of agreement (Sackett *et al.*, 1991).

6.4.2 Test-retest reliability

The same twenty sets of blinded notes were re-audited by the researcher several months later. The results were plotted (Figure 6.2) and the Intraclass Correlation Coefficient (2,1) calculated as 0.88 ($p < 0.001$) indicating an 'almost perfect' level of agreement (Sackett *et al.*, 1991) and hence stability of the instrument.

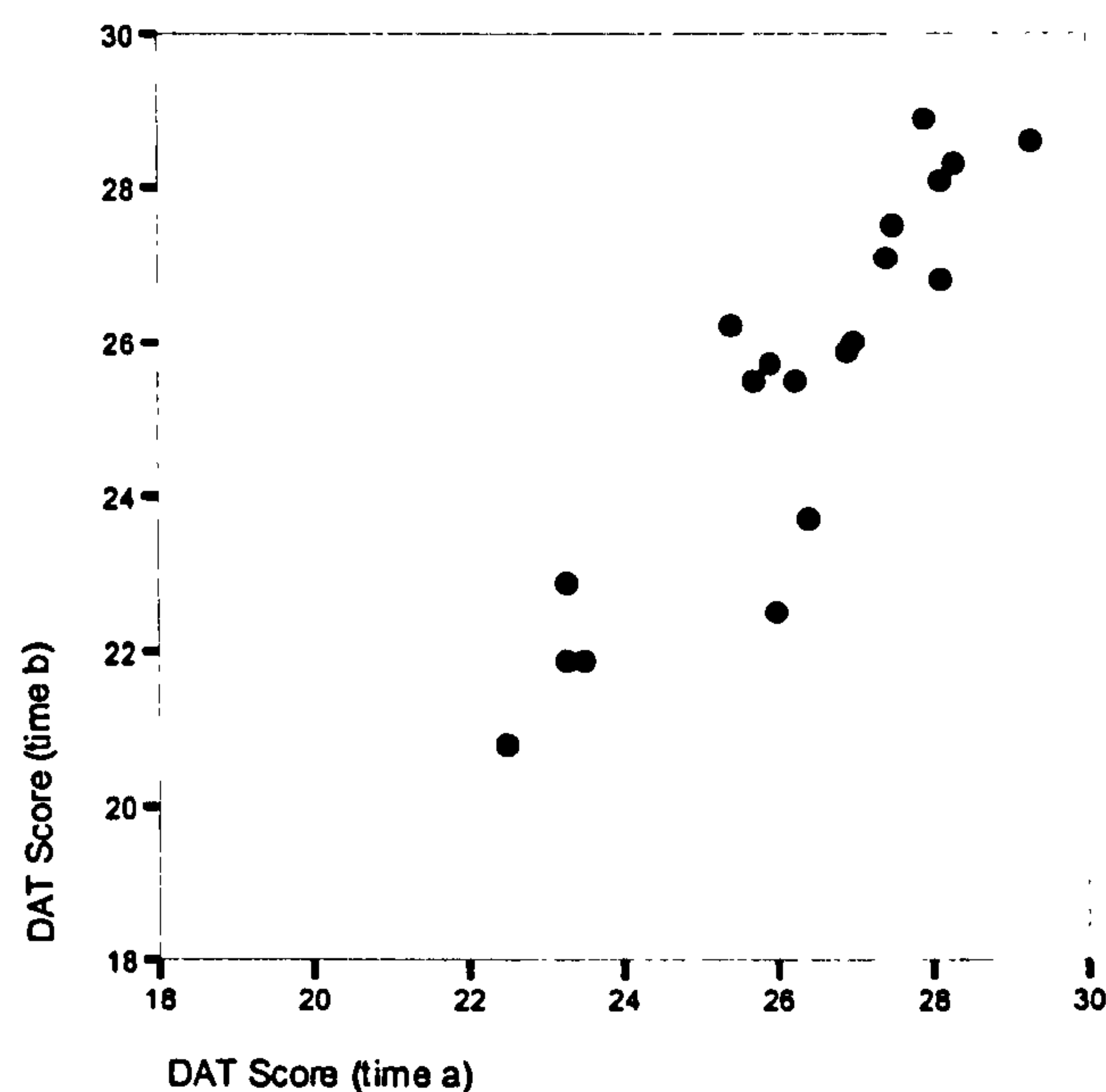


Figure 6.2: DAT Scores: Graph demonstrating test-retest reliability

6.5 Conclusion

This chapter has presented the results which relate to the development of an instrument which was used in the subsequent *RCT of ENP-led care* (reported in Chapter 7) to compare the quality of ENP and SHO documentation. The following key points summarise the development of this tool.

- The modified nominal group technique proved an effective method to develop a documentation audit tool. It allowed selected experts to review a large number of items ($n=158$) relating to the documentation of minor injuries, to be reviewed in a relatively short time frame. It also enabled consensus over the importance of documenting these items to be achieved at one three-hour meeting, without participants becoming side-tracked into other issues.
- The developed tool was found to be a useful method of auditing the clinical documentation of ENPs and SHOs, when tested by a number of different clinicians (each clinician managed to use the tool on both the documentation written by ENPs and SHOs).
- A ‘substantial’ level of inter-rater reliability ($ICC(1,1) = 0.67$) was found when different clinicians used the tool on the same notes.
- The tool was also shown to have an ‘almost perfect’ level of stability when it was used by one individual to measure the quality of documentation on two separate occasions ($ICC(2,1) = 0.88$).

The DAT was subsequently used to compare the quality of clinical documentation of ENPs and SHOs, in the *RCT of ENP-led care* which is reported in the next chapter.

Chapter 7

Results: Phase 2 – Study 2 Evaluating an ENP Service: a Randomised Controlled Trial

7.1 Introduction

In this chapter the results, from a RCT that compared the care provided to minor injury patients by ENPs and SHOs, are presented (Cooper, Lindsay, Kinn *et al.*, 2002) (Appendix IXd). Comparisons between ENPs and SHOs were made with respect to patient satisfaction, quality of clinical documentation, levels of unplanned follow-up and missed injuries. The amount of advice sought by both groups from senior medical staff, and referrals made to specialists were also compared. For continuous data the independent samples t-test was used, and for categorical variables Chi-square test. The Mann-Whitney U test was used to compare the ranked level of agreement relating to statements in the patient satisfaction questionnaire. The reliability and validity of the patient satisfaction questionnaire was tested using the Kappa statistic, Cronbach's Alpha and the Spearman correlation coefficient. Finally, the sample size required for a trial to compare differences in missed injuries and mismanaged cases between ENPs and SHOs was calculated.

7.2 Baseline Characteristics of Study Cohort

7.2.1 Recruitment

A total of 214 minor injury patients were invited to participate in the trial. Ninety-five per cent of the patients invited to participate took part (n=204). Five patients were subsequently withdrawn, as they were inadvertently seen by senior A&E clinicians not participating in the trial (Figure 7.1). Patients were recruited into the trial over 28 days during December 1998 and January 1999 (no recruitment was conducted during the Christmas and New Year period). Approximately 215 hours were spent, by the researcher, in the department recruiting patients. Eight ENPs and 12 SHOs took part in the study. Seven of the eight ENPs had been practising for one year at the time of the study. The eighth ENP had completed her training three months prior to the start of the

trial. All of the SHOs were in their 5th and 6th months of their six-month A&E posting, with the majority in their first SHO post (n=9). However, one was in their third SHO post, and two were in their fifth and sixth posts respectively.

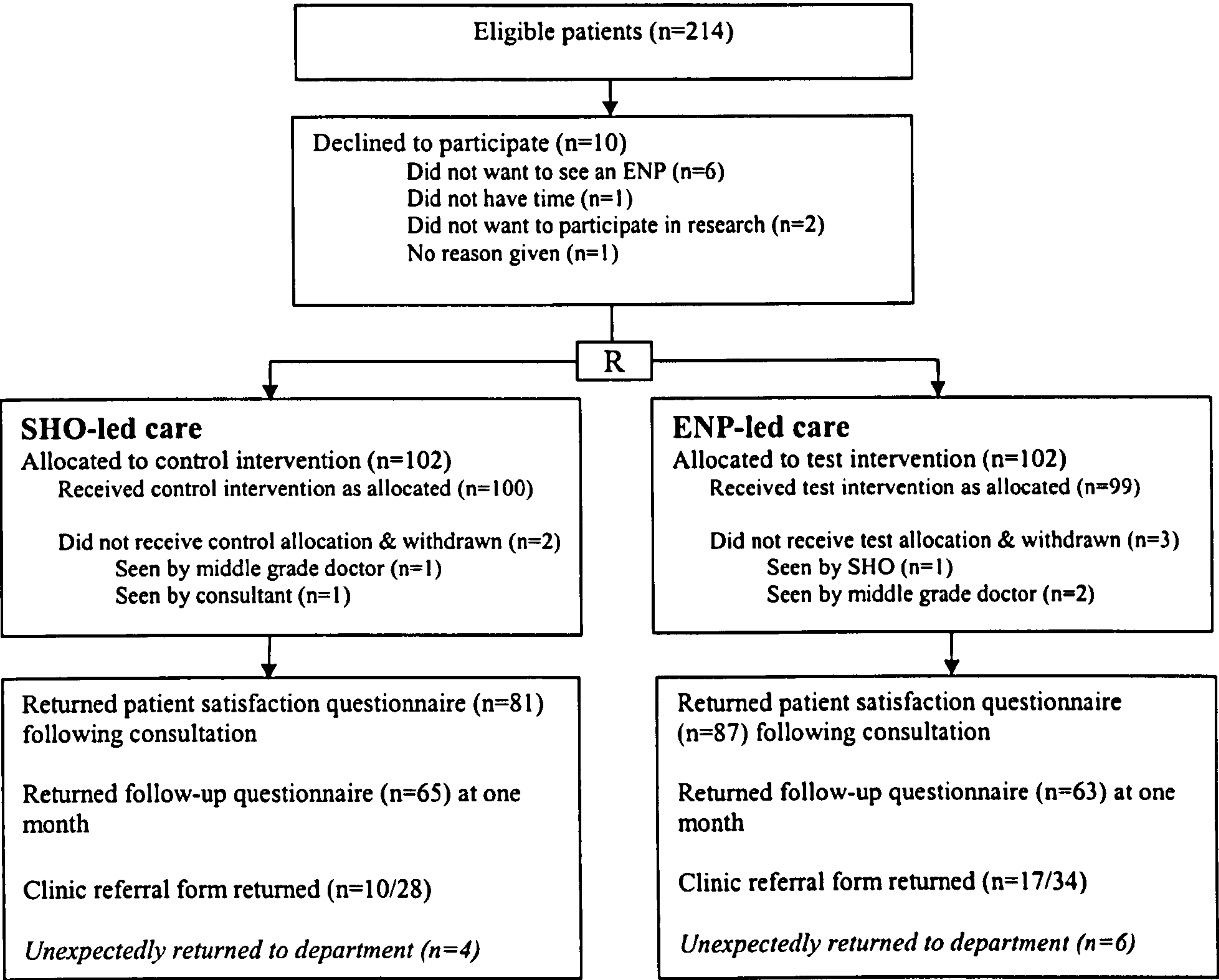


Figure 7.1: CONSORT diagram of trial. The ‘R’ indicates randomisation

7.2.2 Demographic information and types of injury

The average age for patients in the study was 36.3 years. Just over half the patients were male (56%). The demographic characteristics of the patients and the injuries treated in both the ENP-led care group and the SHO-led care group were compared and no statistical differences were found between the groups in terms of age, sex, deprivation score and type of injury (see Table 7.1).

Characteristic	Range	ENP-led care n=102	SHO-led care n=102	P-value (95% C.I.)
Age	Years (Mean)	35.85	36.80	0.648 (-5.04 to 3.14)
	Min	18	16	
	Max	76	86	
	s.d.	14.3	15.32	
Sex	Male	59	56	0.672
	Female	43	46	
Deprivation Score (Carstairs Index) (McLoone 1994)	Least 1	2	1	0.612
	2	2	5	
	3	12	16	
	4	13	10	
	5	11	6	
	6	16	20	
	Most 7	43	43	
	Information not available	3	1	
Type of Injury (primary complaint)	Ankle/foot sprain	18	11	0.764
	Wrist/hand sprain	9	8	
	Wounds, burns & scalds	34	36	
	Contusion injury	8	8	
	Hand/wrist fracture	11	15	
	Ankle/foot fracture	12	10	
	Minor head injury	0	1	
	Other	7	10	
	Information not available	3	3	

Table 7.1: A comparison of the demographics and types of patients in the control and intervention arms of the trial

7.3 Consultation

7.3.1 Consultation and referral

The average time a patient had to wait to be seen by an ENP was significantly shorter than patients who saw a SHO (48.6 mins vs. 70.1 mins, $p<0.001$). However, there was no significant difference in the total consultation time (including the time for treatment) for patients in either group (ENP 30.0 mins vs. SHO 24.9 mins, $p=0.115$).

There was no difference between the groups in the numbers of x-rays requested (ENP 56.6% vs. SHO 47.5%, $p=0.2$). At the time of the trial, according to protocol, the ENPs had to request advice on interpreting x-rays and did so in 98% of cases ($n=55$). SHOs were also at liberty to seek advice on x-ray interpretation and did so in 32% of cases ($n=15$). When patients who had been x-rayed were excluded there was no difference noted between the two groups in terms of advice sought from senior medical staff (ENP 21% vs. SHO 12%, $p=0.21$).

With the requirement that ENPs should seek advice on x-ray interpretation, it is perhaps not surprising that a different pattern was identified between ENPs and SHOs in the reasons why they sought advice. ENPs sought advice predominately for x-ray interpretation and SHOs for advice on treatment of specific injuries (Table 7.2). Both ENPs and SHOs sought most advice from A&E middle grade doctors (Table 7.3).

Advice sought for	ENP-led care	SHO-led care
X-ray interpretation	54	7
Diagnosis	7	0
Treatment	7	12
Prescription of antibiotics	2	0
Other	1	3

NB: ENPs and SHOs may have sought advice for more than one reason

Table 7.2: The number of cases and reasons advice sought by ENPs and SHOs

Advice sought from	ENP-led care	SHO-led care
A&E consultant	8	3
A&E middle grade doctor	49	12
A&E SHO	4	1
Orthopaedic surgeon	3	3
Hand surgeon	4	1
A&E Nursing staff	0	2

NB: ENP and SHOs may have sought advice from more than one person

Table 7.3: The number of cases and types of clinicians whom ENPs and SHOs sought advice from

Both ENPs and SHOs referred some patients to other members of staff (usually nursing staff) for various treatments to be undertaken (e.g. application of dressings or plaster casts etc), and at other times undertook the treatments themselves. There was no difference between the two groups in terms of the proportion of patients referred to other staff to conduct any necessary treatment (ENP 46%, SHO 49%, $p=0.62$). There was also no difference between the groups in terms of patients referred directly for a specialist opinion whilst in the department (ENP 10%, SHO 9%, $p=0.809$), subsequently admitted (ENP 2%, SHO 6%, $p=0.279$) or between patients referred to

follow-up clinics (ENPs 33%, SHOs 28% $p=0.358$). The percentage of clinic referral forms returned by the various follow-up clinics varied considerably from 17% to 100% (Table 7.4). No statistical difference was detected between the two groups in terms of the appropriateness of referral or clinical management (Table 7.5).

Clinic	No. of patients referred	Pro formas recovered	Response rate %
Soft tissue clinic	20	20	100
Fracture clinic	23	4	17
Hand clinic	18	10	56
Burns clinic	1	1	100

Table 7.4: Response rates for the *clinic referral form* from the various follow-up clinics

	ENP-led care	SHO-led care	Significance
Patients referred to follow-up clinics	34	28	$p=0.358$
Patient who failed to attend clinics	4	4	
Patients who attended clinic	30	24	
Completed clinic forms returned	17	10	N/A
Inappropriate or borderline referrals	3	1	$p=0.596$
Unsatisfactory management	2	0	$p=0.254$
Adverse effect on clinical outcome likely, where management was considered unsatisfactory	1	0	N/A

Table 7.5: A comparison of attendance and referral patterns, completion of *clinic referral forms* and patients judged to be managed unsatisfactorily at the follow-up clinics

In two cases patients in the ENP-led care group were considered to have received unsatisfactory clinical management. The first case involved a patient with a suspected ulna collateral ligament injury to the metacarpal-phalangeal joint of the patient’s right thumb. The patient had been correctly diagnosed and referred to the appropriate follow-up clinic. The thumb had also, correctly, been immobilised in a thumb spica, however the patient had not been given a sling, which the reviewing doctor felt was unsatisfactory. At the review clinic the hand was still swollen and a thorough examination was not possible until the swelling had subsided. The second case involved a toe fracture which had been correctly diagnosed and managed by strapping the toes

together, however on review at the clinic the reviewing doctor noticed that a piece of gauze which should have been placed between the toes prior to strapping was missing. This was felt to have been unsatisfactory management which could, if not corrected, lead to an adverse outcome. The piece of gauze is used to help prevent the skin between the toes from becoming macerated. No missed injuries were identified at follow-up clinics.

7.4 Patient Satisfaction

One hundred and sixty-eight patients returned patient satisfaction questionnaires immediately after their treatment: a response rate of 84% (ENP n=87, SHO n=81). Patients appeared very satisfied with the level of care they had received from both the SHOs and the ENPs. However, patients reported that ENPs were easier to talk to; that they were given information on accident and illness prevention; that they were given enough information on their injury; and overall they were more satisfied with the treatment provided by ENPs than they were with treatment provided by SHOs (Table 7.6).

	Percentage agreeing or strongly agreeing with statement		
Statement (Statistically significant statements in bold)	ENP-led care	SHO-led care	p-value
I feel the doctor/nurse practitioner listened to me	98 (n=87)	86 (n=81)	0.089
I feel the doctor/nurse practitioner gave me enough information about my injury/condition	95 (n=83)	83 (n=80)	0.007
I felt able to ask questions about my injury/condition	94 (n=84)	84 (n=80)	0.123
I feel the doctor/nurse practitioner gave me enough time	95 (n=86)	83 (n=80)	0.129
The doctor/nurse practitioner gave me advice on how to avoid illness/injuries	75 (n=81)	45 (n=73)	0.001
I felt it easy to tell the doctor/nurse practitioner about my injury/condition	98 (n=85)	84 (n=81)	0.009
I understood the advice the doctor/nurse practitioner gave me	94 (n=85)	85 (n=78)	0.080
I am satisfied with the treatment the doctor/nurse practitioner gave me	99 (n=85)	88 (n=81)	<0.001

N.B. Not all patients answered every question.

Table 7.6: A comparison of the response to the *Patient Satisfaction Questionnaire* by patients treated within the ENP-led care and SHO-led care groups

7.4.1 Patient Satisfaction Questionnaire – reliability and validity

The *Patient Satisfaction Questionnaire* used in this trial had originally been designed to measure satisfaction with GP registrars’ consultations in primary care. Formal reliability and validity testing had shown this to be a reliable and valid tool for use in the primary care environment (see Section 3.6.4). The following reports the results of tests for reliability and validity when the tool was used during the trial with minor injury patients.

Internal consistency was reasonably high. Cronbach’s Alpha 0.84 (Table 7.7), and the strength of agreement between reciprocal statements was fair to moderate (Table 7.8).

	Pilot RCT
Questionnaires returned	168
Questionnaires completed sufficiently to conduct statistical testing	141
Cronbach’s Alpha	0.84

Table 7.7: Reliability of *Patient Satisfaction Questionnaire* assessed by using a test of internal consistency

Statement	Kappa	Agreement
Gave enough time vs. could have given more time	0.47	Moderate
Able to ask questions vs. difficult to ask questions	0.31	Fair
Easy to tell about my injury vs. difficult to talk to	0.45	Moderate

Table 7.8: The strengths of agreement between positive statements and their reciprocals within the *Patient Satisfaction Questionnaire*

To assess criterion validity each of the ten statements was compared with the statement on general satisfaction. All seven positively worded statements were found to be significantly associated with the statement of overall satisfaction with treatment ($p<0.001$) ($r_s= 0.58$ - 0.79). Similarly, the three negatively worded statements were significantly associated with the statement of overall satisfaction with treatment ($p<0.001$), but with a negative correlation ($r_s = -0.28$ to -0.40).

7.5 Quality of Clinical Documentation

The researcher audited the clinical documentation four months after the trial ended, using the previously validated *Documentation Audit Tool* (Cooper *et al.*, 2000) (Appendix IXb). A total of 186 clinical notes were audited (94%) (ENP n=94, SHO n=92), 13 sets of notes could not be found even after extensive searches. The notes were scored out of a maximum of 30. ENPs were found to have written notes of higher quality than the SHOs (28.0 vs. 26.6, $p<0.001$).

7.6 One Month Follow-up

7.6.1 Patient Follow-up Questionnaire

The *Patient Follow-up Questionnaire* was distributed to patients one month after attendance for treatment, and yielded a 64% (ENP n=63, SHO n=65) response rate following one postal reminder. Patients were asked how long it had taken them to fully recover from their injury. There was no difference in time to recovery ($p=0.96$), level of symptoms (swelling, $p=0.92$ and stiffness, $p=0.80$), level of activity (looking after themselves, $p=0.58$; ability to go to work/school, $p=0.40$; sleep pattern, $p=0.87$), and time off work ($p=0.14$).

Patients were asked if they had required further medical or nursing advice in the month following their attendance in A&E, *excluding* any follow-up appointments either made for the patient or that patients were asked to make with their GP (i.e. unplanned follow-up). A fifth of patients (20%) who replied reported the need to seek this unplanned follow-up (ENP 18%, SHO 22% $p=0.654$). No statistical difference was observed between the two groups.

7.6.2 Returns and missed injuries

Ten patients (5%) re-attended the department. Patients returned for a variety of reasons including new injuries (ENP n=1, SHO n=1), concern about their injury (ENP n=2, SHO n=1), problems complying with treatment (ENP n=2, SHO n=1) and problems with their treatment (ENP n=1, SHO n=1). No missed injuries were identified amongst these return patients.

Routine x-ray reporting identified that a total of three patients entered into the trial had injuries missed by the clinician who initially managed the patient. There was one in

each of the treatment groups (ENP n=1, SHO n=1) and a further one amongst the five patients withdrawn from the study.

No formal complaints were received by the hospital about any patient entered into the trial.

7.7 Sample Size for a Full Scale Trial

In the trial no significant difference was detected in missed injury rates (ENP 1%, SHO 1%) (see Section 7.6.2), however, two patients in the ENP-led care group were felt to have received unsatisfactory management when reviewed in the follow-up clinics (ENP 2%, SHO 0%) (see Table 7.5). Therefore, a 2% difference was found to exist between the two groups. To detect a 2% difference in the missed injury rates or inappropriately managed cases between the two groups, with a power of 80% and a 95% level of significance, a sample size of 769 patients in each arm of the trial is required.

7.8 Conclusion

This RCT has contributed to the growing knowledge relating to the evaluation of ENPs. Prior to this trial being undertaken there were no published RCTs comparing ENPs and medical practitioners. Since this trial was undertaken, two other trials have been published (Chang *et al.*, 1999; Sakr *et al.*, 1999). Each was undertaken independently and each used ENPs prepared on different courses and who worked to different protocols. Each trial also utilised different evaluation instruments and was undertaken using slightly different methodologies. Each contributes to the knowledge on ENPs.

The aim of this trial was to develop methods and tools that could be easily used, in different A&E departments, to measure the quality of ENP-led care (in terms of patient satisfaction, quality of clinical documentation, unplanned follow-up and missed injuries). These tools were tested in one A&E department and the following key points summarise the findings.

- The *Patient Satisfaction Questionnaire*, modified from an instrument designed to measure satisfaction with GP registrars' consultations, appeared acceptable to patients with minor injuries in an A&E department (response rate 84.4%). Internal consistency was reasonably high (Cronbach's Alpha 0.84) and the

strength of agreement between reciprocal statements was fair to moderate (Kappa 0.31 to 0.47).

- A paper based instrument to collect additional data from ENPs and SHOs (the *Treatment Record*), following layout changes and shortening, was found to be a satisfactory method of collecting additional information on the patient's consultation.
- A paper based *Clinic Referral Form* was found to be effective only in certain clinics. An inability to blind reviewing clinicians as to who had originally managed the patient was a limitation to this method of data collection.
- Both the concept of being seen and treated by a nurse, and participating in an experimental study design were acceptable to minor injury patients, 95% of those approached agreed to participate in the trial.
- Patients reported that ENPs were easier to talk to ($p=0.009$); gave them enough information on accident and illness prevention ($p=0.001$); and gave them enough information on their injury ($p=0.007$). Overall they were more satisfied with treatment provided by ENPs than that from SHOs ($p<0.001$).
- The trial was sufficiently powered to demonstrate that the quality of ENP clinical documentation, measured using the *Documentation Audit Tool*, was higher than that written by SHOs ($p<0.001$) (see Section 4.7.7).
- In this trial no difference was detected in missed injury rates (one in each group), however two patients in the ENP group were felt to have received unsatisfactory management when reviewed in follow-up clinics. A larger trial involving 1,538 patients in total would be required to test the significance of this 2% difference in missed injury and mismanagement rate between the two groups.
- Sixty-four per cent of patients in the trial returned their follow-up questionnaires. A fifth of these patients (20%) reported needing to seek additional medical or nursing advice in the month following their attendance (unplanned follow-up). As only 5% of patients re-attended the department it is

possible that other patients with either missed injuries or who were initially managed unsatisfactorily were not picked up in the trial. Furthermore, a third of patients did not return the *Patient Follow-up Questionnaire*, therefore, no data on the follow-up of these patients were available.

The problems which arose in this trial in relation to identifying missed injuries and in particular the larger than expected amount of unplanned follow-up were explored in further detail in a large observational study of minor injury patients which is reported in the next chapter.

Chapter 8

Results: Phase 2 – Study 3 Unplanned Follow-up in Minor Injury Patients

8.1 Introduction

In this chapter the results from the third study in the second phase of the research programme are presented. The results from the *RCT of ENP-led care* suggested that approximately 5% of patients re-attended A&E for various reasons including unplanned follow-up, but four times as many (20%) reported unplanned follow-up in a postal questionnaire (see Section 7.6.1). This meant as many as 15% of patients might have experienced complications or problems with their injury that the original A&E department was unaware of, as patients sought additional advice or a second opinion from other services. This study (*the Unplanned Follow-up Study*) aimed to explore unplanned follow-up in minor injury patients, identify from whom patients sought unplanned follow-up and the reasons why they sought further help.

For this work, minor injury patients were identified from all A&E attendances and were followed by the use of two techniques. Firstly, data from the departmental computer system (CaMIS) were used to identify patients who returned to the department. The case notes of these patients were reviewed and the reasons for their return determined. Secondly, all the identified minor injury patients in the study were sent a questionnaire, one month after attendance, which inquired about the follow-up required in that month for their injury. The results from the three stages of this study are presented: 1) the identification of minor injury patients, 2) the monitoring of re-attendances to the original A&E department and 3) results from the *Unplanned Follow-up Questionnaire* (Figure 8.1). Where data were categorical, the Chi-square test was used to establish whether samples were significantly different, and the independent samples t-test was used when the data were continuous.

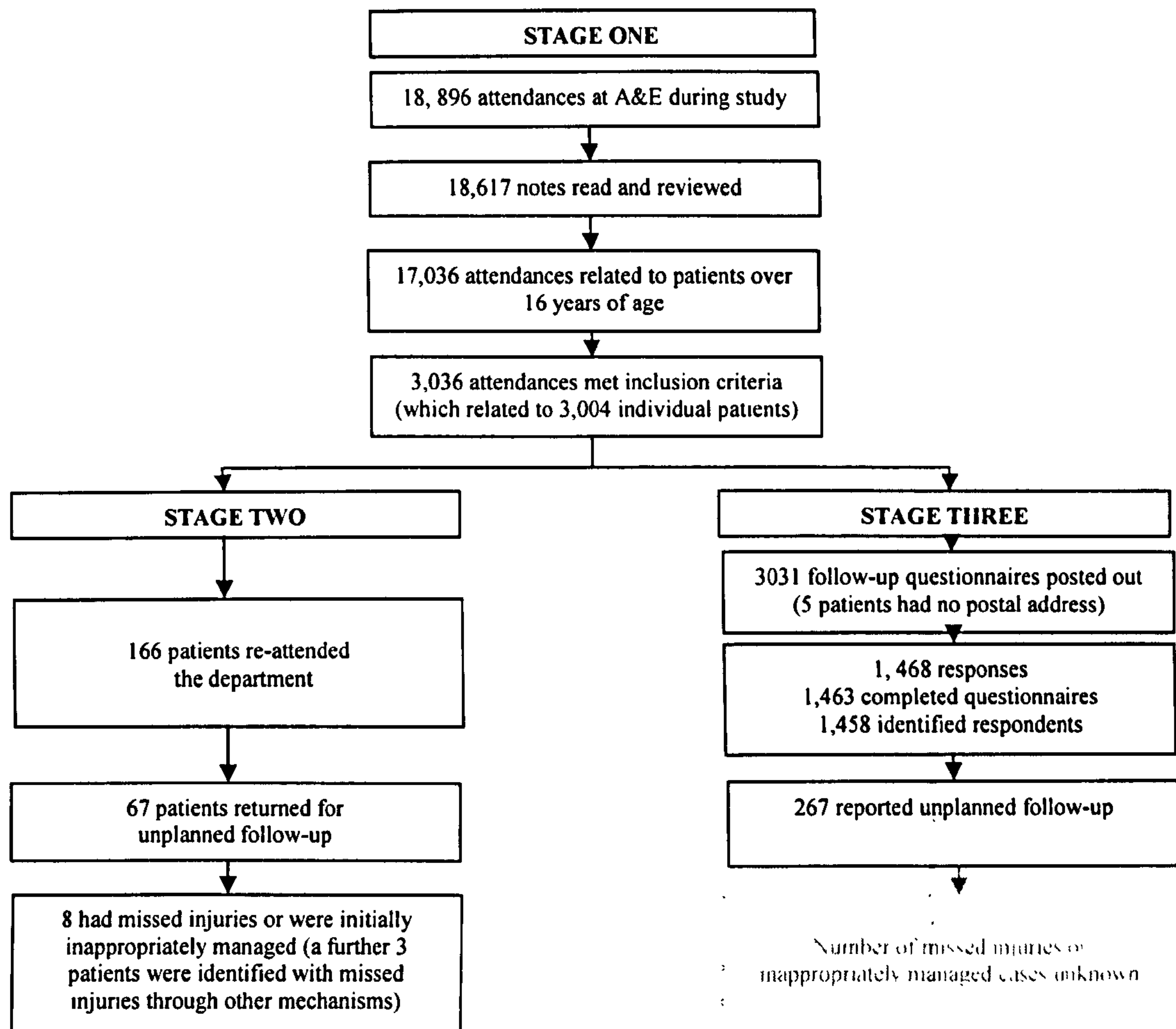


Figure 8.1: Flowchart of *Unplanned Follow-up Study*. Numbers of A&E attendances and patients at each stage in the study

8.2 Stage 1 - Identification of Minor Injury Patients

Clinical notes were reviewed and patients identified for the study over consecutive days until at least 3,000 minor injury patients had been identified. This process took 102 days, beginning on the January 8th 2001 and was completed by April 19th 2001.

8.2.1 Accident & Emergency patients

A total of 18,896 patients attended the Accident and Emergency department during the study period. The majority were male ($n=10,810$, 57.2%). Dates of birth were available from the department's computerised records system for 18,775 patients (99.4%). The majority of patients who attended the department were 16 years or older ($n=17,036$, 90.1%). The youngest patient was 29 days old and the oldest was 102 years. The mean age was 40 (s.d. 21.56). Ages were normally distributed (Skewness = 0.516).

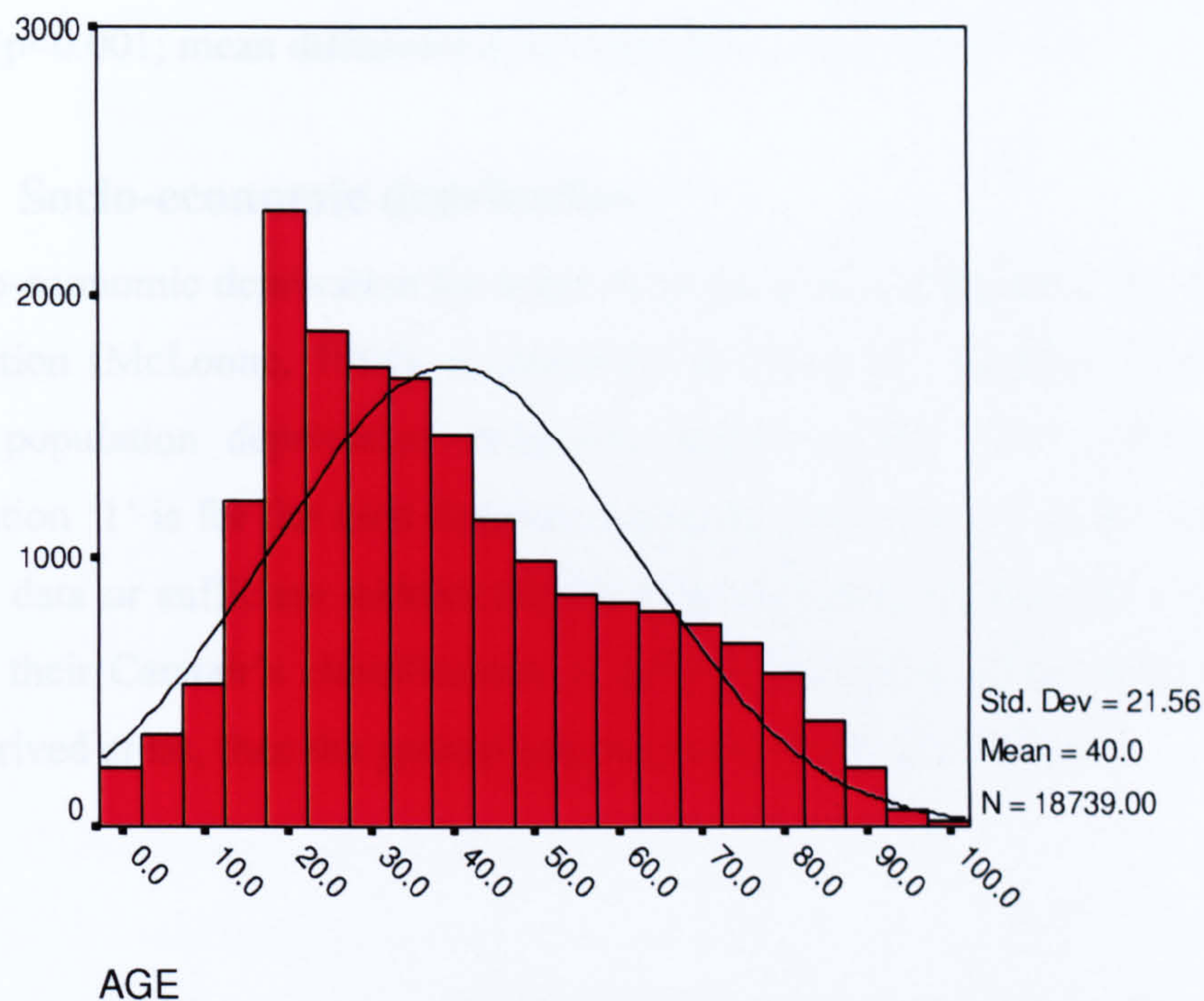


Figure 8.2: Age profile of patients attending A&E

8.2.2 Adult minor injury patients

The researcher and two research assistants identified and reviewed 18,617 sets of clinical documentation relating to 98.5% of the patients who attended the department during the 102 days. There were 3,036 attendances which met the study's inclusion criteria. This equated to 16.1% of all attendances and 17.8% of all the adult attendances. Ages of included patients, ranged from 16 years (the minimum age for inclusion in the study) to 100 years. The mean age was 35.74 years (s.d. 16.25). The majority of the patients were male ($n=1835$, 61.1%). A small number of patients ($n=32$) attended twice with different minor injuries which were suitable for inclusion in the study and were subsequently sent a questionnaire 28 days after each attendance. The total number of individual subjects included in the study was 3,004.

When minor injury patients included in the study were compared with all A&E patients there were statistically significant differences noted both in gender and age. There were a higher proportion of male patients in the minor injury sample (61.1%) than compared

with all A&E patients (56.6%) ($p<0.001$), and minor injury patients were generally younger ($p<0.001$; mean difference 4.32 years 95% C.I. 3.52 to 5.13).

8.2.3 Socio-economic deprivation

The socio-economic deprivation for subjects in the study, as measured by the Carstairs’s classification (McLoone, 1994), is presented in Table 8.1, together with the average Scottish population deprivation categories (based on the 1991 census data). The classification ‘1’ is for the least deprived postcode areas and ‘7’ for the most deprived. Postcode data or sufficient address details were available on 2941 (97.9%) patients to calculate their Carstairs’s classification. A greater proportion of the study sample were from deprived areas, than the general population of Scotland ($p<0.001$).

Deprivation Category	Study Subjects %	Scottish Population (McLoone, 1994)
1 (Lowest deprivation)	1.9	6.1
2	2.4	13.8
3	10.3	21.8
4	10.8	25.4
5	6.4	14.8
6	17.6	11.4
7 (Highest deprivation)	50.6	6.7

Table 8.1: Percentage of patients and Scottish Population in each of the socio-economic deprivation (Carstairs’s classification) categories

It was not unexpected to find that two thirds of the patients in the study group were from the two highest deprivation categories as the research site was centred in one of the most impoverished areas of Glasgow. The Scottish data was drawn from the whole of Scotland and includes suburban and rural areas.

8.2.4 Type of minor injury

The 3,036 attendances for a new minor injury related to 3,004 different patients. The types of minor injuries these patients presented with are shown in Table 8.2.

Minor Injury	No. of patients (%)
Fracture, suspected fracture or dislocation	634 (20.9)
Sprain	687 (22.6)
Laceration, bite or abrasion	772 (25.4)
Contusion or haematoma	354 (11.7)
Burns	66 (2.2)
Muscular injury	48 (1.6)
Isolated minor head injury	56 (1.8)
Minor head wound	51 (1.7)
Other	368 (12.1)
Total	3036

Table 8.2: Number (%) of patients with type of minor injury

8.2.5 Clinician group managing patient

Patients in the study were managed by junior A&E medical staff (Senior House Officers), senior A&E medical staff (Specialist Registrars, Staff Grade doctors, Clinical Assistants or Consultants) and Emergency Nurse Practitioners. During the first 28 days of the study, 'experienced' A&E SHOs (i.e. doctors in their sixth and final month of their A &E post) managed patients. For the remainder of the study these experienced SHOs were replaced by SHOs new to the speciality of A&E medicine.

Clinician Group	No. of attendances (%)
Junior Medical Staff - A&E SHOs	2055 (67.7)
Senior A&E Medical Staff	454 (15.0)
Emergency Nurse Practitioners	527 (17.4)
	3036

Table 8.3: Number of minor injury attendances (%) managed by each clinician group

Interestingly, there was a difference ($p < 0.001$) in the types of patients each clinician group saw, with ENPs seeing more sprains and fractures, but less head injuries, minor head wounds, muscular injuries and burns (see Figure 8.3).

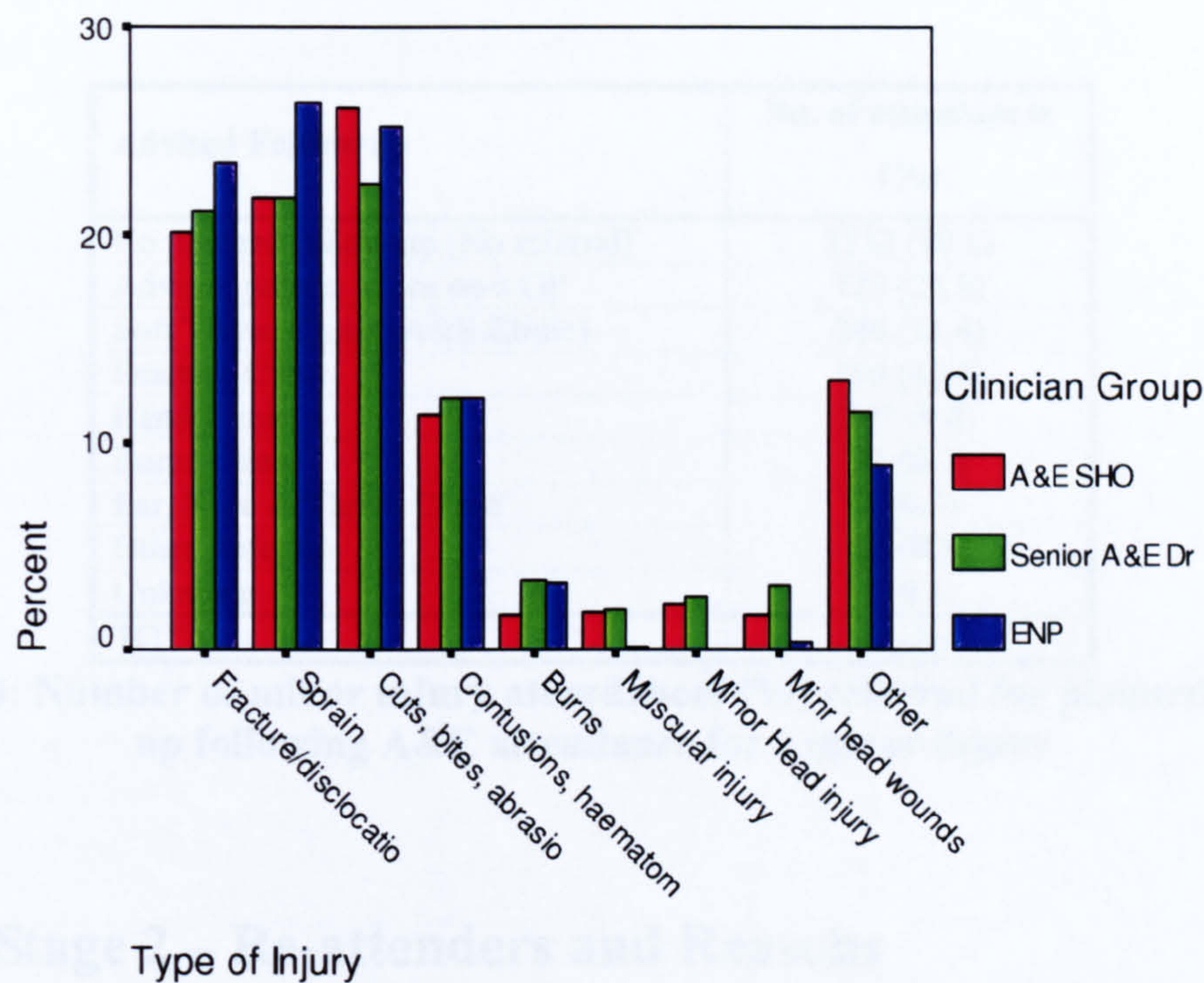


Figure 8.3: Frequency of types of injury managed by different clinician groups

There was no difference between socio-economic deprivation score and the clinician group which managed each patient’s injury episode ($p=0.763$).

8.2.6 Planned follow-up

As part of a patient’s discharge arrangements each group of clinicians were able to refer patients to different hospital follow-up clinics, or to advise the patient to see their own GP (both considered planned follow-up), or to discharge the patient with no referral (no planned follow-up). From the clinical notes it was reported that follow-up appointments were arranged or advised for 59.4% ($n=1,801$) of the patients in the study, 24.0% ($n=727$) were advised to make an appointment with their GP or practice nurse and 35.4% ($n=1,074$) were given a hospital follow-up appointment (see Table 8.4). For the remaining 40.6% ($n=1,232$) no referral was advised or thought necessary. No data on discharge arrangements were available from the clinical notes of three patients (0.1%). There was no difference among the clinician groups in: 1) referral rates to hospital follow-up clinics; 2) the proportion of patients advised to seek an appointment with their GP or practice nurse; or, 3) the proportion who were not advised to have any follow-up ($p=0.191$).

Advised Follow-up	No. of attendances (%)
No planned follow-up (No referral)	1232 (40.6)
Advised patient to see own GP	727 (23.9)
Soft Tissue Clinic (A&E Clinic)	346 (11.4)
Fracture Clinic	384 (12.6)
Hand Clinic	297 (9.8)
Burns Clinic	21 (0.7)
Ear, Nose & Throat Clinic	3 (0.1)
Other Referral	23 (0.8)
Unknown	3 (0.1)
TOTAL	3036

Table 8.4: Number of minor injury attendances (%) referred for planned follow-up following A&E attendance for a minor injury

8.3 Stage 2 – Re-attenders and Reasons

8.3.1 Introduction

Minor injury patients may opt to re-attend the department for a number of different reasons including: problems or complications with their original injury; for further advice; or, because they have sustained a new injury. Each patient who attended the department had their A&E records matched with their unique hospital number; patients without a hospital number were assigned a unique A&E number by the department’s computer records system (CaMIS). Data from CaMIS were uploaded into the study database on a daily basis, to allow these numbers to be monitored, and re-attendances to be identified. Clinical notes were then obtained and the reasons for re-attendance elicited from the notes.

8.3.2 Re-attenders

A total of 166 patients (5.5%) re-attended the department within six weeks (42 days) of their initial attendance. The clinical documentation was sought for all patients who re-attended and the reason for re-attendance identified. Two patients (1.2%) were asked to re-attend the department for review: a form of planned follow-up. The majority of patients who re-attended (n=93, 56.0%) the department within 42 days returned because they had sustained a new injury (e.g. to a different body area) or had developed a medical condition (unrelated to their original injury) which required attention. Information was not available on four patients (two patients notes were lost and two patients registered but did not wait for a consultation and therefore, were not seen). The

remaining 67 patients (40.4%) attended for a problem directly related to their initial presentation: unplanned follow-up (see Table 8.5).

	Days from original A&E visit to re-attendance in seven day intervals						
Reason for re-attendance	1 to 7 No. (%)	8 to 14 No. (%)	15 to 21 No. (%)	22. to 28 No. (%)	29 to 35 No. (%)	36 to 42 No. (%)	Total No. (%)
New injury or medical condition	19 (11.4)	14 (8.4)	19 (11.4)	16 (9.6)	12 (7.2)	13 (7.8)	93 (56.0)
Asked to re-attend for review (Planned follow-up)	2 (1.2)	0	0	0	0	0	2 (1.2)
Unplanned follow-up (original injury related)	43 (25.9)	16 (9.6)	4 (2.4)	2 (1.2)	0	2 (1.2)	67 (40.4)
Unknown (inc. missing notes)	2 (1.2)	0	0	1 (0.6)	1 (0.6)	0	4 (2.4)
TOTAL No. (Total %)	66 (39.8)	30 (18.1)	23 (13.9)	19 (11.4)	13 (7.8)	15 (9.0)	166

Table 8.5: Patients re-attending A&E following previous treatment for a minor injury

8.3.3 Unplanned follow-up

Most of the patients (n=59, 88.1%) who re-attended the department for unplanned follow-up during the six weeks of monitoring did so within the first 14 days (see Table 8.6). The most common reason for unplanned follow-up re-attendance (n=29, 43.3%) was due to the patient being concerned about their original injury (n=25, 37.3%), or because the patient had been to see their GP and the GP had referred them back to A&E (n=4, 6.0%). None of these re-attending patients required changes to their treatment and were subsequently discharged. All four of the patients referred back to A&E by their GP, were patients who had sustained a fairly significant minor injury and there was a concern that a fracture may have been missed. One patient was x-rayed for a second time and the others had their x-ray reports reviewed. No missed fractures were identified and treatment remained the same. Most of the patients who presented with concern regarding their injuries wanted to know if their injury was healing quickly enough. Following further explanation and reassurance, these patients too were discharged.

	Days from original A&E visit to re-attendance in seven day intervals						Total No. (%)
	7 No. (%)	8 to 14 No. (%)	15 to 21 No. (%)	22. to 28 No. (%)	29 to 35 No. (%)	36 to 42 No. (%)	
Reason for unplanned follow-up re-attendance at A&E							
Patient concerned	16 (23.9)	4 (6.0)	2 (3.0)	1 (1.5)	0	2 (3.0)	25 (37.3)
GP advised return for review	2 (3.0)	2 (3.0)	0	0	0	0	4 (6.0)
Problem complying with treatment	5 (7.4)	2 (3.0)	1 (1.5)	0	0	0	8 (11.9)
Dressing or plaster cast problem	7 (10.4)	1 (1.5)	0	1 (1.5)	0	0	9 (13.4)
Worsening condition	4 (6.0)	4 (6.0)	1 (1.5)	0	0	0	9 (13.4)
Missed injury or incorrect management	5 (7.4)	2 (3.0)	0	0	1 (1.5)	0	8 (12.0)
Other	3 (4.5)	1 (1.5)	0	0	0	0	4 (6.0)
TOTAL No. (Total %)	42 (62.7)	16 (23.9)	4 (6.0)	2 (3.0)	1 (1.5)	2 (3.0)	67

Table 8.6: Patient reports of reasons for unplanned follow-up re-attendances to A&E

A small number of patients (n=8, 11.9%) returned with problems associated with non-compliance with prescribed treatment. Four had removed their plaster casts or splints and later returned complaining of pain. Two had failed to attend for planned follow-up appointments at hospital follow-up clinics (one had a plaster which had gradually loosened and fallen off and the other had failed to cleanse the skin on the margins of her plaster resulting in the development of a skin sore). Another patient removed his own sutures too early, only to find his wound re-opened, which necessitated a referral to a plastic surgeon for further management. The final patient, who was unable to comply or cope with the prescribed treatment regimen, was a physically fit 21 year old with a sprained ankle. She was treated with a support bandage and encouraged to mobilise using crutches (to avoid weight bearing on the injured ankle). She returned the next day as the pain was not settling, however she had been walking on her ankle and was failing to use her crutches correctly. Further education on the use of crutches failed, so the management was changed, to a full walking cast. The patient was then discharged, with instructions to keep the original follow-up clinic appointment.

Nine patients experienced a worsening of their condition and returned to A&E for unplanned follow-up. The symptoms which prompted their return and any changes made to their treatment plan are listed in Table 8.7.

Case	Description of deteriorating condition	Change in treatment	Comments
1	Rash developed after taking antibiotics for a dog bite	Antibiotics changed	
2	Increased pain and localised cellulitis over proximal phalanx of great toe	Oral antibiotics	
3	Infected sutured wound left hand	Oral antibiotics	
4	Localised tenderness at tetanus immunisation site	Treatment unchanged	Patient did not wait to be treated
5	Wound not healed and re-opened	Wound dressed	Wound left open to heal by secondary intention
6	Increased symptoms of Carpal Tunnel Syndrome (plaster of Paris cast too tight)	Plaster cast split to relieve pressure	
7	Increased neck pain. (Returned following referral from another A&E department who were concerned a cervical fracture had been missed)	No change to treatment	Patient reviewed by orthopaedic surgeon – no fracture
8	Increased pain at Achilles tendon insertion	Treatment unchanged	Gradually developed into an infected calcaneal bursitis which required admission and drainage in theatre
9	Worsening ulcer on little toe	Admitted via A&E	Referred by GP to vascular surgeons for further treatment

Table 8.7: Description of symptoms of patients whose condition deteriorated and prompted a return to A&E and the change made to treatment

Eight patients (11.9% of patients re-attending for unplanned follow-up) were found to have had injuries missed at initial presentation or were later found to have been initially inappropriately managed.

8.3.4 Missed injuries and mismanaged injuries

In total, eleven patients were identified with missed, misdiagnosed or mismanaged injuries (0.4% of all minor injury attendances). Only two of these patients (both with missed injuries) were picked up through the department's normal monitoring processes (one was identified following x-ray reporting and the other picked up at a follow-up clinic). Eight of these patients were identified through the monitoring of re-attendances for unplanned follow-up undertaken during the study (missed injuries n=7, incorrectly managed n=1) (see Section 8.3.3). The eleventh patient was inadvertently identified by the researcher, when the patient attended 50 days after their initial attendance (eight days outside the six week monitoring period set up for this study); (see Case 6, Table 8.8). Details of all these missed injuries or mismanaged cases are listed in Table 8.8 overleaf. An indication of the severity of the missed injury is given by the *Misdiagnosis Severity Score* (Guly, 1997a) (see Section 3.6.7).

Case	Missed Injury	Clinician originally seen by	Original Management	Ideal initial management	Identified	Misdiagnosis Severity Score
1	Missed extensor hallucis longus tendon rupture in a 26 year old female patient	Senior A&E Medical Staff (Middle grade)	Wound closed with steristrips and patient discharged	Patient should have been admitted and wound explored under general anaesthetic and tendon repaired	Returned to department (Referred back by her GP 12 days later)	4+2-0=6
2	A missed division of a superficial branch of the radial nerve in a 40 year old who had his hand accidentally cut by a colleague with a Stanley knife	Senior A&E Medical Staff (Middle grade)	Wound closed with steristrips and patient discharged	Patient should have been admitted and wound explored under local anaesthetic and the nerve repaired	Returned to the department (Returned to the department 5 days later complaining of numbness in his index finger)	3+2-0=5
3	A missed scaphoid fracture in a 56 year old female patient who had slipped and fallen on her out-stretched hand	Junior A&E Medical Staff (SHO)	A diagnosis of a contusion injury to the wrist was made and the patient discharged with advice	Careful examination of the wrist would have elicited tenderness in the anatomical snuffbox, indicating scaphoid x-rays Tenderness would suggest a clinically fractured scaphoid and management in a splint or plaster cast would be indicated. Referral to appropriate follow-up clinic also required.	Returned to the department. (Returned to the department after approximately 5 hours and increasing pain and swelling)	3+1-0=4
4	A missed ulna collateral ligament injury (UCL) in a thumb metacarpal phalangeal joint in a 29 year old patient who had sustained a hyperextension injury to his thumb and a small laceration to the tip of that thumb	ENP	Wound closed with steristrips and patient discharged	History of the mechanism of injury should suggest possible injury to the UCL. If suspected injury should be managed in a splint with a thumb extension and referral made to an appropriate follow up clinic for further assessment when swelling settled	Returned to the department. (Returned to the department 31 days later complaining of increased pain whenever attempting to grasp anything)	3+1-0=4
5	An incorrectly managed paronychia in a 17 year male who presented with a 2 day old infection in the nail bed of his thumb	Junior A&E Medical Staff (SHO)	Nail was trephined to drain pus below nail and a course of antibiotics started. Patient advised to see GP in one week	Pus should have been drained from the nail fold by an incision placed under local anaesthetic and an appropriate appointment made at a follow-up clinic for review	Returned to the department. (Returned to the department 4 days later and correctly managed except infection had already spread and a mild lymphangitis noted. Returned after another 2 days systemically unwell requiring admission for intravenous antibiotics)	3+1-0=4

T able 8.8: Continued on next page

Case	Missed Injury	Clinician originally seen by	Original Management	Ideal initial management	Identified	Misdiagnosis Severity Score
6	A missed fracture of the tip of the medial malleolus in a 37 year old male who had received a direct kick to the medial side of his ankle the night before his initial attendance in A&E	Senior A&E Medical Staff (Middle grade)	Diagnosed as an ankle sprain with x-rays not indicated. Initially treated with a double Tubigrip, rest, ice and elevation	If x-rayed and fracture noted patient would have been initially managed in a plaster cast and referred to an appropriate follow-up clinic (e.g. fracture clinic)	Returned to department after 50 days (Referred back to A&E by GP who had x-rayed the ankle and noted a bony fragment consistent with a fracture)	3+1-0= 4
7	A missed clinically fractured scaphoid in an 82 year old male who had fallen onto his outstretched hand 3 days previously.	Senior A&E Medical Staff (Middle grade)	Diagnosed as a wrist sprain and not x-rayed. Was referred back to his GP for physiotherapy	If scaphoid fracture has been suspected then the wrist would have been put either into a plaster cast or a splint with a thumb extension and the patient referred to an appropriate follow-up clinic	Returned to the department (patient had seen his GP who had x-rayed the wrist and had noted a suspected scaphoid fracture on x-ray and referred the patient back to A&E for follow-up)	3+1-0= 4
8	An undisplaced, angulated fracture of the 5 th metacarpal in a 44 year old female who had fallen the night before onto her outstretched hands	Junior A&E Medical Staff (SHO)	X-rays were taken but fracture not seen. Patient was given a splint and discharged	If fracture had been noted either a plaster cast or a padded crepe bandage would have been applied and the patient referred to an appropriate follow-up clinic	Recalled (Missed fracture noted when the x-rays were reported. Patient was contacted and given an appointment for the next fracture clinic)	1+1-0= 2
9	Missed coagulopathy in a jaundiced 61 year old patient with alcoholic liver disease and a hand wound which was still bleeding after 3 days	Junior A&E Medical Staff (SHO)	Pressure dressing applied and patient discharged	Clinician should have considered a clotting disorder, advised the patient accordingly and arranged a suitable follow-up clinic appointment	Returned to department (Reattended the next day with wound still bleeding and again 12 days later when GP referred to physicians for further management)	1+1-0= 2
10	Missed neuropraxia to branch of the trigeminal nerve and the temporal branch of the facial nerve in a 45 year old female who had sustained a wound to her forehead following an assault	Junior A&E Medical Staff (SHO)	Wound closed with steri strips, head injury warning information given and patient discharged	Careful examination of the sensation around the wound would have allowed the original clinician to advise the patient that she had some symptoms which were probably due to neuropraxia and would be expected to fully recover. A follow-up clinic appointment should have been arranged for further assessment.	Reattended the department (Reattended 7 days later complaining of numbness and tingling in her forehead. Was referred to a maxillofacial surgeon for review)	1+1-0= 2
11	A missed flake fracture of one of the carpal bones in an 80 year old male who had fallen on his outstretched hand	Junior A&E Medical Staff (SHO)	Diagnosed as a wrist sprain (following x-rays) and treated initially in a wrist splint and referred to the Soft tissue Clinic	If fracture had been noted the injury would have been managed in a plaster cast and the patient referred to an appropriate follow-up clinic (e.g. fracture clinic)	Missed fracture identified at a follow-up clinic (initial management was changed to a plaster cast and the another clinic appointment made to continue follow-up)	1+1-1= 1

Table 8.8: Missed injuries or mismanaged cases identified by returns or recalls to the department or at follow-up clinics with Misdiagnosis Severity Score (MSS) (Guly, 1997a)

8.4 Stage 3 – Unplanned Follow-up Questionnaire

8.4.1 Response rate and responders

A total of 3036 letters and questionnaires were prepared and 3031 were posted out (five patients did not have or had not given a postal address). A total of 2,411 reminder letters and second questionnaires were sent out to non-respondents after two weeks. In total 1,479 responses were received (48.8%) (1,463 returned questionnaires; two blank questionnaires; 11 questionnaires were returned by the Post Office as the addressee had moved away, was unknown at the address or the address was incomplete; and three explanations were received, from individuals representing different patients, which explained why the patient would not be able complete the questionnaire – one patient had been admitted to a psychiatric hospital, a second patient was in a nursing home and was considered too unwell to complete the questionnaire, and a third patient had died. All three instances were unrelated to the original minor injury. Fifteen patients completed and returned both the original questionnaire and reminder.

Questionnaire data were available from 1,463 patients (48.2%), however five respondents had removed the identifying bar code and therefore the questionnaires could not be matched to previously collected data. The 1,458 questionnaires which retained their bar codes were matched to other data. Data from all 1,463 completed questionnaires were included in the analysis (unless otherwise stated).

8.4.2 Responders and non-responders

By matching questionnaires with routinely collected data from the departmental computer system (CaMIS) and from data collected during the first stage of the *Unplanned Follow-up Study*, a comparison of responders (n=1,458) and non-responders (which included the five unidentified responders) was possible. The five unidentified respondents were included with the non-respondents as there was no practical means of separating them. There was no statistical difference between responders and non-responders in terms of: 1) the type of injury they had sustained (p=0.133); 2) the clinician who managed their care (p=0.851); 3) how quickly they sought attention from A&E after sustaining their injury (p=0.165); or, 4) whether they had sought help from other any service prior to seeking attention at A&E (p=0.118). However, there were differences between responders and non-responders in terms of gender, age and the deprivation score (Carstairs's classification) of the area where the patient resided. Respondents were more likely to be female (p<0.001), older (mean age 40.5 years vs.

31.3 years, $p<0.001$, mean difference 9.2 years, 95% C.I. 8.01 to 10.32 years), and live in less deprived areas ($p<0.001$).

8.4.3 Satisfaction with service

All returned questionnaires were analysed to examine satisfaction with care delivery. The vast majority of respondents ($n=1361$, 93.0%) felt that the care and treatment they received in A&E was satisfactory or better. In fact most patients rated their care and treatment as good ($n=452$, 30.9%) or very good ($n=609$, 41.6%) and that the majority of respondents ($n=1199$, 82.0%) felt that the care and treatment they had received had met their expectations. A small number ($n=7$, 0.5%) did not answer the question on satisfaction and 14 (1.0%) did not respond to the question on whether the care and treatment they had received had met their expectations.

Patient satisfaction was related to the type of injury (see Table 8.9) sustained ($p=0.23$) with highest satisfaction reported for fractures and wounds. Lowest levels of satisfaction were reported for muscular injuries and minor head wounds.

Minor Injury	Satisfactory or better No (%)	Poor or very poor No (%)
Isolated minor head injury	28 (96.6)	1 (3.4)
Fracture, suspected fracture or dislocation	317 (95.8)	14 (4.2)
Laceration, bite or abrasion	352 (95.4)	17 (4.6)
Burns	35 (94.6)	2 (5.4)
Sprain	286 (90.8)	29 (9.2)
Contusion or haematoma	137 (90.7)	14 (9.3)
Muscular injury	17 (85.0)	3 (15.0)
Minor head wound	19 (82.6)	4 (17.4)
Other	165 (93.2)	12 (6.8)
Total	1356 (93.4)	96 (6.6)

Table 8.9: Type of injury sustained and level of patient satisfaction with care and treatment reported one month after attendance

8.4.4 Waiting time

The length of time minor injury patients recalled waiting varied. Four hundred and ten respondents (28.0%) reported waiting half an hour or less, 383 (26.2%) waited 30 minutes to one hour, 343 (23.4%) waited one to two hours, and 311 (21.3%) reported having to wait for more than two hours. A small number ($n=16$, 1.1%) could not recall how long they had waited or did not answer the question.

Unsurprisingly there was a relationship between reported waiting time, and reported satisfaction with care and treatment. Those who reported higher satisfaction also reported shorter waits ($p<0.001$) (see Figure 8.4).

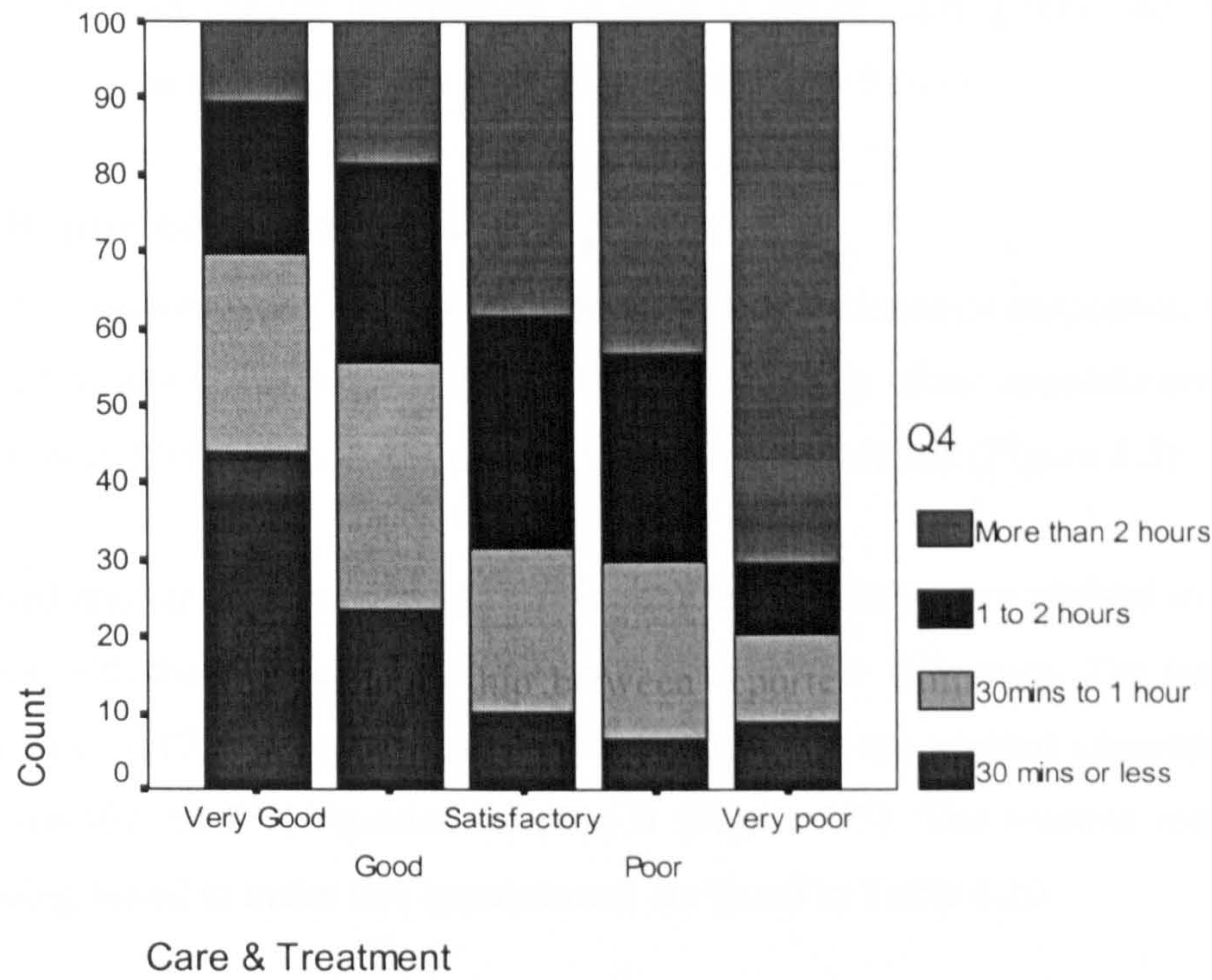


Figure 8.4: How respondents rated the care and treatment they received compared with how long they reported waiting

8.4.5 Information given

The majority of respondents ($n=1231$, 84.1%) felt they had been given sufficient information on how to look after their injury and most respondents ($n=1056$, 72.2%) felt they had been given enough information on what to expect during their recovery. Just under half of the respondents ($n=638$, 43.6%) reported having someone accompany them during their consultation with the doctor or ENP. Having someone accompany the patient made no difference to whether the respondent felt they had been given sufficient information on how to look after their injury ($p=0.509$) or whether the respondent felt they had been given sufficient information about what to expect during their recovery ($p=0.661$).

Matching data from the questionnaires with data collected from the clinical notes during the first stage of this study (see Section 4.8.9), enabled questionnaire responses to be

analysed by the type of clinician that patient had seen. More patients who saw ENPs (92.9%) reported that they were given sufficient information on how to look after their injury than patients who saw either junior (85.3%) or senior (88.5%) A&E medical staff ($p=0.005$). A greater proportion of patients managed initially by ENPs (85.4%) reported that they were given enough information on what to expect during their recovery than by junior (73.1%) or senior (80.7%) A&E medical staff ($p<0.001$).

8.4.6 Reported planned follow-up

A total of 571 respondents (39.0%) reported in their questionnaire responses, that they were advised to attend the hospital for a planned follow-up clinic appointment and the majority ($n=462$, 80.9%) reported that they kept that appointment (Figure 8.5).

Four hundred and three respondents (27.5%) reported that they were advised to make an appointment with their GP or the practice nurse for further follow-up. The majority of these patients ($n=317$, 78.7%) reported that they had made the advised appointment and nearly all ($n=307$, 96.8%) reported keeping it (Figure 8.5). The reasons respondents reported being asked to make this appointment are listed in Table 8.10.

Almost ten per cent of respondents ($n=141$, 9.6%) reported being advised to attend for a hospital appointment and being advised to make an appointment with their GP or practice nurse (Figure 8.5). Approximately forty per cent ($n=599$, 40.9%) reported not being advised to attend for any form of follow-up.

A small number of respondents ($n=59$, 4.0%) who were not given hospital follow-up appointments felt they should have been, although twenty-three of them (39.0%) reported being asked to make an appointment with their GP or practice nurse.

The reasons respondents gave for not keeping the appointments either at hospital or with the GP practice are listed in the Table 8.11.

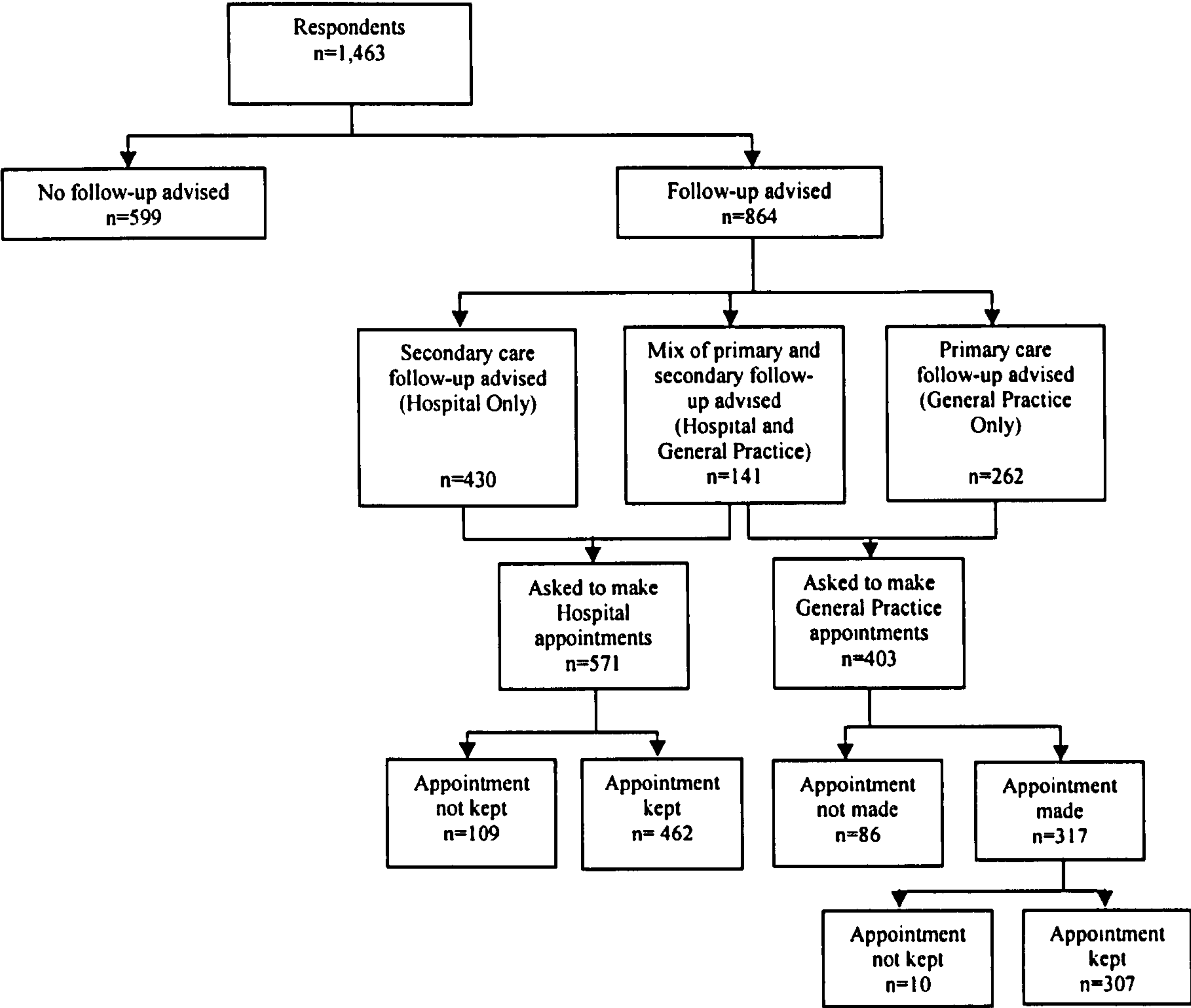


Figure 8.5: Numbers of patients who reported being advised to make planned follow-up appointments and the number of appointments kept

Reason for appointment	Frequency (%)
To get stitches taken out	125 (29.9)
For routine follow-up	120 (28.7)
To get wound re-dressed	64 (15.3)
For further supplies of medication	61 (14.6)
To see about another medical problem	7 (1.70)
Other	41 (9.8)
Total number of reasons given	418

NB: respondents may have had more than one reason for being asked to make an appointment with their GP or practice nurse

Table 8.10: Reasons respondents recalled being asked to make appointments with their GP or practice nurse

Reasons given for not keeping appointment	With hospital follow-up clinic	With GP/PN
	Frequency (%)	Frequency (%)
Felt better	34 (32.7)	1 (11.1)
Couldn't get time off work	14 (13.5)	2 (22.2)
Felt appointment wasn't necessary	11 (10.6)	1 (11.1)
Couldn't get to appointment due to transport problems	5 (4.8)	1 (11.1)
Forgot	5 (4.8)	1 (11.1)
Couldn't get an appointment at a suitable time	5 (4.8)	2 (22.2)
Nobody to look after children / elderly parent etc.	4 (3.8)	0
Didn't have time	3 (2.9)	1 (11.1)
Returned to A&E instead	3 (2.9)	0
Not registered with a GP	N/A	0
Other	20 (19.2)	0
Total number of reasons given	104	9

NB: respondents may have had more than one reason for not keeping their appointment

Table 8.11: Reasons given for not keeping appointments either at hospital follow-up clinics or with their GP or practice nurse

8.4.7 Reported unplanned follow-up

Almost a fifth of respondents (n=267, 18.3%) reported the need to seek further medical or nursing advice in the month after their attendance in A&E due to problems with their initial injury. This reported unplanned follow-up was in addition to routine follow-up appointments at hospital clinics or with their GP.

There were no statistical differences in unplanned follow-up between patients who had been advised to attend a hospital follow-up clinic (19.4%) and those that had not (18.2%) (p=0.567). However, patients who had been advised to make an appointment with their GP or practice nurse reported more unplanned follow-up (24.5%) compared with those who were not (16.7%) (p=0.001).

A greater proportion of female patients (n=145, 22.5%) reported seeking unplanned follow-up compared with male patients (n=120, 15.8%) (p=0.001). Patients who felt the care and treatment they had received in A&E was satisfactory or better were less likely to have sought unplanned follow-up than those who rated it as poor or very poor (16.8% v. 47.7%, p<0.001).

Respondents who reported that they had been given sufficient information on how to look after their injury were less likely to seek unplanned follow-up (n=165, 13.8%) than those who felt they had not been given that information (n=89, 50.6%) (p<0.001). Similarly patients who reported being given enough information on what to expect during their recovery were less likely to seek unplanned follow-up (n=119, 11.6%) than those who did not (n=138, 43.7%) (p<0.001).

No difference was detected in the levels of reported unplanned follow-up between junior A&E medical staff (n=181, 19.2%), senior A&E medical staff (n=40, 19.4%) and ENPs (n=44, 17.5%) (p=0.807).

From the 267 respondents who reported seeking unplanned follow-up 237 (88.8%) specified how many days after their initial attendance it was until they first sought unplanned follow-up. The mean time to first seeking unplanned follow-up was 9.85 days (Median 7 days, IQR 3 to 14 days). Patients sought unplanned follow-up for a variety of reasons (see Table 8.12) and from a variety of different sources (see Table 8.13).

Reason for unplanned follow-up	Frequency (%)
Injury not healing as fast as expected	97 (20.8)
Felt they required pain killers	88 (18.9)
Needed a sick line for work	57 (12.2)
Wanted a second opinion	47 (10.1)
Felt they needed an x-ray	30 (6.4)
Felt they needed physiotherapy	26 (5.6)
Wound become infected	17 (3.6)
Problem with wound dressing	14 (2.9)
Problem with Plaster Cast	14 (2.9)
Felt they needed antibiotics	13 (2.8)
Re-injured themselves	12 (2.6)
Other	51 (10.9)
Total number of reasons given	466

NB: respondents may have had more than one reason for seeking unplanned follow-up

Table 8.12: Reasons respondents gave for seeking unplanned follow-up

Advice sought from	Visits No (%)	Telephone No (%)
General practitioner (GP)	151 (51.5)	17 (40.5)
Glasgow Royal Infirmary A&E department	33 (11.3)	9 (21.4)
Physiotherapist	21 (7.2)	3 (7.1)
Practice nurse	20 (6.8)	2 (4.8)
Other A&E department	18 (6.1)	3 (7.2)
Pharmacist	12 (4.1)	1 (2.4)
Emergency doctor (e.g. GEMS)	6 (2.0)	1 (2.4)
Occupational health doctor/nurse	5 (1.7)	2 (4.8)
District nurse	5 (1.7)	0
Other	22 (7.5)	4 (9.5)
Total number of reasons given	293	42

NB: respondents may have had more than one reason for seeking unplanned follow-up

Table 8.13: Places where respondents reported they sought advice from

Respondents who reported that they had needed to seek unplanned follow-up were asked whether their treatment had been changed at all. Approximately half of the respondents who answered this question (n=116, 52.3%) reported that their treatment had been altered. A further 45 respondents who also reported having sought unplanned follow-up (16.9%) did not respond to this question.

8.4.8 Comparison of questionnaire responses and departmental pick up

Thirty-three respondents reported re-attending Glasgow Royal Infirmary A&E department in the month after their attendance due to a problem with their initial injury. However, only thirteen of these (39.4%) were picked up in the monitoring of study patients reported in Section 8.3. This suggests that there were problems either with the systems used to identify returning patients, or that patients were incorrectly reporting their re-attendance for unplanned follow-up at the original A&E department, or that patients were misinterpreting the question asking where patients had sought their unplanned follow-up.

A search was conducted of the A&E computer system to identify whether any of these patients had returned to the department and been allocated a different unique patient number (which may have occurred, if any of the information the patient provided to the A&E reception was different - for example, if a different date of birth or name was

given). Clinic records were also searched to identify whether any of these patients had re-attended the return clinic due to a problem. Finally, the reason respondents had given on the questionnaire were compared with A&E departmental records. Twenty-eight patients (84.8%) were identified by searching these sources, however any form of documented return at the original A&E department or associated follow-up clinics could not be found for five patients (15.2%). Results are presented in Table 8.14.

Identified	Frequency (%)
Returned to the original A&E with a problem	13 (39.4)
Re-attended a clinic with a problem	10 (30.3)
Re-attended, but was in connection with an older injury	5 (15.2)
Unable to identify any unplanned return to the original A&E or to follow-up clinics	5 (15.2)
Total	33

Table 8.14: Respondents reporting an unplanned return to A&E within a month of original attendance

8.5 Conclusion

This chapter has presented the results which relate to the exploration of unplanned follow-up and the monitoring of patients who returned to the treating A&E for unplanned follow-up. The reported unplanned follow-up rate, from the questionnaires, of 18% and the 5.5% of patients identified as returning to the original A&E department is very similar to that found in the *RCT of ENP-led care* where 20% self-reported unplanned follow-up and 5% were found to have returned to the original A&E department.

Adverse outcomes are arguably the most important single factor to assess when comparing two different methods of treatment. The monitoring of possible adverse outcomes is an important consideration in any future evaluation of ENP-led care. The following key points outline this exploration into unplanned follow-up in minor injury patients and can be used to inform future evaluations relating to ENP-led care.

- A sixth of all attendances (16.1%) to the A&E department during the study period had minor injuries that met the inclusion criteria for the study and potentially could have been managed by ENPs, although ENPs only managed 17.4% of the patients in the study. SHOs managed the majority of minor injury

patients (67.7%) and senior A&E medical staff (middle grade doctors and consultants) the remaining 17.4%.

- A difference was found in the types of injury managed by ENPs, SHOs and senior medical staff ($p < 0.001$) with ENPs seeing more sprains and fractures, but fewer head injuries and muscular injuries.
- There was no difference in the socio-economic deprivation score of patients managed by different clinician groups ($p = 0.763$). However, the study did find that two-thirds of the patients selected for the study were from the two highest deprivation categories, whereas less than a fifth (18.1%) of the general Scottish population live in the same deprivation categories.
- No difference was seen between the three clinician groups and the amount of planned follow-up arranged, advised or not thought necessary ($p = 0.191$).
- One in twenty patients (5.5%) re-attended the department within 42 days of their initial attendance. The reason for re-attendance for the majority of cases was that they had sustained a new injury (56.0%). A proportion (40.4%) attended for follow-up that was not planned at the time of initial treatment.
- The majority of patients (80.1%) returning for unplanned follow-up did so within 14 days of their initial attendance. The most common reason for seeking unplanned follow-up back at the original A&E department was due to the patient being concerned about their injury (37.3%). A small number of those who returned (12.0%) were subsequently identified as having an injury missed on initial presentation or were found to have been incorrectly managed on their first attendance.
- By monitoring returns to the department, recalls following radiological reporting of x-rays, and clinic consultations, eleven patients (0.4% of all patients in the study) were identified as having a missed injury or were inappropriately managed at initial presentation.
- A 48.4% response rate was achieved during the third phase of this study. No difference was detected between responders and non-responders in terms of: the

type of injury they had sustained ($p=0.133$); the clinician who managed their care ($p=0.851$); how quickly they sought attention from A&E ($p=0.165$); and, whether they had sought help from any other service prior to seeking attention in A&E ($p=0.118$). However, respondents were more likely to be female ($p<0.001$), older ($p<0.001$) and live in less deprived areas ($p<0.001$).

- The vast majority of respondents (93.0%) felt that the care and treatment they received in A&E was satisfactory or better. Perhaps, unsurprisingly there was an inverse relationship between reported waiting time and satisfaction with care and treatment ($p<0.001$).
- More patients who were managed by ENPs reported that they were given sufficient information on how to look after their injury ($p=0.005$), and on what to expect during their recovery ($p<0.001$) than those who were managed by SHOs or senior medical staff.
- Just under a fifth of patients (18.3%) reported the need to seek unplanned follow-up in the month following their attendance in A&E. No statistical difference was found in unplanned follow-up rates between those given hospital appointments and those that were not ($p=0.567$), however patients advised to make an appointment with their GP or practice nurse were more likely to report unplanned follow-up ($p=0.001$). Female patients ($p=0.001$) and those who rated their care in A &E as poor or very poor ($p<0.001$) were more likely to report seeking unplanned follow-up.
- No difference was detected in reported unplanned follow-up levels between ENPs, SHOs and senior A&E medical staff ($p=0.807$). However patients who reported that they had been given sufficient information on how to look after their injury ($p<0.001$) and who had been given enough information on what to expect during recovery ($p<0.001$) were less likely to seek unplanned follow-up than those who did not.
- Most patients who sought an unplanned follow-up visit did so from their GP (51.5%). Only 11.3% reported returning to the original A&E department.

- Reported returns to A&E were matched with patients identified by the study's monitoring system. Only 39.4% of the patients who reported returning were identified by the systems in the department as having returned. Further investigation found another 30.3% had returned for an earlier clinic appointment than was expected, 15.2% did return to A&E but not for the injury related to the study and an unplanned follow-up visit could not be identified for the remaining 15.1%.

Chapter 9

Discussion

9.1 Aims of the Thesis

The general aims of this thesis were to explore the provision of ENP services in Scotland, and to examine how ENP-led care could be evaluated. Six research questions were formulated. These were:

- How widespread are ENP services throughout the different types of A&E departments in Scotland?
- What are the commonalities between ENPs in different departments?
- How have ENP services evolved over a three-year period?
- How does ENP-led care compare with SHO-led care (in terms of patient satisfaction, quality of clinical documentation, unplanned follow-up and missed injuries)?
- What is the extent and nature of the unplanned follow-up sought by patients, following an attendance in A&E with a minor injury?
- What proportion of patients, who return to A&E are subsequently found to have missed injuries?

The first three questions were addressed in the first phase of this thesis and the final three more complicated questions in the second phase. In order to answer these research questions a number of different research methods were utilised. To address the first three questions, data on ENP services in A&E departments in Scotland were collected using cross-sectional postal surveys repeated three years apart. To address the fourth question, data collection tools and instruments were developed or modified to measure: the quality of clinical documentation; patient satisfaction; improvement in symptoms; unplanned follow-up; various care process outcomes; and inappropriate initial management and missed injuries. A modified nominal group technique was used to develop a tool to assess quality of clinical documentation, and a RCT was undertaken to

examine clinical documentation and other potential differences between ENP and SHO-led care. Whilst it was recognised that many minor conditions are self-limiting in nature, and to some extent, no matter what diagnostic or therapeutic interventions are rendered, unless harmful, most patients will recover (Mushlin and Appel, 1980). There are conditions which have poor outcomes if not managed correctly (Lam, Fitzgerald and Hooper, 2000; Sunderamoorthy, Gupta and Bleetman, 2001; Gilligan, Hegarty, Bradley *et al.*, 2003). Therefore, the fifth and sixth questions were constructed, as it was recognised that patients having poorer outcomes could have sought additional health advice from another health professional or service at some point after their attendance in A&E (unplanned follow-up). These final questions were addressed in a large prospective study using routinely collected data and a cross-sectional postal questionnaire.

9.2 Overview of the Significant Findings of the Thesis

9.2.1 ENP services in Scotland (Phase 1)

The very high response rates achieved during both surveys of Scottish A&E departments (98% and 91%) allowed a virtually complete picture of ENP services in Scotland to be constructed. By conducting the surveys three years apart, the development of those services in Scotland could be assessed. Between the surveys, the NHS in Scotland was devolved to the Scottish Parliament (Pollock, 1999) and additional funding to develop ENPs in Scotland was made available from the Scottish Executive (Scottish Executive, 2001a). The widespread utilisation of nurses to deliver minor injury services directly to patients was identified in the surveys, and was similar to patterns identified in England and Wales (Meek *et al.*, 1995; Tye *et al.*, 1998) (see Table 2.1). Results from both surveys also showed that the ENP service provided at the research site chosen for Phase 2 of this thesis was, in many respects, similar to the majority of ENP services currently being provided in Scottish A&E departments.

9.2.2 Evaluation of ENP services (Phase 2)

Using a modified nominal group technique and a panel of eleven experts, the *Documentation Audit Tool* was developed. This instrument was able to measure the quality of clinical documentation of both ENPs and SHOs. The tool was successfully used in the *RCT of ENP-led care* also conducted in Phase 2.

Prior to the start of the research in this thesis there was a paucity of empirical data to support the role of the ENP (Tye, 1997). Data from the RCT in the second phase of this research programme supports other recently published research which also demonstrated that ENPs can perform to similar standards as A&E junior medical staff (e.g. SHOs) (Chang *et al.*, 1999; Sakr *et al.*, 1999).

Whilst results from the *RCT of ENP-led care* suggest that 3% of ENP patients may be misdiagnosed or initially incorrectly managed (see Section 7.7) (a similar figure to that used in other studies to calculate the sample size required for a full-scale trial (Read and George, 1994; Sakr *et al.*, 1999)). Data from a separate cohort of patients in the *Unplanned Follow-up Study* showed that when routinely collected data (re-attendance, x-ray reporting, and incidents from follow-up clinics) were monitored, the incidence of cases where an injury was inappropriately managed or even missed altogether by A&E staff, including ENPs, was very low and at around 0.4% (see Section 8.3.4). However, around a fifth (18%) of minor injury patients seek unplanned follow-up in the month following their attendance in A&E, and only one-in-ten of these patients returned to the original A&E for additional advice or treatment. Neither of the previous RCTs (Chang *et al.*, 1999; Sakr *et al.*, 1999) which examined ENP-led care, took account of the difficulty of identifying those patients with missed injuries or who were inappropriately managed, and who chose to attend a different health-care provider. If identifiable missed injuries or mismanaged cases are as low as 0.3% then this has implications for the sample size of any future evaluation. It also suggests that the trials conducted or planned to date, may have been too small to establish whether a difference exists between minor injury care provided by ENPs and SHOs, in terms of these rare, but clinically significant events.

9.3 The Extent and Nature of ENP Services in Scotland

The two surveys conducted as part of this thesis and reported in Chapter 5 (referred to as the *1998 Survey* and the *2001 Survey*), have illustrated a diverse and developing range of ENP services across Scotland. Nurses practise as ENPs in every type of A&E department from a casualty room in a small community hospital to purpose built departments in major university teaching hospitals. By 2001, two-thirds of departments in Scotland had nurses who practised as ENPs. The majority of A&E departments prepared their ENPs on a university accredited nurse practitioner course. Most of these nurses combined their ENP role with other nursing duties and worked within a range of

protocols. In the majority of departments, ENPs in Scotland were able to request certain specific x-rays, but were not permitted to interpret them. Most were also able to supply simple analgesics to their patients and tetanus immunisation boosters, but could not supply antibiotics. They were unlikely to use the title 'nurse practitioner' and were usually remunerated at E-grade or below, unless based in one of the larger departments.

Prior to the two surveys reported in Chapter 5, there had been no previous examination of ENP services in all types of A&E department in Scotland. In 1996, Tye *et al.* (1998) as part of a UK wide survey of ENP services in major A&E departments, had examined services in 35 of the larger departments in Scotland. They identified 'formally recognised' ENP services in only five departments (14%), however 'minor' departments were excluded from this study. As earlier surveys in England and Wales (Read *et al.*, 1992; Meek *et al.*, 1998) had identified that 'minor' departments were more likely to utilise ENPs than 'major' departments, it was not surprising that the *1998 Survey* found that just under half of all the 'minor' departments utilised ENPs, whereas, less than a third of all district general hospitals or inner-city hospitals had nurses working in this role (see Section 5.4). Conducting a second survey (*2001 Survey*) three years later allowed the growth in Scottish ENP services to be examined.

The number of nurses who practised in an ENP role rose by just over a quarter during the three-year period between 1998 and 2001, from 306 to 388 with an additional 56 in training. Part of this increase was probably due to additional central funding, made available in 2000, from the Scottish Executive. This financed an additional 40 ENP posts throughout Scotland. These new ENP posts were part of 210 new specialist nursing posts introduced as part of a specific 'specialist nursing initiative' (Scottish Executive, 2001c). This formal Government support for the role has resulted in a modest increase in the number of nurses practising as ENPs. As these posts are in addition to existing staffing levels, they may help to alleviate one of the disadvantages related to the introduction of ENPs which was identified in the *2001 Survey*, namely that in some departments there were 'insufficient resources to support the service'. With the impact of the European Working Time Directive (Council Directive 93/104/EC, 1993) and changes to junior doctors training (Department of Health, 2002c) there is an increased pressure on hospital Trusts to identify different ways to provide patient care which involve less input from junior doctors. This is likely to result in an even greater use of nurse practitioners.

Over the last fifteen years, there appears to have been a legitimising of the role of the nurse treating minor injuries, instead of the introduction of a completely new nursing role. Two of the earliest surveys, conducted in English and Welsh departments classified ENP services into two groups 'official' and 'unofficial' based solely on whether the title 'nurse practitioner' was used or not (Read *et al.*, 1992; Meek *et al.*, 1995) (see Section 2.4.1). If this definition was applied to the results from the 1998 Survey, seven out of ten of the departments in Scotland which provided ENP services would have been considered 'unofficial', however this would have reduced to 57% by 2001. 'Unofficial' services were statistically more likely to exist in the minor departments ($p < 0.0001$). A similar pattern of 'unofficial' services, predominantly being found in the smaller departments, was identified in previous studies (Read *et al.*, 1992; Meek *et al.*, 1995). A similar, gradual change from 'unofficial' to 'official' services can also be seen if the results from the surveys by Read *et al.* (1992) and Meek *et al.* (1995) are compared (see Table 2.1). The finding that the majority of 'unofficial' services are primarily in the 'minor' departments is perhaps unsurprising as nurses in many smaller hospitals have been known to practise as 'unofficial' ENPs for many years (Read and George, 1994). These traditional ENP-type services were provided in the smaller departments where health service management and GPs accepted that some patients did not necessarily need to be seen by a medical practitioner.

The use of a title, of course, does not necessarily imply that a service has been properly organised, funded and the nurses trained appropriately. Three-quarters of departments prepared their ENPs on an 'in-house' training course or a university accredited course as a minimum requirement. It is a concern that almost a quarter of departments with ENPs, did not insist on any formal educational preparation (whether university accredited courses or 'in-house training') for the role. There is no doubt that several years experience working in A&E gives nurses considerable knowledge relating to many aspects of A&E work. However, the diagnosis and management of acute minor injuries is not part of the formal pre-registration education of nurses. It is of concern to note that the number of departments utilising untrained ENPs increased by 50%, from eight departments in 1998 to twelve in 2001. The fact that there are no national standards for ENP courses or recognition of ENPs by the Nursing and Midwifery Council (NMC) (Dolan, 2003) does not help this situation. Until minimum national standards for the educational preparation of ENPs are set, there may be considerable variation in the quality of minor injury care from one A&E department to another.

Most ENPs in Scotland appear to be predominantly managing minor injuries to the limbs, with a small number of departments managing other conditions such as headaches and providing emergency contraception (see Section 5.5). Generally, the range of minor injuries seen by ENPs in Scotland appears similar to conditions managed by ENPs in other areas of the UK (Read *et al.*, 1992; Woolwich, 1992; Dolan and Dale, 1997).

In the three years between the surveys (1998–2001), more departments allowed their ENPs to request and interpret x-rays. However, a third of departments (with on-site x-ray facilities) did not allow their ENPs to request x-rays, despite published evidence to demonstrate that ENPs can request x-rays appropriately (Freij *et al.*, 1996; Mann *et al.*, 1998; Allerston and Justham, 2000). There are also a growing number of research studies which have demonstrated that ENPs are able to interpret selected limb x-rays to similar standards as A&E SHOs (Mabrook and Dale, 1998; Meek *et al.*, 1998; Overton-Brown and Anthony, 1998). It was, therefore, surprising to find that just over half of the departments which did allow their ENPs to request x-ray films, did not allow them to interpret those films. As just under a third of departments had telemedicine links (31%), and a further 21% had links planned it is perhaps likely that in at least some departments, telemedicine links may be used for x-ray interpretation. One of the main uses for telemedicine links has been for the transfer of x-ray images (Brebner, Brebner, Ruddick-Bracken *et al.*, 2002), and this may reduce the need for ENPs, at least in these departments, to be skilled in x-ray interpretation.

It is a concerning finding that 38% of departments in Scotland, who employed ENPs, did not permit their ENPs to supply any medication to their patients (including paracetamol), as most patients who attend an A&E department with a minor injury are likely to be experiencing some degree of pain. However, this figure is similar to the 39% of major English and Welsh departments identified in 1994 by Meek *et al.* (1995), which did not allow their ENPs to supply any 'over the counter' medications (e.g. paracetamol). It would seem appropriate that the health-care professional managing a patient should be able to supply appropriate analgesia. In 1992, the law was changed to allow nurses to prescribe certain medications to their patients (Medicinal Products: Prescription by Nurses Act, 1992), however only district nurses and health visitors were eligible to undertake additional training to allow them to prescribe from a specific nurses formulary. Following two reports (Department of Health, 1998; 1999), and with

new governmental support, nurse prescribing has been extended to include nurses working in four broad areas of practice: minor injuries, minor ailments, health promotion and palliative care. This 'extended' nurse prescribing allows all General Sales List (GSL) and Pharmacy (P) medicines prescribable by GPs (with the exception of products which contain controlled drugs), together with a limited list of Prescription Only Medicines (POMs), to be prescribed by suitably qualified nurses (Scottish Executive, 2002a). In 2002, this 'extended' nurse prescribing was launched in Scotland (Scottish Executive, 2002b), and the first new 'independent' nurse prescribers qualified in early 2003. Another type of prescribing has also been introduced: supplementary prescribing. Supplementary prescribing allows nurses and other health professionals such as pharmacists, the ability to prescribe specific medications for a patient after an initial assessment by a physician and in accordance with a specific clinical management plan (Scottish Executive, 2002a). This type of prescribing is thought to be particularly suitable for nurses working with patients with chronic conditions such as diabetes, asthma, heart disease and mental illness. It is therefore likely that the anomalies seen in the survey relating to prescribing will begin to disappear as more nurse practitioners undertake additional training for nurse prescribing.

Not only does the scope of practice vary from one department to another, but ENP services are often organised in different ways too. The results from the two surveys highlight not only the differences in types of A&E department across Scotland, but also the considerable variation in ENP services from one department to another. The system of classifying ENP services into 'official' and 'unofficial' is over simplistic. Instead, in Scotland, it appears that there are three broad groups of ENP services: 1) Untrained ENPs; 2) Trained ENPs with a limited scope of practice (i.e. might not be authorised to supply analgesia, antibiotics or interpret x-rays); and, 3) Trained ENPs with a broader scope of practice (i.e. ENPs who are able to request and interpret selected x-rays, plus are authorised to supply analgesics and antibiotics to various minor injury patients) (see Section 5.7). Using these groups, the majority of ENP services in Scotland were provided by ENPs with some form of formal training. Almost a quarter of departments (23%) utilised untrained ENPs and only a small proportion (8%) utilised trained ENPs who could request and interpret x-rays and who were authorised to supply a range of medications including both analgesics and antibiotics.

In addition to the variation in training and scope of practice of ENPs in Scotland, the deployment of ENPs within A&E departments can vary too. Tye *et al.* (1998) identified three different operational models commonly used by departments for organising their ENP service (see Section 2.8.3): 1) A dedicated role model, where the ENPs were permanently employed in this role; 2) An integrated model, where the ENP role was combined with other nursing duties; and, 3) A rotational model, where ENPs were rostered into the ENP role for a specific period (e.g. a shift or a week of shifts). Tye *et al.* (1998) found that the integrated model was the most common approach used in 54% of the UK's major A&E departments. In Scotland, in the 2001 survey, just under two-thirds of departments (62%) organised their ENP service using an integrated model (see Section 5.4). Whilst this might be the only practical option for the smaller departments, if used in the larger departments with dedicated nursing staff, it may mean that the full benefits of ENPs will not be realised. This may occur if ENPs become caught up with other essential nursing duties when they could be helping to reduce waiting times by seeing minor injury patients, a situation most likely to occur when the department is busy and they could be most effective. The provision of a dedicated service to treat patients with minor complaints quickly to help reduce waiting times has been endorsed by the NHS Modernisation Agency (NHS Modernisation Agency, 2002) and is commonly known as 'See and Treat'. Basically, this system of care involves patients with minor injuries or ailments being seen by one clinician. Ideally, this clinician will assess, treat and discharge these patients in a short space of time. Patients with more involved problems or those who are more seriously ill are 'streamed' to another area of the A&E department to be managed by different clinical staff. The clinician who undertakes 'See and Treat' can either be a doctor or a suitably prepared and experienced ENP.

With the wide variations in ENP practice, it is important that findings from any evaluation of ENPs are carefully interpreted, as results are unlikely to be generalisable to all services. However, in order for practice to advance and the profession to learn from developments, it is critical that there is a good understanding of the ENP services which exist and of the departments where they are based. Practice could also be developed if there were standardised methods of data collection that could be applied across all areas to generate larger data sets. Standard data sets of clinical information are a priority for the NHS Information Standards Advisory Board (Department of Health, 2002a) and are recommended by the Clinical Standards Board for Scotland (2003).

9.4 Development of Instrument to Measure the Quality of Clinical Documentation

Comprehensive clinical notes are important for patient care. However, they are also important for clinical audit data, and for the protection of the clinician and/or hospital against negligence claims (Audit Commission, 1995). 'Good notes' are often said to imply 'good practice' (Montague, 1996), therefore the quality of clinical documentation should be considered to be an essential and integral part of the evaluation of the care provided by ENPs.

9.4.1 The evaluation of clinical documentation

The *Documentation Audit Tool* (Appendix IVc) developed as part of this thesis (reported in Chapter 5) consisted of five sections: core criteria; investigations, medications and discharge; wounds and burns; limb injuries (sprains, strains and fractures); and, minor head injuries. The core criteria section predominantly examined administrative information. The remaining four sections examined specific clinical detail. These sections and their individual subsections were only used if the auditor judged them applicable to the clinical documentation being audited. For example, the section on head injuries should not be used for auditing a set of clinical notes relating to an ankle sprain.

Prior to the development of the *Documentation Audit Tool* detailed in Chapter 5 there were no published studies which had specifically attempted to evaluate the clinical documentation of ENPs. Two evaluations of ENP services have since examined clinical documentation using different methods. In a study by Heaney and Paxton (1997a; 1997b) four clinicians examined clinical notes written by ENPs (n=810). These clinicians were asked to compare the standard of these notes with their own subjective impression of the standard of SHO notes, and to rate the notes on a three-point scale (very satisfactory, satisfactory and unsatisfactory) for history taking, use of protocols and effective use of investigations. Only 2% of the notes were rated as unsatisfactory. To ensure inter-rater consistency, half of the notes were to have been reviewed by two clinicians, although no formal evaluation of inter-rater reliability was undertaken. When the study's authors reviewed the comments from different auditors who had seen the same clinical notes, it was identified that there were some differences in opinion. This included occasions when information was recorded as missing, although it was actually

present in the notes. This method of evaluation relies on the subjective opinion of the auditors, and on their knowledge of the ENPs protocols and scope of practice. For example, without an awareness of the detail in the ENP protocols, an auditor would be unable to judge how effectively the protocol had been followed or the level of clinical detail appropriate to the notes. In comparison, the *Documentation Audit Tool* was formally subjected to inter-rater reliability testing which showed a substantial level of agreement (see Section 6.4.1). As the *Documentation Audit Tool* was developed around the information that should be included for a range of specific minor injuries by clinicians in A&E (including SHOs and ENPs), auditors do not need to be aware of specific ENP protocols or need to make subjective comparison between the notes of an ENP and medical practitioner.

Macduff *et al.* (1999; 2001) developed a tool, which was used with specific clinical documentation developed for ENPs, in nine community hospitals in the Grampian region. This tool was in two parts. The first section produced a score based on how effectively the ENP had completed a pre-printed *pro forma*. This *pro forma* section related primarily to observations, medications and discharge arrangements. The second section required the auditor, using the tool, to judge on a three-point scale (comprehensive, satisfactory or unsatisfactory) how closely local protocols were followed and how complete the notes were. Protocols were pre-printed on the back of each set of clinical notes. Prior to completion, ENPs selected a blank A&E card with the most appropriate protocol on the reverse prior to completing the documentation. Again, inter-rater reliability was not assessed with this tool, and secondly it was dependent on using the pre-printed documentation used in these departments. In comparison, the *Documentation Audit Tool* was designed to be used with free-text notes and not dependent on specific printed documentation.

More recently a third study piloted a further tool (Dolan, 2000). This tool was originally developed by Dale, Green, Glucksman *et al.* (1991) to assess GPs' documentation. It examined the level of written detail in relation to 13 different items. These items were predominantly related to history taking or management, and measured the quality on a four-point scale (not recorded, recorded without detail, recorded in detail and not appropriate). Three items appeared to relate to health promotion, but only one item related to examination findings. However, dependent on the injury, there may be several examination findings which should be recorded. Therefore, assigning one global value

may be clinically unmeaningful. For example, with a wound to the head, it is important that consciousness level, neurological signs, depth and size of wound, presence of foreign bodies etc. are all recorded. Following pilot work, Dolan (2000) found that rather arbitrary judgements relating to the level of detail recorded, were made by the auditors who used the tool. He felt further work was necessary to develop the sensitivity of this tool. The *Documentation Audit Tool*, in comparison, allowed for a higher level of detail relating to clinical examination, and assigned a score based on the presence of that information.

There are a number of difficulties related to the development of any tool designed to assess the content and quality of clinical documentation. Depending on the injury or condition being documented, the resultant clinical notes will vary in length and detail. For example, clinical notes relating to a head injury should contain substantially different information from those for an ankle sprain. An instrument with a list of items applicable to all clinical notes, runs the risk of missing important information specific to particular types of injury. Alternatively, it will require a high level of subjective judgement on the part of the person using the instrument to determine whether appropriate information is recorded. To detect differences between ENP and SHO documentation, an instrument sensitive enough to identify differences in written content relating to different injuries, was required.

9.4.2 Development of the *Documentation Audit Tool*

A qualitative methodology, the modified nominal group technique, was used to develop the *Documentation Audit Tool*. This technique proved to be effective in developing this instrument, as it facilitated a panel of experts to reach a consensus in a relatively short time interval. This was crucial as it allowed a large number of items related to clinical documentation, to be reviewed and rated in a relatively short space of time, thus maximising response rates to the first round of the process. This was a very important consideration, as busy clinicians were being asked to participate in the research project. The reference booklet (Appendix IVc), presented background material and references for each of the items initially selected. This gave panel members the opportunity to review background literature related to the selected items.

The *Documentation Audit Tool* examined both administrative information and clinical detail. It ensured a greater degree of objectivity in assessing notes. As the tool had a

number of different sections and subsections it could be tailored for use with a range of different injury types. The use of a panel of experts ensured that the tool had content validity, and formal inter-rater reliability testing showed ‘substantial’ agreement ($ICC(1,1) = 0.67$) (see Section 6.4.1). Anecdotal feedback from panel members, who used the tool, indicated that they found it fairly easy to use and relatively quick. The tool could be used consistently between users, however a degree of interpretation was still required in assessing the level of detail recorded. Therefore, there was still an element of subjectivity in using it. Increased familiarity with the *Documentation Audit Tool* and some training would probably improve inter-rater reliability even further.

The technique used in developing the tool was time consuming for the researcher, particularly in the preparation of the documentation for the panel members. A further limitation of the method became apparent during the nominal group meeting. Due to the large number of items to discuss and re-rate, approximately only one minute was available per item. This meant that valid items could have been dropped from the final *Documentation Audit Tool* as there may have been insufficient time to achieve consensus about rewording.

The tool only measured the completeness of recording essential items of information in relatively broad categories, for example, minor wounds, limb injuries, etc. It was not sensitive enough to measure whether all the important information was recorded for any individual patient. Further research is needed to establish whether the tool is more reliable in measuring the quality of clinical notes, than auditing by an experienced A&E practitioner.

9.4.3 Conclusion

In summary, the use of the *Documentation Audit Tool* was shown to be used consistently by different users. However, as a degree of interpretation was required to assess whether certain items had been recorded in sufficient detail, there was an element of subjectivity in its use. Increased familiarity with the tool and some training would probably improve inter-rater reliability. Use of the tool in the *RCT of ENP-led care* demonstrated that the tool was sufficiently sensitive to demonstrate a difference in the quality of ENP’s and SHO’s clinical notes (discussed in further detail in Section 9.5).

9.5 Measuring the Quality of Minor Injury Care

The wide variation in ENP services, training of ENPs, and the differences in scope of practice, mean that the conclusions drawn from any single study are difficult to generalise to all ENP services. Whilst there have been two RCTs (Chang *et al.*, 1999; Sakr *et al.*, 1999) (see Section 2.12) which have compared ENPs with junior doctors (e.g. SHOs), neither can claim their findings are applicable to any ENP service other than those studied. Even if the trial conducted by Chang *et al.* (1999) had been larger and more robust, it would still be difficult to assume the results could be directly transferred from a rural emergency department in New South Wales, Australia to the diverse range of A&E departments in the UK's NHS. The full-scale trial conducted in Sheffield (Sakr *et al.*, 1999) has shown that UK nurses can perform as well as SHOs when: 1) they have trained on a specific course (the English National Board's Development of Autonomous Practice (A33) course); 2) they use the ENP protocols in place at the A&E department at the Northern General Hospital (Sheffield, England); and, 3) they have access to A&E senior medical staff. Before further evaluations can be undertaken to confirm these findings found in Sheffield, there needs to be some form of standardisation of education and training for ENPs across the UK, perhaps in line with the training provided at Sheffield.

The RCT conducted as part of this thesis (see Chapter 7) demonstrated that, it is possible to evaluate patient satisfaction with ENP-led care and to measure the quality of documentation in the real-life situation of an A&E department, using the tools described in this thesis. It also demonstrated that the number of injuries missed or cases mismanaged by ENPs are low, and maybe of a similar proportion to the 3% estimated by James and Pygros (1989). Although the RCT described here was not designed to be as large as the Sheffield trial (Sakr *et al.*, 1999), the results support the conclusion they drew, that 'properly trained accident and emergency nurse practitioners, who work within agreed guidelines can provide care for patients with minor injuries that is equal or in some ways better than that provided by junior doctors'. The results presented here contribute to the understanding of how the quality of ENP-led care can be assessed. The instruments and methods described in this thesis could also be used in a large-scale multi-centre trial involving ENPs in different settings, and deployed in different ways. Individual instruments could also be used in regular clinical audits of different ENP services.

A number of authors have suggested that one of the perceived benefits of introducing an ENP service would be reduced waiting times (Head, 1988; Burgess, 1992; Tye and Ross, 2000). At the study site, there were no additional nursing staff employed to provide the ENP service, and the number of doctors remained unchanged. This effectively meant that the nursing staff took on an additional part of the workload of medical staff with no additional resources. Whilst a statistically significant difference was detected in the waiting times between patients who saw ENPs and SHOs (ENPs 48.6 mins, SHOs 70.1 mins, $p < 0.001$), this might have been related to the fact that not all the patients who attended the minor injury area of the department, were suitable for inclusion in the trial. These additional patients were generally seen by the SHOs, who also saw patients randomised to them as part of the trial. In contrast the ENP tended only to see patients involved in the trial. No attempt was made to compare waiting times when an ENP was not on duty.

9.5.1 Patient satisfaction

It is acknowledged that patient satisfaction surveys tend to show uniformly high ratings (McColl *et al.*, 1996), and in the RCT, patients managed by both ENPs and SHOs reported high levels of satisfaction. However, overall they were more satisfied with treatment provided by ENPs than with that from SHOs ($p < 0.001$). This may, in part, be related to the shorter wait to see an ENP, as a number of studies have reported an inverse relationship between perceived waiting and patient satisfaction (Trout, Magnusson and Hedges, 2000; Nerney, Chin, Jin *et al.*, 2001; Goldwag, Berg, Yuval *et al.*, 2002; Spaite, Bartholomeaux, Guisto *et al.*, 2002). Although, this would not explain some of the specific differences between ENP and SHOs noted in the RCT, for example, that ENPs were more likely to provide health education advice ($p = 0.001$) and to be better at providing information to patients than SHOs ($p = 0.007$). These identified differences are, however, supported by results from a study conducted by Byrne *et al.* (2000). In their study, patient satisfaction with SHOs in an A&E department was compared with patient satisfaction with ENPs in a MIU and a minor accident treatment service based in an A&E department. Patients who were managed by ENPs reported that they were: 1) more likely to have had health and first aid advice ($p = 0.05$); 2) more likely to have been told who to contact for advice ($p = 0.01$); 3) more likely to have been given written instructions ($p = 0.01$); and, 4) less likely to be worried about their health ($p = 0.05$) than patients who were seen by SHOs (Byrne *et al.*, 2000). However, it should be noted that neither of the other RCTs of ENP-led care detected a significant difference

in patient satisfaction between ENPs and junior doctors (Chang *et al.*, 1999; Sakr *et al.*, 1999), although the larger trial (Sakr *et al.*, 1999) found a non-significant trend in favour of ENPs.

9.5.2 Consultation

The mean combined consultation and treatment time for patients who saw an ENP, in the *RCT of ENP-led care*, was 30 minutes, which was very similar to the total consultation and treatment times reported by Heaney and Paxton (1997a) for patients who were managed by ENPs in a nurse-led minor injuries unit (28 minutes). The combined consultation and treatment time for patients in the SHO-led care group was five minutes shorter, although the difference was not significant. Both ENPs and SHOs carried out some of the treatments themselves, but referred others to colleagues. The difference in referral rates to other members of staff for treatments was not significant.

ENPs sought more advice from senior medical staff than the SHOs. The ENPs in the trial sought advice in almost two-thirds of cases (65%), compared to SHOs seeking advice in approximately a fifth of cases (21%) ($p < 0.001$). At the time of the study the ENPs at the research site were not authorised to interpret their own x-rays (although they were allowed to request specific views). If these ENPs were allowed to interpret their own x-rays then the amount of advice sought would be considerably less, as ENPs had to seek advice from senior A & E doctors for interpretation of every x-ray taken. This equated to every second patient they managed. Not allowing ENPs to interpret x-rays is likely to make the role far less efficient, and there is growing evidence to show that ENPs are able to interpret specific x-rays to a similar level as SHOs (Freij *et al.*, 1996; Meek *et al.*, 1998; Overton-Brown and Anthony, 1998; Sakr *et al.*, 1999). When patients with x-rays were excluded, no statistical difference was found between ENPs and SHOs in terms of the proportion of patients that advice was sought for, although ENPs were still seeking almost twice as much advice as SHOs (21% vs. 12%, $p = 0.21$). This advice was predominantly with regard to diagnosis, whereas SHOs generally sought advice about the most appropriate treatment plan. However, it should be borne in mind that the SHOs were at their most experienced (in their fifth and sixth months) and the ENPs were in a developing role. The ENPs were probably seeking reassurance as they may have been particularly conscious about ensuring they provided high quality care. It is therefore essential that these new roles have appropriate clinical support.

9.5.3 Clinical documentation

The importance of accurate and comprehensive clinical documentation is well accepted. Anecdotal evidence suggests that ENPs may produce clinical documentation of a standard 'far superior' to SHOs (Tye and Ross, 2000). Evidence from the RCT suggests that generally ENPs and SHOs both write relatively comprehensive clinical notes of a high quality; however the ENPs notes generally contained more information ($p < 0.001$). Clinical documentation is often used to evaluate the quality of care. In the RCT by Sakr *et al.* (1999), clinical documentation was used to compare the 'adequacy of care' provided by an ENP or SHO against a 'gold standard' of care provided by an A&E registrar. In that trial, patients were assessed by an ENP or SHO then re-assessed by an A&E registrar. Errors and omissions were judged to have occurred if there was a clinically significant difference between the ENP's or SHO's notes and those of the A&E registrars. This method relied on the ENPs and SHOs comprehensively documenting the care they have provided. As ENPs write more comprehensive notes, they stand at an advantage in clinical trials that use this particular type of trial design. It is therefore important that other outcome measures are incorporated into the study design.

9.5.4 Patient outcomes

As the majority of patients are not expected to return to hospital for any form of follow-up, it is difficult to evaluate longer-term outcomes. In the RCT undertaken by Sakr *et al.* (1999), the only longer-term outcomes assessed were self-reported outcomes obtained via a postal questionnaire at 28 days. Attempts to measure patient outcomes following attendance in A&E are fraught with practical difficulties, as Read and George (1994) identified in their proposed trial design (see Section 2.12). Minor injuries often heal well, independent of the treatment used (see Section 2.9). In a number of trials, which have examined various treatments for a range of minor injuries, differences have been seen in several outcomes. These outcomes have included: the use of pain killers (Watts and Armstrong, 2001); return to normal walking (Green *et al.*, 2001); return to work (Konradsen *et al.*, 1990); and return to full activity (Wiener *et al.*, 1997). These outcomes were included in the diary, developed by Read and George (1994), for use in monitoring the recovery of minor injury patients. In the RCT reported here, the follow-up questionnaire found no differences in terms of patients' time to recovery, level of symptoms, level of activity, or time off work, between patients who had seen an ENP or a SHO (see Section 7.6.1). However, a much higher level of unplanned follow-up was

found than was anticipated as one in five (20%) of all the patients in the trial reported they had to seek additional advice (ENPs 18.3%, SHOs 21.5%, $p=0.654$). This was almost double the level identified by Sakr *et al.* (1999) who found that 11% of patients in their trial reported unplanned follow-up, and that patients treated by ENPs were less likely to seek unplanned follow-up than SHO patients. As patients have a wide range of health-care professions from which to seek additional advice (for example, they may return to A&E, seek an appointment with their GP, go to another A&E department, attend their occupational health service, or seek a private consultation with a physiotherapist or private doctor), it can be extremely difficult to determine the exact level of unplanned follow-up, and therefore the extent to which missed or mismanaged injuries occur.

9.5.5 Conclusion

In conclusion, the evaluation of ENP-led care will only be possible once there is some level of standardisation of training, practice remit and service provision. The *Documentation Audit Tool* and *Patient Satisfaction Questionnaire* were sufficiently sensitive to measure differences in the quality of clinical documentation and levels of patient satisfaction between ENPs' and SHOs' care provision. Monitoring recalls and other returns to a department is an important measure of the quality of care in A&E; however, caution must be exercised in interpreting the results as patients are at liberty to seek second opinions and other unplanned follow-up from different health-care providers. Although the follow-up questionnaire provided an estimate of the scale of this unplanned follow-up, it did not provide data about the reasons for, or from whom that follow-up care had been obtained.

9.6 The Extent and Nature of Unplanned Follow-up (*The Unplanned Follow-up Study*)

A small proportion of patients will have injuries that are missed on initial presentation (Guly, 1984), and others will develop problems or concerns related to their injury or its initial management. All A&E departments should have systems in place to identify missed fractures through some form of formal x-ray reporting (Benger and Lyburn, 2003). Departments are also likely to have a system whereby patients can be brought back for planned follow-up, allowing further review and re-assessment (Dasan and Hashemi, 2003). These systems will identify a proportion of the injuries missed at first

presentation. In addition, there will be a number of patients initially managed inappropriately plus those who required some form of additional treatment. Patients may also choose to re-attend the department or seek a second opinion elsewhere with another health-care provider.

The *Unplanned Follow-up Study* which involved just over 3,000 patients and was reported in Chapter 8 aimed to examine the extent and nature of this unplanned follow-up in patients who attended with a minor injury of the type which ENPs at the research site were authorised to manage (Appendix V IIb). The study was undertaken in three phases. The first phase identified patients with specific minor injuries (see Section 4.8.9), the second phase monitored which of these patients returned to the A&E department and why, and the third phase examined patient reported unplanned follow-up.

9.6.1 Identification of minor injury patients

The *Unplanned Follow-up Study* demonstrated that around a sixth (16.1%) of the patients who attended A&E could potentially be managed and discharged by the ENPs at the research site using only a small range of protocols (Appendix VIIb). This figure is lower than the 30% of A&E patients (who attended a large inner-city department and were considered appropriate for ENPs to manage) as estimated by Brebner *et al.* (1996), and even lower than the 46% of all A&E patients managed by ENPs in one community hospital in Grampian (Macduff *et al.*, 1999). A partial explanation is that a proportion of the patients ENPs could manage were excluded from the *Unplanned Follow-up Study*. These included: children between one and 15 years old with similar minor injuries; patients who presented with minor injuries who subsequently were admitted (e.g. distal radius and ulna fracture which required manipulation under anaesthetic); and patients who sought post-coital contraception. Requests for post-coital contraception were not included in the study as the SHOs at the research site were not authorised to provide this service. It also should be borne in mind that different locally agreed protocols will enable varying proportions of patients to be managed by ENPs, and that the study by Brebner *et al.* (1996) was theoretical as nurse practitioners did not work in the department studied.

The total proportion of patients who attended the research site and were managed by ENPs during the *Unplanned Follow-up Study* was less than 3% of all attendances. In

2001, the Audit Commission (2001) reported that most A&E departments were not utilising ENPs as effectively as they could be, as only one in twenty departments had ENPs who saw more than ten per cent of all the patients who attended a department. SHOs managed two-thirds of the attendances for minor injuries in the *Unplanned Follow-up Study*, which supports the claims made by Sakr *et al.* (1999), and Wallis and Guly (2001) that most patients who attend A&E departments in the UK are seen by SHOs. In the *Unplanned Follow-up Study* an unexpected difference was found between ENPs, junior (SHOs) and senior medical staff in terms of the types of injuries managed by each group ($p < 0.001$) (see Section 8.2.5). ENPs managed more sprains and fractures, but fewer head injuries, head wounds and muscular injuries. A possible explanation is that ENPs may 'cherry pick' the patients they manage, choosing the cases which are easier to diagnose and treat. For example, most minor fractures or sprains are relatively straightforward to manage, whereas an assessment of a head injury requires greater skill, and arguably carries greater risk of missing a life threatening injury.

9.6.2 Re-attenders to A&E

Patients may re-attend A&E either because they have sustained a new injury or developed another condition which requires medical attention, or they may re-attend for unplanned follow-up. The *Unplanned Follow-up Study* demonstrated that a small proportion (2.2%) of minor injury patients will re-attend A&E for unplanned follow-up, with a concern or problem related to their injury or its initial management. A few international studies have examined re-attendance at A&E for unplanned follow-up, and have recorded re-attendance figures of between 0.2% and 2.5% (Lerman and Kobernick, 1987; Armstrong, Pennycook and Swann, 1991; Wong and Lam, 1994; Goh, Masayu, Teo *et al.*, 1996). Each of these studies examined re-attendance rates for all A&E patients, not just patients with minor injuries, and used different periods of time to monitor for re-attendance ranging from 48 hours to 4 weeks. The lowest rates (0.2% to 0.7%) were recorded for studies which only monitored re-attendance within a time frame of either 48 (Wong and Lam, 1994) or 72 hours (Lerman and Kobernick, 1987; Goh *et al.*, 1996). Armstrong *et al.* (1991) examined re-attendance for unplanned follow-up over a five-week period and identified a 2.5% re-attendance rate, with the majority (94%) returning within two weeks. Whilst it would be expected that larger numbers would be detected using a longer time frame, if the time frame selected is too short then a large proportion of unplanned follow-up may go undetected. A second reason why this study reported a similar re-attendance rate to that identified for minor

injury patients in the *Unplanned Follow-up Study* may be due to the fact that both these studies were undertaken at the same research site: Glasgow Royal Infirmary albeit over ten years apart.

Whilst the A&E department computer system was used to identify any patient who re-attended during a 42-day period, four-fifths of the patients who re-attended during the *Unplanned Follow-up Study* did so within 14 days. If a 72-hour time frame had been used, only one of the missed injuries or initially inappropriately managed cases would have been identified through returning patients. Therefore, a longer time period is essential if monitoring re-attendances in minor injury patients is to identify missed injuries.

The largest single proportion of minor injury patients (one-third) re-attended as they were concerned about their injury (e.g. their injury was not healing as fast as expected) and were discharged following re-assurance and further advice (in contrast Armstrong *et al.* (1991) identified persistent pain as the reason one-quarter of patients re-attended A&E). Others experienced problems with dressings or plaster casts, had difficulty complying with the prescribed treatment, or their condition appeared to be worsening and required changes to their treatment. A small, but very important number were found to either have had an injury misdiagnosed, missed completely, or managed incorrectly (see Section 8.3.4). The routine monitoring systems in place at the research site identified two further cases (one through x-ray reporting and the second through review at a follow-up clinic). A further case was identified by the researcher, by chance, when he re-attended the department 50 days after his initial attendance. In total, the proportion of patients who were positively identified as having an injury which was missed or inappropriately managed at their initial attendance in A&E was only 0.4% (n=11) (see Section 8.3.4).

In summary, the second stage of the *Unplanned Follow-up Study*, demonstrated that monitoring return attendances to a department (for at least two weeks after the initial attendance) combined with x-ray reporting and feedback from review clinics, is a useful method to identify patients with missed injuries. However, patients may choose to seek a second opinion from another health-care provider.

9.6.3 Patient reported unplanned follow-up

The third stage of the *Unplanned Follow-up Study* involved sending patients a postal questionnaire which enquired about any follow-up they had sought following their attendance in A&E. A response rate of 48% was achieved.

Only one published study (Sakr *et al.*, 1999) had attempted to measure unplanned follow-up visits in minor injury patients. In their trial of ENPs and SHOs, 11.0% of the patients reported having sought unplanned follow-up in the month after their treatment in A&E. In our *RCT of ENP-led care* (see Chapter 7), almost twice as many patients (20%) reported the same need. In the second stage of the *Unplanned Follow-up Study* reported in Chapter 8, a similar proportion (18%) of patients reported seeking unplanned follow-up. One possible explanation for the differences in unplanned follow-up rates in the trial by Sakr *et al.* (1999) and from both the *RCT of ENP-led care* (see Chapter 7) and the *Unplanned Follow-up Study* (see Chapter 8), may be related to the second consultation by a research registrar in the Sakr *et al.* (1999) trial. For example, in the *Unplanned Follow-up Study* it was noted that self-reported unplanned follow-up was lower in patients who also felt they were given enough information on how to look after their injury and what to expect during recovery, as well as those who were most satisfied with their care and treatment. It is therefore possible, that patients who were subjected to a second consultation as part of the study design may have felt that they had had a more comprehensive consultation and therefore were less likely to seek unplanned follow-up in the ensuing weeks.

It appears that approximately half of all minor injury patients who seek unplanned follow-up do so from their GP. A figure supported by the findings of Sakr *et al.* (1999). The remainder sought consultations from a variety of other sources including other primary care services and local A&E departments (see Table 8.13). One in ten patients reported that they had returned to the original A&E. However, just over one in twenty (n=18, 6.1%), reported they had attended another A&E department (within a 30 minute drive of the research site there are another seven general A&E departments plus a dedicated paediatric A&E). This may have been because they did not have confidence in the care provided by the original A&E department, or perhaps because another department was more convenient. Whether any of these patients had missed injuries could not be determined from the data, however, Guly and Grant (1994) in a small study

which examined patients who sought unplanned follow-up from a neighbouring A&E department, found that a proportion ($n=7$, 17%), had a missed injury.

Patients reported seeking unplanned follow-up for a variety of reasons. Primarily this was because their injury: 1) was not healing as fast as they expected; 2) they required more pain killers; 3) a medical certificate to authorise time off work was needed; or, 4) they were requesting a second opinion (see Table 8.12). Unplanned follow-up was found to be: greater among female patients ($p=0.001$); patients who felt their care was poor or very poor ($p<0.001$); patients who felt they had not been given sufficient information on how to look after their injury ($p<0.001$), or what to expect during recovery ($p<0.001$); and, with patients who had been advised to make appointments with their GP or practice nurse ($p=0.001$).

If patients were better informed about their injury and what to expect during recovery then the number of unplanned follow-up visits may be reduced and patient satisfaction increased. No significant difference was found in terms of unplanned follow-up between any of the groups of clinicians who managed patients in this study, however patients who were managed by ENPs were more likely to report being given enough information. In the RCT conducted by Sakr *et al.* (1999), patients who were managed by ENPs were found to be less likely to seek unplanned follow-up than patients who had consulted with SHOs ($p=0.03$).

Just over half of the respondents, in the *Unplanned Follow-up Study*, who reported unplanned follow-up (52.3%) stated their treatment had been altered. Without having access to these patient's medical records, it is impossible to judge whether the reported alteration in treatment was due to a misdiagnosis, inappropriate management, a complication, or some other reason. No inference is, therefore, made from this data other than to note that 116 patients (7.9% of patients who returned completed questionnaires) reported that their treatment was altered following an unplanned follow-up appointment. It is possible that a proportion of these patients did have problems associated with their initial treatment and management, however, the true nature and extent of these problems remains unknown.

As no additional clinical information was available for patients not re-attending the department, it was not possible to determine whether any of them had missed injuries or were initially inappropriately managed. However, it is important not to assume, that if

patients do not return to the original A&E department, they do not have a missed injury. This is an assumption often made in studies involving A&E patients (see for example James and Pyrgos, 1989; Davies, 1994; Mann *et al.*, 1998; Allerston and Justham, 2000).

As always, where data does not exist (as with non-responders) caution must be taken with the interpretation of findings. In the *Unplanned Follow-up Study*, patients who responded were more likely to be female, older and live in areas of less deprivation, a similar pattern to that identified by Cohen (1996). It is perhaps not surprising to find that women were more likely to seek unplanned follow-up than men, as women are twice as likely to consult with a GP than men of the same age (Walker, Maher, Coulthard *et al.*, 2001). However there is still much debate around the reasons for gender differences and health service utilisation (Green and Pope, 1999; Bertakis, Azari, Helms *et al.*, 2000). Some of the reasons suggested have included: that differences may be associated with reproductive biology and conditions specific to gender (Gijsbers van Wijk, Kolk, van den Bosch *et al.*, 1992; Mustard, Kaufert, Kozyrskyj *et al.*, 1998); suggestions of higher rates of morbidity in women (Cleary, Mechanic and Greenley, 1982; Hibbard and Pope, 1983; Verbrugge and Wingard, 1987); differences in health perceptions and the reporting of symptoms and illnesses (Cleary *et al.*, 1982; Hibbard and Pope, 1983; Waldron, 1983; Verbrugge and Wingard, 1987) or a greater likelihood that women seek help for prevention and illness (Cleary *et al.*, 1982; Hibbard and Pope, 1983; Verbrugge and Wingard, 1987). However, even when gender specific problems are excluded, women still make more use of health services than men (Summer, 2001). Even when key factors (including self-reported health status, mental and physical health symptoms, concerns about health, interest in health and tendency to adopt illness behaviours) were controlled, gender was still found to predict health care utilisation (Green and Pope, 1999).

9.6.4 Difficulties in identifying unplanned follow-up from patient reported data

In the *Unplanned Follow-up Study*, one in ten patients reported returning to the A&E department where they were originally treated, twice the proportion identified when monitoring returns in the first phase of this study (see Section 8.4.8). This could be due to a number of reasons, which include: 1) the possibility that respondents to the questionnaire were more likely to seek unplanned follow-up; 2) patients did not

properly understand the questionnaire or incorrectly completed it; or, 3) the monitoring system did not pick up all the patients who returned to the department. This has implications for monitoring return patients.

To conclude, identifying patients with missed injuries or who were initially inappropriately managed, poses a real practical challenge. Unplanned follow-up appears to be a sizeable problem, with a fifth of patients with minor injuries reporting the need to seek unplanned follow-up in the month following their attendance in the A&E department studied. Only a tenth of these patients reported seeking unplanned follow-up at the original A&E department. Data, derived solely from monitoring patients for unplanned follow-up, identified missed injuries or problems with initial management in 12% (n=8).

Patients attend many other health-care providers for unplanned follow-up. If a similar rate of missed injuries exists within these groups, then the overall missed injury rate may be around 2.4% (i.e. 20% x 12%). This makes missed injuries or inappropriately managed injuries relatively uncommon, and difficult to identify or monitor.

9.7 The Quality Health Outcomes Model

The Quality Health Outcomes Model (QHOM) was a useful framework within which to view the evaluation of minor injury care. Results from each of the studies in this thesis will be examined within the context of this model in Section 9.8. Prior to this, the contribution the research in this thesis makes to support the interactive nature of this model is discussed.

The conceptual framework, the QHOM (see Section 2.7) proposed by Mitchell *et al.* (1998) is a comparatively new framework. Developed from Donabedian's seminal structure-process-out model (Donabedian, 1966), the QHOM is a more intricate and dynamic model which attempts to reflect the complex nature of health care (see Figure 2.1). Client characteristics have been added to Donabedian's model and the other components realigned in an attempt to capture the complex, dynamic relationships inherent in a healthcare system. Whilst some testing of the model has been undertaken by a small number of researchers who have explored its applicability in obstetric practice (Mayberry and Gennaro, 2001), or used it to group disparate studies in order to view as a more coherent programme of research (Radwin and Fawcett, 2002), the

applicability of the model to the care of minor injuries within an A&E setting has not been explored.

The research reported in this thesis was not undertaken to test the rigor of the model, however some of the results can be used to explore many of the relationships proposed in the model. Specifically, the model posits that therapeutic interventions affect and are affected by system and client characteristics in contributing to outcomes, and that the effect of the intervention is mediated by both system and client characteristics rather than having a direct effect (see Figure 2.1). In addition the system can be affected by and can affect client characteristics. Finally outcomes (positive and negative) may have a reciprocal affect on both the client and the system. These relationships will be discussed in more detail in the following sections.

9.7.1 System characteristics

The QHOM proposes that the health care system has a reciprocal relationship with interventions, clients and outcomes. From the *2001 survey* (see Section 5.3) it is clear that A&E services vary considerably from department to department. The interventions conducted will depend on the resources available, for example, x-ray facilities were not available in all departments which managed A&E patients. In addition, clinicians may be restricted in their choice of therapeutic intervention due to local protocols. ENPs in the majority of A&E departments practised using protocols (see Section 5.5).

The types of clients managed in any particular department may depend on the patient's age and the type of injury they present with. From the *2001 Survey* (see Section 5.5) it was seen that ENPs in the majority of departments had an age restriction on the patients they could manage, and three departments only treated paediatric patients. Similarly, the types of injuries ENPs managed varied between departments.

Outcomes may be directly affected by system factors. For example, if follow-up clinics are not held at convenient times for patients then outcomes may potentially be affected. In the *Unplanned follow-up study* (see Section 8.4.6) a small number of patients reported they were unable to get follow-up appointments at suitable times and therefore did not attend.

9.7.2 Interventions

The system is likely to mediate the outcome of an intervention. For example, as ENPs are unable to supply antibiotics in two thirds of departments (see Section 5.5.3), treatment for infected wounds or wounds at risk of infection may be compromised. In addition, client characteristics will mediate the outcome of various interventions as the severity of injury will differ, however this was not examined in this thesis.

9.7.3 Client characteristics

Client characteristics may affect interventions, the system and outcomes directly. Patients may be given a choice in treatment, where options exist. This was not explored in the thesis, however for example 1) ENPs and medical practitioners had at their disposal a number of different wound closure methods, which they could offer patients; and, 2) patients had the choice of not consulting with an ENP, however out of 214 patients invited to participate in the *RCT of ENP-led care* (see Section 7.2.1) only six stated that they did not wish to take part as they did not want to be treated by a nurse. In a large A&E department, where there are both medical and nurse practitioners, this may not be a problem. However where services are solely nurse-led, arrangements may need to be made for patients who wish to be seen by a medical practitioner. Outcomes can be affected directly by client characteristics, for example in the *Unplanned Follow-up Study* (see Section 8.4.7) increased levels of unplanned follow-up were reported by female patients.

Radwin and Fawcett (2002) proposed an adaptation to the QHOM, separating client characteristics into 'trait' and 'state' characteristics (Figure 9.1). 'Trait' characteristics include characteristics such as gender, race and age, which were considered stable entities, whereas 'state' characteristics were those which could vary and may be altered by other factors (e.g. the severity of illness). Radwin and Fawcett (2002) argue that whilst 'state' characteristics may be affected by and affect interventions, system characteristics and outcomes, 'trait' characteristics only have a unidirectional relationship. 'Trait' characteristics, they argue, may affect interventions, system characteristics and outcomes, but are unaffected by any of these. Whilst it is logical at the individual level that 'trait' characteristics such as gender or age cannot be altered by interventions, system characteristics or outcomes, these characteristics can be altered at group levels. For example, if a healthcare system redefines the age group of patients it will manage, then its client group's demographics will alter. The QHOM was designed

to reflect healthcare quality at different levels from the individual through to population. Radwin and Fawcett (2002) highlight a difficulty associated with the model at the individual level, however their argument does not apply to group or population levels.

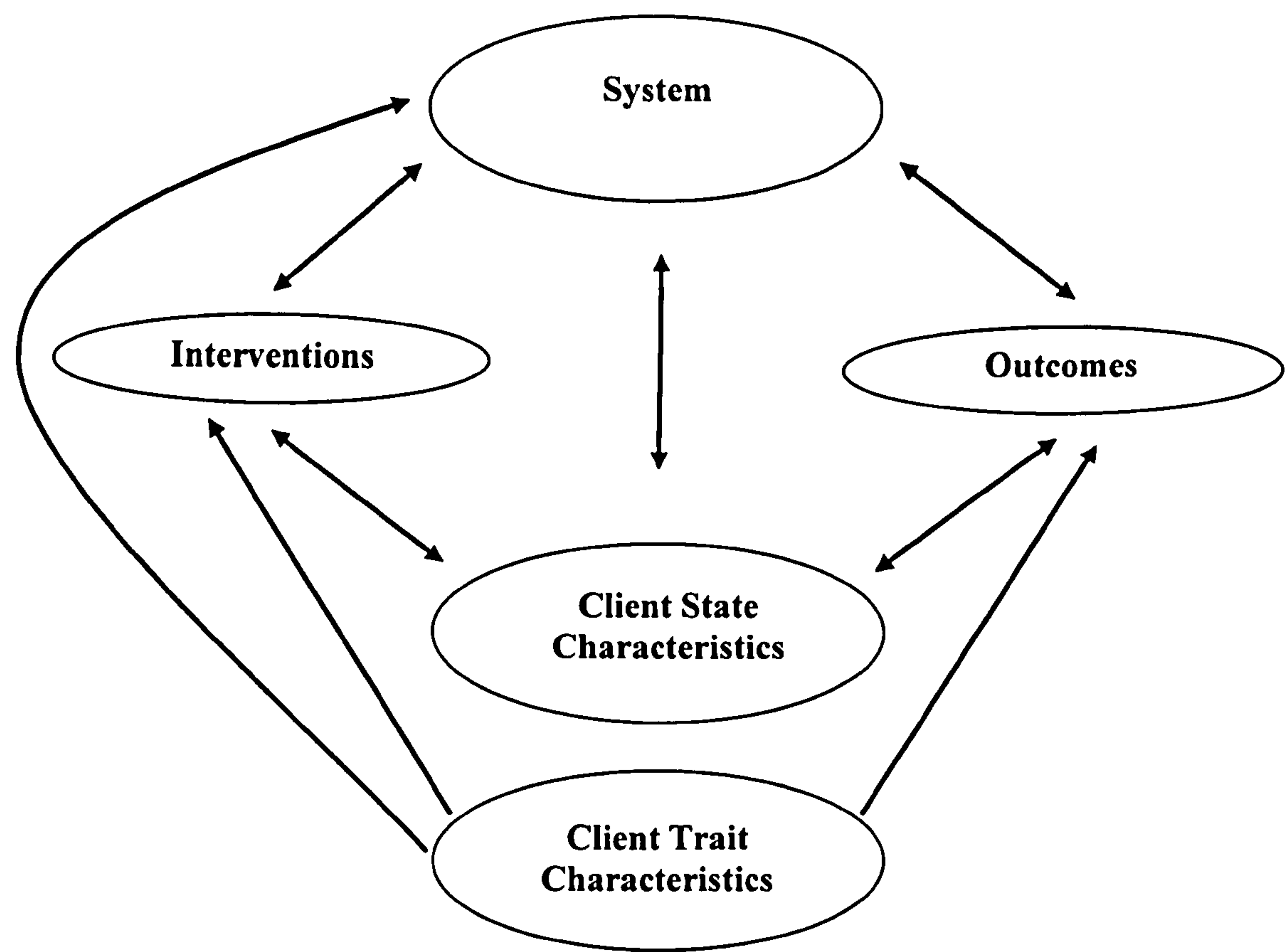


Figure 9.1: Radwin and Fawcett’s proposed adapted Quality Health Outcomes Model (Radwin and Fawcett 2002)

9.7.4 Outcomes

Finally, outcomes themselves may affect the system and clients directly. Poor outcomes may cause a service to be changed or withdrawn, or lead to patients seeking treatment elsewhere. In the *Unplanned Follow-up Study* (see Section 8.4.7) a small proportion of patients sought unplanned follow-up from other healthcare providers as they looked for a second opinion. If there was a significant difference between providers it is conceivable that the poorer performing provider might be withdrawn.

9.7.5 Conclusion

Although the studies undertaken in this thesis were not developed to explore the applicability of the QHOM to minor injury care by ENPs, when the model was retrospectively applied and the results viewed through this particular conceptual model it did appear to be a useful framework at the group level. The adaptation posited by Radwin and Fawcett (2002) is perhaps only helpful if it is applied at the individual level. Arguably, the original QHOM is a better conceptual model for examining healthcare quality for a group of individuals in a healthcare system.

The QHOM proposed various components related to healthcare outcomes and relationships between these components. The contribution to the theoretical development of this model is in two parts. First, the areas examined in this thesis can be fitted into the components outlined in the model, which suggests the model included all the important components. Second, a number of examples from the research support the existence of the inter-relationships between components outlined in the model. However, further work to explicitly evaluate the model within the field of minor injuries would be beneficial.

9.8 Integrating the Studies Undertaken in this Thesis

A conceptual model can provide a useful framework within which research findings can be interpreted. A model may allow the identification of new concepts for future study or propose new relationships for exploration (Radwin and Fawcett, 2002). The *Quality Health Outcomes Model (QHOM)* (Mitchell *et al.*, 1998) described in Section 2.7 appears to reflect the complex nature of minor injury care within the A&E system, and will be used to facilitate the interpretation of results from the different studies described in this thesis.

The introduction of any new treatment or change in system should be thoroughly evaluated to ensure its safety and effectiveness (Dickens, 1994). As ENPs are increasingly taking on the management of injuries, previously managed by medical staff, evaluations should seek to compare ENP provided care with that of the existing providers. Results from the *Unplanned Follow-up Study* (see Section 8.2.5) confirm the view of other authors (McHugh and Driscoll, 1999; Armon *et al.*, 2001; Wallis and Guly, 2001) that junior doctors (namely SHOs) are the clinicians responsible for the management of the majority of patients presenting with minor injuries. Therefore, it

would seem reasonable that ENPs are initially compared with SHOs. Although some have argued against this (Dolan, 2000), suggesting instead, that ENPs should be compared with more senior medical staff. In many of the smaller departments GPs are the main providers of care, and in these departments comparisons should be between ENPs and GPs. No study has compared these two groups. However, a few studies have compared patients with primary care problems (including some minor injuries) seen by GPs and SHOs both working in A&E departments. Generally, experienced GPs have been found to request fewer investigations and make fewer referrals than SHOs (Dale, Green, Reid *et al.*, 1995; Murphy, Bury, Plunkett *et al.*, 1996), although less experienced GPs utilise more resources (Gibney, Murphy, Barton *et al.*, 1999). Each of these studies was conducted in major A&E departments (district general hospital or inner-city teaching hospitals) and evaluated GPs who worked in A&E on a sessional basis, with A&E medical staff.

Across the range of A&E departments there are variations both in the type of doctors and of ENPs who provide care to minor injury patients. The title ENP makes the role appear homogenous, but results from the *ENP Surveys* have identified that this is not the case. A&E services in different departments vary considerably. Large inner-city teaching hospital departments, like the department used in this thesis for both the *RCT of ENP-led care* and the *Unplanned follow-up Study*, have senior medical staff on-site for consultation and referral. Some of the smallest departments in the country that see only a few hundred patients each year, rely on staff attending from an adjacent ward when a patient arrives and do not even have x-ray facilities. ENPs in Scotland can be divided into three broad groups: 1) untrained; 2) trained but limited scope of practice; and, 3) trained with a broader scope of practice. The ENPs used in the trial undertaken by Sakr *et al.* (1999) were the equivalent of the third group (trained with a broader scope of practice). They were considered to be as competent as the SHOs in managing minor injuries within the defined group of protocols at the Northern General Hospital in Sheffield (see Section 2.12.2). The ENPs in the *RCT of ENP-led care* reported in Chapter 7, resembled the type of ENPs in the second group (trained, but a limited scope of practice) (see Section 5.7). Where similar measures were used, the findings support the conclusion by Sakr *et al.* (1999), that ENPs can provide a level of care for minor injury patients similar to that provided by SHOs. No evaluation has specifically evaluated untrained ENPs, or those prepared on different types of training course.

If all ENPs were expected to work within the same defined scope of practice, and were prepared on a single standardised course, any future evaluation of the role would be more straightforward. However, the scope of practice defined for ENPs in one department might not suit, or be applicable to another department. In some of the smallest departments (e.g. where nurses are based in an adjacent ward, there are no x-ray facilities, and where only a few hundred patients each year are treated for minor injuries), it may not be practical to train several nurses as ENPs, and expect them to remain competent to treat a wide range of minor injuries. Conversely, in the largest departments, a small number of ENPs, may provide a very efficient service when trained to manage a limited range of the most commonly presented injuries, perhaps managing a higher proportion of these without referral. However, neither of these two types of ENPs will be very efficient in departments which do not have medical staff on site and manage larger numbers of patients (e.g. a nurse-led MIU, or perhaps community hospital managing a few thousand patients every year). ENPs working in this latter type of department will need to manage a wide range of conditions, and to treat these conditions on a regular basis to maintain their competence. Work to develop competencies for both Emergency Nurses and those working as ENPs has been undertaken by the newly formed RCN Faculty of Emergency Nursing (Crouch and Jones, 1997; Crouch, 2003) and NHS Education for Scotland (Cooper, Nelson and Purcell, 2003). These together, it is hoped, will lead to some standardisation of clinical competency for nurses working in ENP roles.

Not only are the ENP roles very varied, but the role is still developing. In Scotland at present, ENPs are predominantly managing a limited range of the most common minor injuries. However, the role is likely to develop into other areas of A&E, such as review clinics (Tachakra, Wiley and Dawood, 2001), assessment and management of stroke patients (Minchin and Wensley, 2003) and even the initial management of major cases (Tachakra and Stinson, 2000). As the ENP role develops, each new area of practice should be rigorously evaluated to ensure the care provided is both safe and effective.

A&E departments are seen as an ideal setting for training junior medical staff (Wallis and Guly, 2001), and there has been concern that the increase in nurse practitioners may result in the reduction of training opportunities for junior doctors (Dowling, Barrett and West, 1995; Tye, 1997). However, there have also been similar concerns related to ENPs who potentially could lose competence in advanced trauma life support or

cardiopulmonary resuscitation (McKenna, Woolwich and Burgess, 1994; Whelan, 1997). With the majority of ENPs in Scotland working in either rotational or integrated posts this is unlikely to be a major problem. Rotation of ENPs, from MIUs to major A&E departments, would be one way of ensuring those in dedicated ENP posts have the opportunity to maintain these important skills. If ENPs became more involved with the formal teaching of junior medical staff, then concerns about the reduction in opportunity for junior doctors to manage minor injuries may be minimised.

The training of ENPs and junior medical staff is different. Dolan (2000) makes the point that there are differences in the cultures, emphases and backgrounds of these two professions. This raises the notion that ENPs may practise in a different way to junior medical staff. Both the *RCT of ENP-led care* and the *Unplanned Follow-up Study* found that patients reported that, generally, ENPs provided more information than medical staff. In the *RCT of ENP-led care* it was noted that patients in the ENP-led care group had a slightly longer consultation and treatment time than patients in the SHO group although the difference was not significant. ENPs may use this additional time to provide more information to patients (Dolan, B. 2003, Personal Communication). Additional information may, in turn, have an effect on reducing unplanned follow-up visits. Results from the *Unplanned Follow-up Study* showed that patients who reported that they have been provided with sufficient information to look after their injury, and on what they should expect during their recovery, sought fewer unplanned follow-up visits. Whilst no statistical difference was noted in unplanned follow-up rates between ENPs and SHOs in the *RCT of ENP-led care* (see Section 7.6.1), in the larger RCT comparing ENPs and SHOs conducted by Sakr *et al.* (1999), ENP patients sought fewer unplanned follow-up visits than junior doctor patients.

One area ENPs out-performed SHOs, was over the standard of clinical documentation. Accurate and complete clinical documentation is important particularly for follow-up, as patient care may be compromised by missing information (Audit Commission, 1995). Results from the *RCT of ENP-led care* support the hypothesis that the clinical documentation of ENPs was of a higher quality, as measured by the *Documentation Audit Tool*, than that written by SHOs. High quality documentation will also assist hospitals and Trusts to defend themselves against claims of negligence which may be levelled against them (Audit Commission, 1995).

The findings, from the studies described in this thesis, demonstrate the difficulties involved with attempting to measure patient outcomes in patients with minor injuries. The *QHOM* (Mitchell *et al.*, 1998) (see Section 2.7) suggests that both health-care system factors and client characteristics can affect outcomes. Results from the *Unplanned Follow-up Study* demonstrate that both system factors and client characteristics affect the measurement of outcomes. The accurate identification of re-attenders to an A&E department will depend on the records' system in place in that department. In larger departments this system may be computerised, whereas in smaller departments it may still consist of a hand-written ledger. Feedback from follow-up clinics may also be very variable, and rely on informal systems rather than a more robust system. Client characteristics play an important role too, as men, younger patients, and patients who live in areas of higher deprivation, are less likely to return paper-based outcome instruments (see Section 8.4.2) (Cohen, 1996). Plans by the Scottish Executive to develop Electronic Health Records, and an electronic repository for clinical information which can be accessed by different health providers (Scottish Executive, 2001b), may facilitate the identification of outcomes in future studies.

The *QHOM* also takes account of the fact that the health-care system may affect and be affected by client characteristics. For example, ENP services are unlikely to be effective if patients are not content to be treated by a nurse instead of a medical practitioner. The recruitment figures for the *RCT of ENP-led care* suggest that most patients do not mind an ENP treating their minor injuries. As it has been proposed that ENPs could manage certain types of patients with more serious and even life-threatening conditions (Tachakra and Stinson, 2000), it remains to be seen whether these patients will be as accepting. This will require careful assessment.

In summary, the studies in this thesis have demonstrated the complexity and varied nature of ENP services in Scotland, and examined how specific important outcomes can be evaluated. ENPs' clinical documentation has been shown to be of a higher standard than that of SHOs', and patients report that ENPs are better at providing information and advice than SHOs. Unplanned follow-up has been shown to be complex and time consuming to measure, but it is an important outcome and further work needs to be done to devise robust methods where this can be routinely monitored.

9.9 General Conclusions

This thesis set out to examine a method to evaluate ENP-led care, with the intention that any tools or methods developed could be used in other A&E departments to evaluate other ENP services. From previous research by Read and George (1994) it appeared prudent to both develop and trial any methods in a department where the ENPs managed a large number of patients. For this reason, the A&E department at Glasgow Royal Infirmary was chosen as the main research site. However, if the tools developed were to be useful in evaluating other ENP services it was important to identify how similar other ENP services, across the rest of the country, are to the service at the chosen research site. The two surveys, undertaken at two separate points in time, identified the extent and nature of ENP services in Scotland. This has provided an insight into the variety of ENP services, and highlights the importance of developing simple tools which can be used or adapted for evaluations at other sites.

The *Documentation Audit Tool* (see Chapter 6), whilst it was designed for the RCT at the research site, is suitable for the assessment of clinical documentation related to the types of minor injury commonly seen by ENPs throughout Scotland. The methodology used to develop the tool was both practical and effective, and the same procedures could be used to expand or update the tool. The *RCT of ENP-led care* whilst large enough to show a difference in patient satisfaction and the quality of clinical documentation between ENPs and SHO, was not designed to be, and was not, sufficiently large to compare missed injury or mismanagement rates between ENPs and SHOs. However, it was large enough to suggest that relatively large numbers of patients are seeking unplanned follow-up in the month after their initial injury. This supports the findings of the separate, and the larger RCT of ENPs conducted in Sheffield (Sakr *et al.*, 1999). Attempts to identify missed injuries and mismanaged cases proved to be a complicated undertaking, as was identified in the *Unplanned Follow-up Study* (see Chapter 8). Monitoring returns to the A&E department was identified as being a useful component of any evaluation of ENP services. Identifying missed injuries or mismanaged cases through unplanned follow-up with other services, needs further exploration. This may require developing a formal feedback system with GPs, or the development of patient-held or electronic health records.

Detailed conclusions of the results are presented at the end of the four results' chapters (see Chapters 5-8). The main conclusions of the work undertaken in this thesis are outlined below.

- Nurses working in an ENP role are widespread throughout the many different types of A&E department in Scotland and new services continue to be developed.
- Educational preparation, scope of practice, authority to supply medication, the ability to request and interpret x-rays, and, even title and grading, appear to vary considerably across Scotland. However, ENPs in the majority of departments are managing similar types of minor injury which correspond to the types of injury managed by ENPs at the main research site used in this thesis.
- The modified nominal group technique was found to be an effective method to develop the *Documentation Audit Tool*, as it allowed a group of experts to review a large amount of information and reach a consensus in a short space of time. The same technique could be easily used to expand or modify the tool. This is important, as the tool was developed to measure the quality of clinical documentation relating to the types of minor injuries seen by ENPs and covered in the original 12 protocols at the research site (Appendix VIIa). Additional sections could be added to cover injuries managed by ENPs in other A&E departments using the same technique.
- The *Documentation Audit Tool* was found to be effective at measuring the quality of free-text notes of both ENPs and SHOs, with 'almost perfect' stability and 'substantial' inter-rater reliability.
- The patient satisfaction questionnaire was acceptable to patients and was sufficiently sensitive to measure differences in satisfaction between patients managed by ENPs and SHOs.
- Generally, paper-based data collection tools, developed to collect data related to patients' consultations (e.g. referrals made, advice sought, etc.), worked well, with the exception of the clinic referral form. Response rates to the clinic referral

form may have improved if the researcher had been able to be present in the clinic.

- By agreeing to be randomised to either an ENP or SHO, it appears that patients found ENPs to be acceptable providers of minor injury care. An assumption supported by the higher levels of satisfaction found with patients randomised to ENP-led care. Specifically, patients reported that ENPs were easier to talk to, gave them enough information on accident and illness prevention, and gave them enough information on their injury. Overall, patients were more satisfied with treatment provided by ENPs than that from SHOs. However, it should be borne in mind that the waiting time to see an ENP was significantly lower than that to see an SHO and that an inverse relationship was found between overall satisfaction and waiting time in the *Unplanned Follow-up Study*.
- Clinical notes written by ENPs were found to be of a higher standard, when measured by the *Documentation Audit Tool*, than those written by SHOs.
- A larger trial would be required to assess any difference in missed injury rates and numbers of patients who were inappropriately managed on initial presentation. Based on the figures from the *RCT of ENP-led care* a trial would have to involve 1,538 patients to have sufficient power to test the significance of the 2% detected difference, in missed injury and inappropriately managed cases, between the two groups found in the trial. However, in the trial a fifth of patients reported unplanned follow-up, and it is possible that further missed injuries and inappropriately managed patients were not detected.
- In the *Unplanned Follow-up Study*, which was a large prospective study of minor injury patients, a similar proportion of patients reported unplanned follow-up to patients in the *RCT of ENP-led care*. Half of these patients sought unplanned follow-up from GPs. Only one in ten reported returning to the original A&E department, however, only two-fifths of these (40%) were picked up by systems put in place in the department to capture unplanned follow-up. Inaccurate reporting by patients was partly to blame, and it is possible that hospital systems are not sufficiently robust to ensure all are identified.

- Monitoring returns to the department proved a useful method of identifying possible negative outcomes. A total of 5.5% (n=166) of patients re-attended the department. Forty per cent of these (n=67) returned for unplanned follow-up and 12% (n=8) of these were found to have had either an injury missed on their initial presentation or were incorrectly managed.
- Overall, only 0.4% of patients were identified with a missed injury or who were incorrectly managed at their initial attendance, using routinely collected data. This was considerably lower than the potential proportion of clinical errors reported by Sakr *et al.* (1999), who found that SHOs and ENPs made clinically important errors in 10% of minor injury patients. It was also lower than the 3% of patients observed to have been potentially mismanaged by untrained ENPs in the study by James and Pyrgos (1989), or the 3% of ENP patients with missed injuries or inappropriate managed in the *RCT of ENP-led care*.
- Monitoring returns to A&E is a useful procedure in assessing the quality of ENP-led care. However, patient reported unplanned follow-up suggests that many patients seek advice elsewhere if they encounter a problem or concern with their treatment. Developing better systems to measure this would be advantageous.

9.10 Generalisability of Results

Generalisability, sometimes referred to as external validity, is the extent to which the results of a study undertaken in a sample of a population can be applied to the population as a whole (Polit and Hungler, 1995). To address this issue, it is necessary to be able to demonstrate that the characteristics of the sample involved in the study are representative of the population as a whole. This applies equally to A&E departments in the survey as it does to patients in the *RCT of ENP-led care* and the *Unplanned Follow-up Study*.

As all the A&E departments in Scotland were included in each of the two surveys, which examined the extent and nature of ENP services in Scotland, a census was effectively undertaken. Therefore, the results from the surveys are representative of the extent and nature of ENP services in Scotland, at the time of the surveys, and subject to the limitations of survey methodology (see Section 3.3.1). Using the findings from the

surveys, it appears that the research site chosen for the *RCT of ENP-led care* (see Chapter 7) and the *Unplanned Follow-up Study* (see Chapter 8) had many of the characteristics of ENP services throughout the country. ENPs at the research site managed similar injuries to ENPs in other departments. Also, the educational preparation, service deployment, clinical grading, and use of the 'Emergency Nurse Practitioner' title, were similar to many other departments in Scotland, although it should be noted that a wide variation exists across the country. The research site was one of the largest departments in Scotland, which meant sufficient numbers of patients were likely to be seen by the ENPs for the studies.

The patients who attended the research site, had a similar pattern of minor injuries as patients who attend other services. The patients in the *Unplanned Follow-up Study* and the *RCT of ENP-led care* did differ from the general population of Scotland in terms of the deprivation of the areas in which patients lived (see Section 8.2.3). This is likely to have affected the response rates of the postal questionnaires used in both the *RCT of ENP-led care* and the *Unplanned Follow-up Study* (Cohen, 1996). Also, there is evidence that patients from more deprived areas are less healthy (Smith, Bartley and Blane, 1990; Smith, Carroll, Rankin *et al.*, 1992) so may have longer recovery times.

9.11 Study Limitations

9.11.1 The extent and nature of ENP services in Scotland

There are limitations when using self-reporting questionnaires to gather data. For example, although the questionnaires were sent to the nurse-in-charge of each department, there is no way of knowing who completed the questionnaire, and whether they were the most appropriate person with the relevant knowledge. In addition, the answers given may have, subconsciously, presented the department in what may be perceived as a more favourable way (often termed social desirability response bias (Polit and Hungler, 1995)).

In this thesis, the widest definition of an ENP was used. The results have demonstrated that the training and scope of ENPs, in different departments across Scotland varied, sometimes considerably. It is possible that if a different definition had been used, a different picture of ENP services might have been seen. However, the use of a narrower definition of ENPs might have obscured actual clinical practice in many departments. It

must be borne in mind, that to date, the nursing profession is still unable to define exactly what an ENP is or what it should be.

9.11.2 The Documentation Audit Tool

The modified nominal group technique is in many respects a hybrid of the Delphi process (Delbecq *et al.*, 1975) and the nominal group technique as it combines a Delphi-type postal questionnaire round with a nominal group meeting. Separating the rounds reduces the length of time of the nominal group meeting, but introduces the possibility of respondent fatigue developing; a phenomenon more often associated with the Delphi technique than with the nominal group technique (Keeney, Hasson and McKenna, 2001). Respondent fatigue relates to decreasing response rates between rounds, often incurred in methodologies where there are two or more rounds. For the development of the *Documentation Audit Tool* the nominal group technique was specifically chosen as it involved only two rounds. In comparison the Delphi technique typically involves three or more rounds (Powell, 2003).

In the study to develop the *Documentation Audit Tool* (see Chapter 6), eleven experts were invited to join the expert panel. In the first round they were asked to rate 123 items listed in booklets that were posted out to them. Ten of the eleven experts responded to this round. The large number of items to rate may have contributed to one panel member not responding, as they were unable to find the time to complete the booklet before the meeting. The second round was conducted at the nominal group meeting which lasted three hours. If the two rounds had been combined the meeting would have lasted considerably longer, which in itself would have been a source of fatigue and could have led to reduced concentration (Gastil, 1993). Whilst the meeting was three hours long, as it was highly structured and as panel members were provided with food and refreshments during the meeting, fatigue amongst panel members was minimised. Only six of the experts who completed the first round ($n=10$) attended the meeting and completed the second round. This was possibly attributable to the difficulty of getting experts with clinical commitments together at the same time, however it may reflect respondent fatigue as panel members were expected to go through a large number of items.

The validity of the whole process can be affected if response rates between rounds decrease, as consensus amongst the resulting group may not necessarily reflect the

original group's true opinions (Whitman, 1990; Hasson, Keeney and McKenna, 2000), and this would be exacerbated if the group became unbalanced, for example if one contingent of the group has their opinions over-represented (Duffield, 1988). Whilst five members of the original panel discontinued participation during the process, both medical and nurse practitioners were represented at the nominal group meeting.

A limitation of the *Documentation Audit Tool* was that it only measured the completeness of recording essential items of information in relatively broad categories, i.e. minor wounds, limb injuries, etc. It was not sensitive enough to measure whether all the important information was recorded for any individual patient. The tool was also developed around the specific injuries covered in the ENP protocols (Appendix VIIa) at the research site. Whilst they include the types of injuries commonly seen by ENPs across Scotland, the tool does not cover all injuries seen by all ENPs. It also has limited use for non-injuries.

9.11.3 Evaluating ENP services: a randomised controlled trial

In any study where subjects are aware that they are participating in an experimental study there is the possibility that the awareness of observation could alter the way a person behaves. This effect is commonly referred to as 'the Hawthorne effect', a term derived from experimental studies conducted between 1924 and 1932 in the Hawthorne Works Plant of the Western Electric Company in Chicago (Parsons, 1974). These studies were undertaken to investigate whether productivity could be improved by changing workers environmental conditions. They found more light increased productivity, however so did decreasing light. Any change in working conditions led to increased productivity. The researchers concluded that the increase in productivity was in response to the increased attention and the subtle pressure of being observed. However, in the same plant other workers admitted that if they increased their level of productivity they anticipated they would have to work harder in the future for the same pay. Whilst the phenomena of unintentional confounding in experiments on human behaviour exists, it is difficult to know exactly what they are and whether they should be considered in any investigation (Holden, 2001). To complicate matters a meta-analysis of 38 studies exploring 'Hawthorne effects' concluded that "there is no [single] artefact that can be labelled *the Hawthorne effect*" (Adair, Sharpe and Huynh, 1989).

In the *RCT of ENP-led care* (see Section 4.7.12) both the patients and the clinicians under investigation knew they were participating in an experimental research project. This knowledge may have had an effect on measured outcomes, but there was no reason to suspect that this affected one group more than the other. All parties were aware of the research, although it could be argued that the ENPs may have felt under more pressure to perform well as their role was relatively new and nurses had not been independently responsible for discharging patients from the A&E department for very long.

The presence of the researcher, recruiting patients, in the department would have been a constant reminder for the clinicians that they were participating in an experimental study. Any action or decision made by the researcher will inevitably impact on the study being undertaken (Horsburgh, 2003). As the researcher is an integral part of the world which he or she studies complete neutrality and detachment in relation to data collection, analysis and interpretation are impossible (Porter, 1993). It is therefore important that a researcher reflects then identifies and describes their involvement (researcher reflexivity) so that a reader can judge the potential or actual effect a researcher may have had upon the findings. In this study the researcher was known to both the ENPs and the SHOs as an A&E staff nurse. However, the researcher was one of fifty nurses within the department and due to study leave, had not been part of the staff establishment for over a year prior to the trial. It is possible that because the staff in the department knew that the researcher had worked in the department prior to the trial, they may have been reassured that the trial would have been designed in a way to minimise disruption to the department. It is therefore possible that the presence of the researcher may have led to a 'Hawthorne effect', and had an effect on response rates from self-completion questionnaires and other data collection instruments. However, there is no reason to suspect one group may have been affected more than the other.

Self-completion questionnaires do have a number of limitations. The key difficulty often involves the refusal of respondents to complete and/or return the questionnaire (Barker, 1991), leading to a non-response bias if non-responders differ from responders. Subjects may also ask other people to assist in completing the questionnaire, or even ask them to independently complete the questionnaire on their behalf, prejudicing the sample (Barker, 1991). This may have occurred in a sample of patients with minor injuries. For example, where subjects may have injured their dominant hand and be

unable to write without help, or with subjects that in their haste have not brought reading glasses with them to hospital and cannot read the questionnaire properly.

The reading ability of subjects may also account for poor completion or non-response. Whilst very few adults living in the developed world are completely illiterate, approximately 23% of the Scottish population would have difficulty identifying the correct amount of medicine to give a child from the information given on the medicine package (Organisation of Economic Co-operation and Development, 2000). This may, in part, account for a proportion of the non-responders.

Detail on the patient's recovery over a four-week period which was to be collected through the use of the *Patient Diary* developed by Read and George (1994), had to be sacrificed in favour of a shorter *Patient Follow-up Questionnaire*. Unfortunately, it readily became apparent during pre-testing that, despite reminder phone calls, less than a quarter of patients returned completed diaries. This was considerably less than the 82% response rate achieved by Read and George (1994) during the original piloting of their diary. The difference in response rates may in part be related to the number of patients successfully contacted by telephone in the two studies. Read and George (1994) successfully contacted 71% of patients, compared to only 34% of patients contacted during pre-testing of the study described in this thesis. A second possible reason for the poor response rate may be related to the commitment required by patients to complete the diary once a week for four weeks. The modification of the diary into a follow-up questionnaire to be completed at a single point in time one month after attendance increased the response rate two-and-a-half fold, and without a telephone reminder. The trade off was the reduction in data that could be obtained.

In line with several other studies (Daoud, Strickberger, Man *et al.*, 1997; Fazekas, Deisenhammer, Strasser-Fuchs *et al.*, 1997; Jacobson, Greenspan, Spritzler *et al.*, 1997; Spruance, Rea, Yhoming *et al.*, 1997), patients who were randomised, but did not start the intended intervention, were excluded from the final analysis. This was felt unlikely to lead to bias, as the intended effects of the intervention (ENP or SHO-led care) could only occur if an ENP or SHO saw the patient. In fact, if these patients had been included, then the number of missed injuries in the ENP group would have been doubled as one of the patients who was randomised to an ENP, was seen by a middle

grade doctor who failed to notice a minor fracture (see Section 7.6.2). This, of course, does not mean that the ENP would not have missed this fracture too.

The problem of patients being seen by professionals not involved in the trial, could perhaps have been avoided if randomisation occurred immediately before a patient was seen. As the research was being conducted in a 'real-life' situation, it was necessary to randomise a patient whilst they were waiting to be seen, and it was impossible to guarantee that neither the ENP nor SHO would get called away or get caught up with another case. Four of the five patients excluded from the analysis were seen accidentally by more senior medical staff, who were unaware of, or had forgotten about, the study (see Section 7.2.1). A second researcher, observing compliance with randomisation, may have been able to prevent this.

9.11.4 Unplanned follow-up study

Whilst 98% of the attendances included in the *Unplanned Follow-up Study* related to different individuals, a tiny proportion (2%) related to a small number of patients (n=32) who attended the A&E department on two separate occasions within the study period. These patients had different unrelated minor injuries that were suitable for inclusion in the study. Each of these patients had both their attendances included in the study and a questionnaire posted to them four weeks after each attendance. Therefore, they would have received a questionnaire relating to each injury. As the reply envelope was bar-coded for a specific attendance, the information from the questionnaire was matched with that attendance. Six returned questionnaires related to each of their attendances, eleven returned one questionnaire, and the remainder did not respond. As the questionnaire could only be matched to a specific visit through the bar code, it may have been difficult for the patient to know to which attendance the questions applied. If the cover letter had specified which attendance and injury the questionnaire related to, this might have helped prevent this problem. However, the search of the study database for double entries identified that this was a potential problem which affected less than 2% of the attendances and around 1.6% of the returned questionnaires, and was felt unlikely to seriously bias the results of the study. Similarly, a small number of patients (n=5) were found from their questionnaire responses and subsequent searching of their A&E records, to have been entered into the study (as their first attendance), when in fact they were re-attending the department in connection with a previous injury. This problem related to only 0.3% of returned questionnaires and again was felt unlikely to

seriously bias results. Tighter inclusion criteria and a search through previous A&E computerised records may have prevented this problem.

Care must be taken when comparing the results, on unplanned follow-up, identified in the *Unplanned Follow-up Study* and the *RCT of ENP-led care*. Although the same inclusion criteria were used in the *Unplanned Follow-up Study* as were used in the *RCT of ENP-led care*, the patient groups were slightly different. This occurred for a number of reasons. Firstly, patients were selected retrospectively instead of prospectively (as had been the case in the RCT). The selection of patients retrospectively allowed those with definite minor injuries to be selected. Patients selected prospectively, may initially appear to present with a minor condition that later may prove more serious, conversely, some patients may present a more serious injury, which may after appropriate examination and investigations, proves not to be. Secondly, patients who required admission were not included in the *Unplanned Follow-up Study*. In the *RCT of ENP-led care* 2% of ENP patients were admitted for urgent specialist treatment. Therefore the patients in the *Unplanned Follow-up Study* were more likely to have less serious minor injuries. Finally, the *Unplanned Follow-up Study* recruited patients who attended the department at anytime of the day or night, whereas the *RCT of ENP-led care* only recruited patients during the day. Notably, different patterns of injury and types of patient are seen in A&E during the day and at night, with more serious injuries and male patients being seen at night (Downing, 2003).

In both the *RCT of ENP-led care* and the *Unplanned Follow-up Study*, children under 16 years of age were not included (this was partly for ethical reasons, e.g. the difficulty in obtaining parental permission to contact the child prior to distributing a postal questionnaires). Therefore, the percentage of patients included in these studies represents a smaller proportion of patients than ENPs could have managed.

As with any questionnaire there is the problem related to how people interpret the questions (see Section 3.6.1). With expected follow-up patterns being different for different injuries, it was difficult to develop a questionnaire which could accurately collect follow-up information from patients, be short enough to encourage patients to complete, but contain sufficient detail to draw meaningful conclusions. Not having a specific box for patients to tick if they 'returned to a clinic earlier than expected' caused some confusion during the analysis stage (see Section 8.4.8). Rather than complete the

‘other, please specify’ box, patients appeared to tick the nearest relevant box i.e. ‘Glasgow Royal Infirmary A&E department’. This was a problem that had not been anticipated and had not occurred during pre-testing and piloting. Triangulating the results of the postal questionnaires with the results from monitoring returns, enabled this problem to be identified and minimised. The addition of this extra question would improve the questionnaire for future use.

Finally, actual unplanned follow-up may be slightly different from that reported as just under half of the patients in the study responded. Also responders were more likely to be female (a greater proportion of unplanned follow-up was found to be reported by female patients).

9.12 Recommendations for Further Research

The research conducted as part of this thesis has highlighted the fact that ENP services are very varied and that evaluating outcomes associated with minor injuries is not necessarily straightforward, but is worthwhile. There are several areas worthy of further investigation. Future research should: examine ENPs working in smaller, more rural A&E departments; compare ENPs with other existing providers of minor injury care including GPs; and, ideally conduct a multi-centre randomised trial comparing ENP-led care and medical staff-led care (including SHOs, middle graders and GPs). Different models of ENP service delivery (see Section 5.4) and scope of practice, could be examined for their efficiency and effectiveness. For example, what are the advantages and disadvantages to each type of ENP service delivery (dedicated, rotational or integrated)? Which is most suited to providing an efficient service and what is required to ensure ENPs are able to maintain their competence in all their areas of practice? What configuration of ENPs and other nursing staff provide the most efficient staffing in different types of department, and what impact does the ENP role have on other nursing staff?

Further work should be done on identifying adverse events including missed injuries with A&E patients. These findings could then be used to inform the development of information technology systems to identify and provide earlier intervention for these patients. Future research could also explore ways of reducing unplanned follow-up in minor injury patients. For example, by examining how unplanned follow-up is affected when patients are provided, at their initial visit, with more information on what to

expect during their recovery, and how to look after their healing injuries. Other lines worthy of investigation might include: examining the effect, on unplanned follow-up, of issuing medical certificates for work by A&E; and, examining ways of identifying patients at particular 'risk' of seeking unplanned follow-up. This is because one of the reasons patients seek unplanned follow-up is for a GP to issue them with a medical certificate for work, and there may be other groups of patients, perhaps with specific injuries, who are at 'higher risk' of requiring unplanned follow-up, who could be identified. This would allow ways of reducing their need for unplanned follow-up to be explored.

9.13 Implications for Professional Practice

The findings from this programme of research have several implications for future practice. Firstly, A&E departments which introduce ENPs or expand the role should ensure they have systems in place to properly evaluate practice. Secondly, the tools developed or utilised in this programme of research may be useful to individual departments to evaluate their own service, or in a future multi-centre trial, to compare ENP-led care with medical staff-led care. Thirdly, the findings from evaluations of ENP-led care should be carefully interpreted to judge whether they are applicable to: 1) a different type of department; 2) ENPs with a different training; or, 3) a different scope of practice. Fourthly, departments should ensure they have robust systems in place to detect and monitor the nature of re-attendance to a department. These patients should be seen by senior clinicians as they have a higher incidence of having a 'missed injury', than patients who do not re-attend. Finally, any evaluation of ENP-led care should be sufficiently large to detect the small number of adverse events associated with the management of minor injuries.

Findings from the surveys reported in Chapter 5, show that ENPs are being rapidly introduced into A&E departments. Not only is there a need for standardisation of educational preparation for the ENP role, but departments should ensure that services are properly evaluated and that systems should be put in place to continually audit practice. Already, a number of departments in Scotland have begun to use the *Documentation Audit Tool* in local evaluations. NHS Education for Scotland are in the process of developing competencies (Cooper *et al.*, 2003) based on different levels of ENP practice as a direct result of the two surveys (reported in Chapter 5) which indicated that different levels of ENP practice already exist in Scotland.

9.14 Full Circle

This programme of research began with the recognition that the ENP role was a new and developing role, with little empirical evidence to support the role's rapid introduction into A&E departments across the UK. The work in this thesis examined, for the first time, the extent and nature of these services in all A&E departments across Scotland. It developed an instrument sensitive enough to measure the difference in quality of ENP and SHO documentation, undertook the first RCT of ENP-led care in Scotland, and explored the extent and nature of unplanned follow-up in minor injury patients.

The findings reveal that: 1) the role of the ENP is very varied across different A&E departments in Scotland; 2) that ENPs' clinical documentation is of a higher quality than that of SHOs'; 3) that patients reported higher levels of satisfaction in relation to the provided ENP-led care; and 4) that the level of adverse events related to minor injury management are very low. During the time the research in this thesis was being conducted, the Northern General Hospital trial (Sakr *et al.*, 1999) was published. The findings from the *RCT of ENP-led care*, support the conclusion from this larger trial, which stated 'that properly trained ENPs can provide care for patients with minor injuries to a standard equal, or in some ways better, than that provided by junior doctors'.

The findings from both the *RCT of ENP-led care* and the *Unplanned Follow-up Study* also show that unplanned follow-up is a useful outcome to measure, as unplanned re-attendance at A&E is often associated with problems related to treatment and missed injuries. Several factors appear to be related to unplanned follow-up, including information relating to both care of injuries and what to expect during healing. Some of these factors could be improved which, in turn, may reduce the number of patients who seek additional unplanned follow-up visits.

As the role of the ENP develops it is essential that further evaluations are undertaken to ensure that the care delivered is safe and effective. Instruments and methods described in this thesis could be used in future evaluations. Further work is required to explore the differences in care provided by nurse practitioners and physicians.

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Appendix I. Literature search strategies

a Medline search strategy

b CINAHL search strategy

c EMBASE search strategy

d British Nursing Index search strategy

e Evidence Based Medicine search strategy

The following literature search strategies were developed with the assistance of a medial librarian and were designed to capture as much of the relevant literature as possible. Results from the five searches were combined, duplicates deleted and citations reviewed manually (primarily by title, then secondly by abstract). Relevant papers were retrieved; their reference lists searched and further papers identified. Ad hoc searches were also done regularly using the internet search engine Google and the National Research Register.

The specific search strategies for each of the on-line electronic bibliographic databases searched are detailed below:

Appendix Ia: MEDLINE Search strategy

MEDLINE

<1966 to January Week 3 2003>

-
1. exp Nurse Practitioners/
 2. exp Nurse Clinicians/
 3. (((expanded or extended or advanced or expert or specialist) adj5 (nurs\$ adj2 practi\$)) or (emergency adj3 nurse practi\$)).mp. [mp=title, abstract, registry number word, mesh subject heading]
 4. or/1-3
 5. exp Research/
 6. 4 and 5
 7. limit 6 to animal
 8. 6 not 7
 9. limit 8 to english language

Appendix Ib: CINAHL Search strategy

CINAHL

<1982 to December Week 2 2002>

-
1. advanced practice nurses/ or exp nurse practitioners/
 2. advanced nursing practice/ or scope of nursing practice/
 3. (((expanded or extended or advanced or expert or specialist) adj5 (nurs\$ adj2 practi\$)) or (emergency adj3 nurse practi\$)).mp. [mp=title, cinahl subject heading, abstract, instrumentation]
 4. or/1-3
 5. limit 4 to audiovisual
 6. limit 4 to brief item
 7. limit 4 to (care plan or cartoon)
 8. limit 4 to (ceu or chat groups or commercial website or computer program or consumer patient teaching materials or directories or equations & formulas or exam questions or forms or games or glossary or individual testimonial website or information website or journal description or listservs or obituary or pamphlet or pamphlet chapter or pictorial or poetry or software or teaching materials or tracings or website)
 9. 4 not (5 or 6 or 7 or 8)
 10. limit 9 to (alternative complementary therapy journals or "computer and information science journals" or consumer health journals)
 11. 9 not 10
 12. limit 11 to research
 13. exp RESEARCH/
 14. 11 and 13
 15. 12 or 14
 16. 15 and (*advanced practice nurses/ or exp *nurse practitioners/ or (*advanced nursing practice/ or *scope of nursing practice/))

Appendix Ic: EMBASE Search strategy

EMBASE
<1980 to 2003 Week 04>

1. nurse practitioner/
 2. (((expanded or extended or advanced or expert or specialist) adj5 (nurs\$ adj2 practi\$)) or (emergency adj3 nurse practi\$)).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
 3. 1 or 2
 4. limit 3 to english language
 5. limit 4 to human
 6. 5 and *nurse practitioner/
-

Appendix Id: British Nursing Index (BNI) Search strategy

British Nursing Index (BNI)
<1994 to November 2002>

1. (((expanded or extended or advanced or expert or specialist) and (nurs\$ and practi\$)) or (emergency and nurse practi\$)).mp. [mp=heading words, title]
-

Appendix Ie: Evidence Based Medicine Databases Search strategy

Cochrane Database, ACP Journal Club, DARE, CCTR

1. (((expanded or expert or advanced or extended or specialist) adj5 (nurs\$ adj3 practic\$)) or (emergency adj3 nurse practic\$)).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
2. from 1 keep 4, 7, 12, 15, 22, 24...

Appendix II. Ethical approval

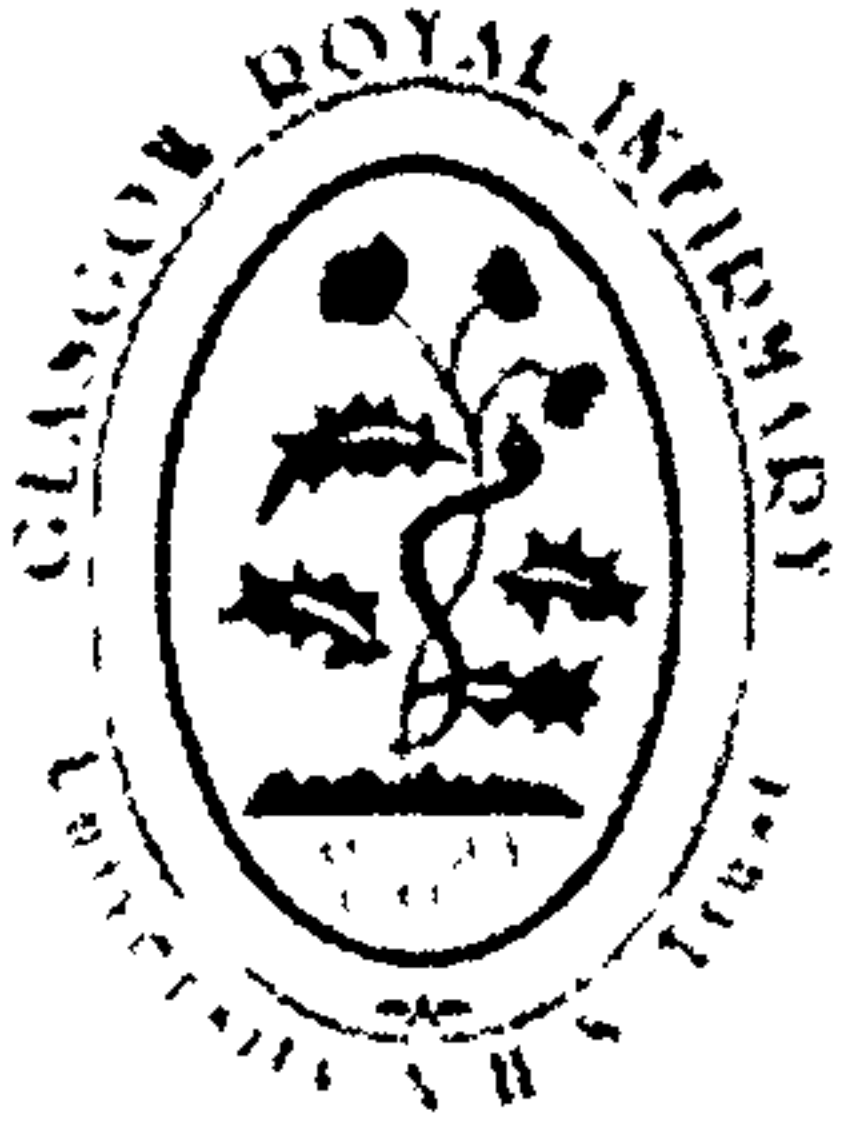
a Ethical Approval – RCT of ENP-led care

b RCT consent form

c RCT Patient Information Leaflet

d Ethical Approval – Unplanned follow-up study

e Cover letters for Unplanned follow-up study questionnaire



Please reply to -
 Dr E O Pomphrey, R&D Manager
 Trust Research Office, 4th Floor
 10 Alexandra Parade, Royal Infirmary
 Glasgow G3 7ER

Royal Infirmary
 84 Castle Street
 Glasgow G4 0SF

Switchboard	0141 211 4000
Direct Dial	0141 211 4587
Fax Number	0141 553 2558

• Glasgow Royal Infirmary •
 • Glasgow Royal Maternity Hospital •
 • Victoria Hospital •
 • Leithburn Hospital • Belvedere Hospital •

9th of February 1998

Mr Mark A. Cooper
 Accident & Emergency
 GRI

Dear Mr Cooper

PROJECT APPROVAL : Project no. 97AC009
(Please quote on all correspondence)

A randomised controlled clinical trial of the assessment and treatment of patients, with minor injuries, by the emergency nurse practitioner: a pilot study

I am pleased to inform you that the above project has received both ethical and financial approval and may now proceed.

I have recorded the start date for this project as 1st of February 1998. If this is not now correct I would be grateful if you would let me know when this project will start. Approval is subject to the submission of progress reports throughout the lifetime of the project and this date will be used to time appropriately requests for such reports.

The project must commence within two years of the date of this letter. After that time, approval will be deemed to have lapsed and the project will require to be resubmitted. Please ensure that the relevant senior nursing staff are fully informed before the study begins.

With all good wishes for the success of this research initiative.

Yours sincerely

E O Pomphrey

Dr E O Pomphrey
 Research and Development Manager

c.c. Mr. Ian Swann, Consultant, Accident & Emergency, GRI

Royal Infirmary
84 Castle Street
Glasgow G4 08F

Switchboard: 0141 211 4000
Direct Dial:
Fax Number:



Accident & Emergency Minor Injuries Project

Patient Consent Form

I,consent to participating in the Accident & Emergency minor Injuries Project at Glasgow Royal Infirmary. I have received information on the project and I am willing to be allocated to either a nurse practitioner or a casualty doctor for assessment and treatment of my injury. I understand that, if I am seen by a nurse practitioner, I will be referred to a doctor if the nurse practitioner thinks this is advisable. I am also willing for the research nurse to contact me at home, if necessary, to monitor my progress towards recovery. I also have no objection to completing the two short questionnaires (which I have been shown).

I understand that my participation in this project is entirely voluntary and that I may at any time stop taking part in the project, if I so wish. If I do withdraw from the project I understand that the care that I am presently receiving will not be affected in any way.

Signed.....

Date.....

.....
Signature of research nurse

Thank you

A&E label



accredited by the
Health Quality Service



**Glasgow Royal Infirmary
University NHS Trust
&
Nursing & Midwifery School
University of Glasgow**



Accident & Emergency minor injuries project

Patient Information Leaflet

We would like to invite you to participate in a special project looking at the care of minor injuries. This project is being conducted by one of our staff nurses in conjunction with Glasgow University and the Glasgow Royal Infirmary. Your participation in this project is entirely voluntary.

What would I have to do if I take part in the project?

We would like to allocate you to see either an emergency nurse practitioner or a doctor to treat your injury. We would also like you to complete a short questionnaire before you leave the department today and lastly to complete another very short questionnaire in one month's time which we will post out to you with a reply paid envelope in which to return it.

What is an emergency nurse practitioner?

An emergency nurse practitioner is a very experienced Accident and Emergency nurse who has done further training to be able to treat minor injuries. Emergency nurse practitioners have been treating patients for last two years in this department and have seen over 3,500 patients. Emergency nurse practitioners also work in many other A&E departments throughout the UK.

Who will I be seen by?

If you are willing to take part in the project, you will either be seen and treated by an emergency nurse practitioner or an A&E doctor. If you are seen by the emergency nurse practitioner, you will only see a doctor if the nurse practitioner thinks this is advisable. If you are referred to a clinic, as part of your normal treatment, then it will be a doctor who will see you at the clinic; and if you have an x-ray taken a doctor will see your x-rays. You can, of course, ask to see a doctor at any time if you are unhappy.

Why is this project important?

Very little research has been conducted looking at the care of minor injuries. At the Royal Infirmary we are committed to reviewing all our services and seeing how we can improve them - we can't do this without your help. This is one of the first pieces of research like this looking at minor injuries in the UK. Any benefits this project may identify, might not benefit you now, but may benefit other patients in the future.

Who is funding this project?

This project is funded by the Chief Scientist Office, Scottish Office and Glasgow Royal Infirmary. The project will be conducted by an A&E research nurse (Mark Cooper) based at the department of Nursing & Midwifery, University of Glasgow.

If I need more information, where can I get it?

The research nurse will be in the A&E department the whole time you are here. If you want to ask any more questions please feel free to ask for him in the A&E department or you can call him at Glasgow University on 0141 330 3249



RESEARCH ETHICS COMMITTEE

4th floor, 10 Alexandra Parade
Royal Infirmary
GLASGOW G31 2ER

Chairman: Mr Colin Buck
Secretary: Mr Iain Douglas
Administrator: Miss Sharon Robertson

Royal Infirmary
16 Alexandra Parade
Glasgow G31 2ER

Switchboard: 0141 211 4000
Direct Dial: 0141 211 4020
Fax Number: 0141 553 2558
Email: sharon.robertson@northglasgow.scot.nhs.uk
Website: www.griresearch.co.uk

Mr M A Cooper
Department of Accident & Emergency
Glasgow Royal Infirmary

1st September 2000

Dear Mr Cooper,

Submission: Exploring unplanned follow-up consultations following attendance to an A & E department with a minor injury.
Project number: 00NR002 (Please quote)

I am pleased to advise you that the Research Ethics Committee have now approved this project, the Patient Information Sheet & Consent Form and the Patient Follow-up Questionnaire. Approval is granted subject to the following conditions:

- The study must start within two years of the date of this letter. After that time approval will be deemed to have lapsed and the project will require to be resubmitted.
- A short "Progress Report" questionnaire will be forwarded to you every 6 months until project completion. As well as being an ICH GCP requirement, this information will contribute to the Annual Report for the Scottish Office and therefore these forms must be completed. Failure to return reports within a reasonable time may result in future projects being held up for processing. A final summary report should also be sent to the Committee upon the completion of the project.
- Changes to the protocol must not be initiated until written Committee approval is given, except when necessary to eliminate immediate hazards to subjects. You should also promptly report any changes increasing the risk to subjects and all serious and unexpected adverse drug reactions. These should be sent to the Administrator at the address above, stating the project number of the study. Drug company funded trials will be charged an administrative fee of £50 +VAT.
- The approval contained in this letter is valid for all sites that form part of the North Glasgow Trust. However, the person responsible for the research on any other site must notify their local Ethics Committee in writing to ensure that they have no local objections to the study. They should list the names, titles and addresses of all collaborating researchers and enclose a copy of this letter.

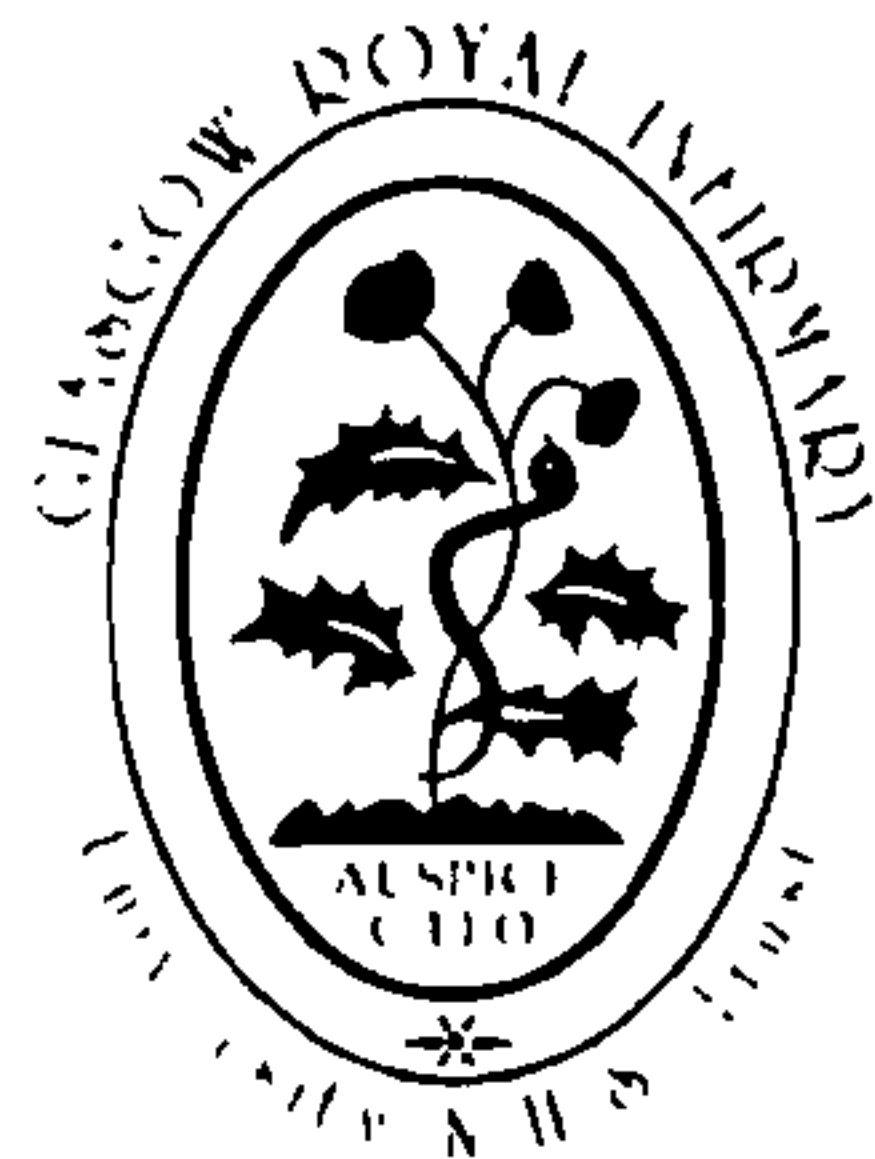
This Committee conforms to and abides by the ICH Guideline for Good Clinical Practice.

Yours sincerely

Iain Douglas
Secretary



accredited by the
Health Quality Service



Accident & Emergency

Royal Infirmary
84 Castle Street
Glasgow G4 0SF

Switchboard: 0141 211 4000
Direct Dial: 0141 211 0558
Fax Number:

- Glasgow Royal Infirmary •
- Glasgow Royal Maternity Hospital •
- Camiesburn Hospital •
- Lightburn Hospital •

«Forename» «Surname»
«Address_line_1»
«Address_line_2»
«Address_line_3»
«Address_line_4»
«Postcode»

«Date_to_send»

Dear «Forename» «Surname»
A&E Department - Patient Survey

Just over one month ago you attended the Accident & Emergency department at Glasgow Royal Infirmary for the treatment of a minor injury. I am writing to you to ask whether you would be kind enough to complete a very short questionnaire on any follow-up care you have received over the last month. The questionnaire contains 15 short questions, which nearly all require a tick in the appropriate box. I expect that it will only take you 4 to 5 minutes to complete. If, for any reason, you find it difficult to read or fill in the questionnaire please ask a friend or family member help you. A reply-paid envelope is enclosed and I would appreciate it if you could complete and return the questionnaire as soon as possible.

The idea behind the survey is to examine how much follow-up care patients with minor injuries require, and where that follow-up care is sought. Many patients with relatively straightforward minor injuries don't require any type of follow-up, however we appreciate that some patients do require further appointments. Sometimes these appointments are made for hospital follow-up clinics and sometimes patients are asked to make an appointment with their own GP or practice nurse. There is also a proportion of patients the department does not expect will require any follow-up, but for various reasons they need to seek further advice following their attendance in A&E. The questionnaire explores all of these. The results from the survey will help us to develop the service we provide to patients with minor injuries.

Any information you do provide, as part of this survey will be treated in the strictest of confidence. This survey is part of a larger project we have been conducting over the last two years, examining our provision of care for patients with minor injuries. The support for this work from our patients has been tremendous and has helped us to improve and develop the service that we deliver. Each questionnaire helps us get a clearer view of how we have performed in our aim to provide the best service we can. Hence your help with this work is greatly appreciated. Thank you for your valuable time.

Yours sincerely,

Mark A. Cooper
A&E Researcher-Practitioner



Appendix III. Survey instruments

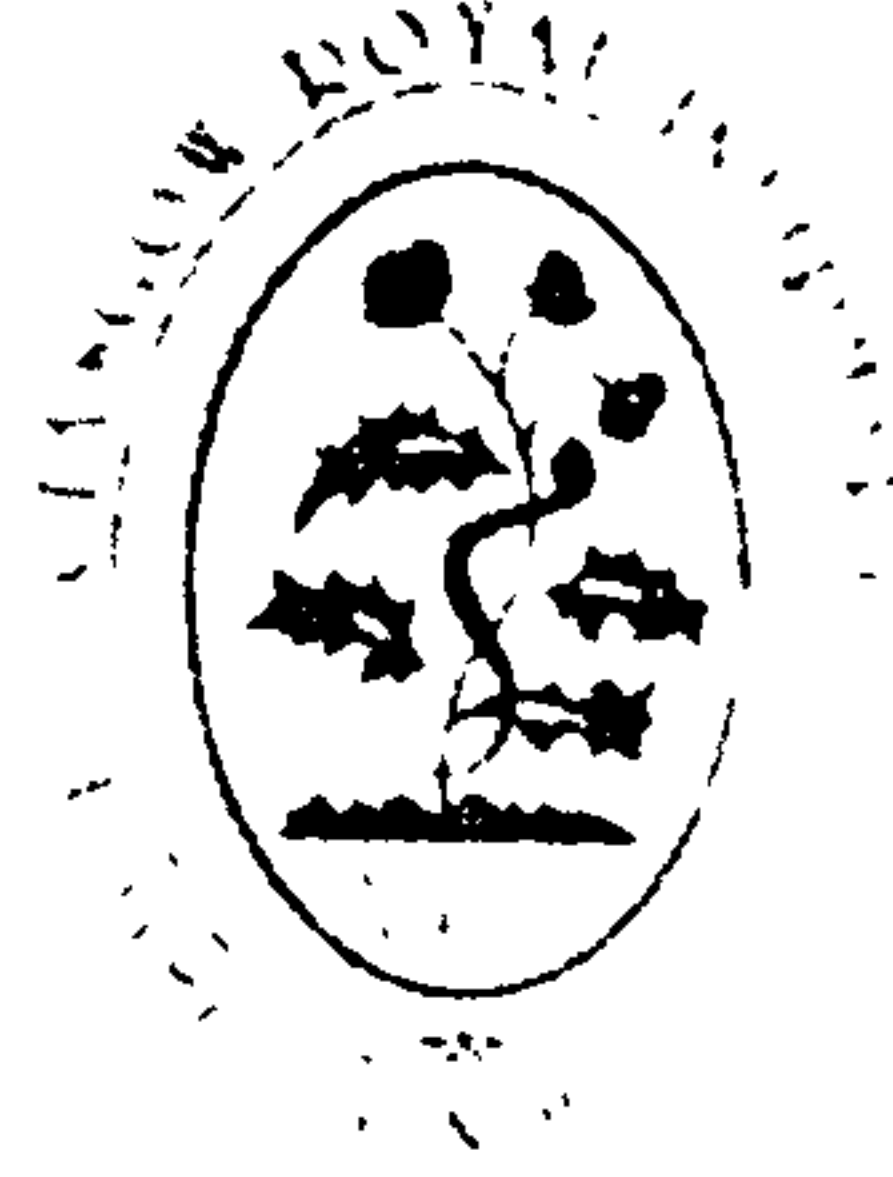
a 1998 ENP survey questionnaire

b 2001 ENP survey questionnaire

PAGE
NUMBERING
AS ORIGINAL



UNIVERSITY
of
GLASGOW



The extent and nature of Emergency Nurse Practitioner services in Scotland

For the purposes of this questionnaire an 'nurse practitioner in A&E' is defined as:

"a nurse who is authorised to assess and treat patients attending an accident and emergency department, either as an alternative to the patient being seen by a doctor, or in the absence of a doctor in a department where a continuous medical presence is not maintained. Some nurses function as nurse practitioners without actually holding the title"

Read, Jones & Williams (1992)

Mark A. Cooper
CSO Research Training Fellow
University of Glasgow

Stewart Hair
A&E Staff Nurse
Glasgow Royal Infirmary

Please return by Monday 3rd August 1998

Thank you

Q1 Which of the following *best* describes your A&E department?

Inner City Hospital A&E department ☐ District General Hospital A&E department ☐
Minor (e.g. GP unit, Minor injuries unit) ☐ Specialist Paediatric A&E Department ☐

Q2 Do you have nurses who function as nurse practitioners working in the department? (see definition on front page)

Yes ☐
No ☐

If you answered **no** please go to question 14 ←

Q3 Do you use a formal title to describe your nurse practitioners?

Yes ☐
No ☐

What is this title?

.....

Q4 How many nurse practitioners in total do you have employed in the department?

a) by F.T.E. (Full time equivalent) ☐☐

b) by number of staff ☐☐

Q5 When did your first nurse practitioner(s) start working in the department?

Month ☐☐ Year 19☐☐

Q6 What specific preparation for practice have each of your nurse practitioners had?

(Each column is one individual nurse practitioner - please tick the appropriate boxes for each ENP)

Nurse practitioner	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
No formal training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On the job training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In-house course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A 'recognised' ENP COURSE (e.g. Southend, Derbyshire Royal Infirmary etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RCN nurse practitioner diploma/degree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other training (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....										
Other training (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....										
Other training (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....										

Q7 Does your department have written protocols or guidelines for the nurse practitioners to work to?

Yes ☐
No ☐

Q8 Please list the types of condition/problem the nurse practitioners in your department commonly treat
(if you wish, you may attach a list of the types of conditions or a list of your protocols rather than filling out the boxes below)

1.	9.	17.
2.	10.	18.
3.	11.	19.
4.	12.	20.
5.	13.	21.
6.	14.	22.
7.	15.	23.
8.	16.	24.

Q9 Are your nurse practitioners able to request any x-rays?

Yes ☐
No ☐

If yes, are they also able to interpret any x-rays without reference to a doctor?

Yes ☐
No ☐

Q10 What clinical grade are your nurse practitioners on?
*(please write the **NUMBER** of nurse practitioners **on each grade** in the appropriate box)*

For example - F

C

D

E

F

G

H

I

Q11 *Approximately*, how many patients *on average* **per month** do your nurse practitioners see?

Additional comments

Q12 What do you consider are the main benefits that your nurse practitioners have brought to your department?
(please list any benefits and comments in this space - please continue on a separate piece of paper if necessary)

Q13 What do you consider are the main disadvantages that your nurse practitioners have brought to your department?
(please list any disadvantages and comments in this space - please continue on a separate piece of paper if necessary)

If you do not have nurse practitioners at present working in your department

Q14 Is your department considering introducing the role of the nurse practitioner in the foreseeable future?
(please tick the appropriate box)

- Yes, definite plans are being made for their introduction before the end of 1998 ☐
Yes, definite plans are being made for their introduction, but not for this year ☐
Possibly, there has been some discussions about their introduction ☐
No, there are no plans are present to introduce nurse practitioners ☐

Thank you for your time completing this questionnaire.

Please use the reply-paid envelope to return the questionnaire to:
Mark A. Cooper, Research Training Fellow, A&E Department,
Glasgow Royal Infirmary, 84 Castle Street, Glasgow G4 0SF

If you would like a copy of the results of this survey please tick this box ☐

*If you have any comments you would like to add about the questionnaire or to clarify any of the questions you have answered please write them below
(or on a separate piece of paper).*

*The extent and nature of
Emergency Nurse Practitioner
services in Scotland 2001*

Questionnaire

Please return by 16 July 2001

Mark A. Cooper
A & E Lecturer/Practitioner
North Glasgow University
Hospitals NHS Trust

Sarah Haggerty
Undergraduate Nursing Student/
Research Assistant
University of Michigan--Flint/NRIS

For the purpose of this questionnaire a 'nurse practitioner in A&E' or Emergency Nurse Practitioner (ENP) is defined as:

"a nurse who is authorised to assess and treat patients attending an accident and emergency department, either as an alternative to the patient being seen by a doctor, or in the absence of a doctor in a department where a continuous medical presence is not maintained. Some nurses function as nurse practitioners without actually holding the title."

Read, Jones, & Williams (1992)

For the purpose of this questionnaire a 'student nurse practitioner' is defined as:

A nurse in training to be a nurse practitioner, or a nurse practitioner that is not yet authorised to practice independently.

*Please tick the answer(s) to the questions which best describe your department.
Please feel free to add comments or further explanations next to any question.*

SECTION A: YOUR DEPARTMENT

Q1 Which of the following **best** describes your A&E department?

- | | |
|---|--|
| <input type="checkbox"/> ¹ Inner City Hospital A&E department | <input type="checkbox"/> ³ District General Hospital A&E department |
| <input type="checkbox"/> ² Minor (e.g. GP unit, Minor injuries unit) | <input type="checkbox"/> ⁴ Specialist Paediatric A&E Department |

Q2 Does your department receive 999 (blue light) ambulances on a routine basis?

- ☐¹ No
☐² Yes
☐³ Very occasionally

Q3 When is your department open?

a. 24 hours a day

☐¹ No

☐² Yes

b. 7 days a week

☐¹ No

☐² Yes

Q4 Who has overall managerial responsibility for your department?

☐¹ Community NHS Trust

☐² Acute Hospital NHS Trust

☐³ Primary Care (e.g. GP Practice)

☐⁴ Other (please specify) _____

Q5 Who is the lead clinician in your **department**?

☐¹ A&E consultant

☐² Other A&E doctor

☐³ GP

☐⁴ Senior ENP

☐⁵ Other (please specify) _____

Q6 Does your department have ALS (Advanced Life Support) facilities (e.g. defibrillator, ALS drugs, intubation equipment and ALS trained staff) available during all its opening hours)?

☐¹ No

☐² No, but available on-site

☐³ Yes

☐⁴ Don't know

Further comments/explanation _____

Q7 What x-ray facilities do you have access to?

☐¹ On-site x-ray service – always available

☐² On-site x-ray service – available at specific times (e.g. office hours)

☐³ Off-site facilities

Q8 Who is responsible for interpreting x-rays *at the time the patient presents?* (Tick **all** that apply)

- ☐¹ GP
☐² Radiologist
☐³ A&E medical staff
☐⁴ ENP
☐⁵ Radiographers
☐⁶ Telelink to another site
☐⁷ Other (please specify) _____

Q9 Does your department have telemedicine facilities

- ☐¹ No
☐² No, but links planned
☐³ Yes

(Q9a) *If yes,*

- ☐¹ To another site
☐² From another site

Q10 Are the **nursing staff** in your department

- ☐¹ Only A&E, i.e. based permanently in A&E
☐² Available from the wards
☐³ Rotate with the wards (most time spent on the wards)
☐⁴ Rotate from A&E (most time spent in A&E)
☐⁵ Other arrangement (please describe) _____

SECTION B: NURSE PRACTITIONERS

Q11 Do you have nurses who function as nurse practitioners working in the department? (See ENP definition on front page)

- ☐¹ No
☐² Yes

*If you answer **NO** please go to question 29 (please see last page)*

Q12 Do you use a formal title to describe your nurse practitioners?

- ☐¹ No
☐² Yes

(Q12a) *If yes, what is this title?* _____

Q13a How many nurse practitioners in total do you have employed in the department? *Include all nurses who regularly work as ENPs in your department. Exclude student ENPs (See definition of student ENP on front page)*

a) By F.T.E. (Full time equivalent)

b) By number of staff

Q13b How many student nurse practitioners do you have in the department? (See Student Nurse Practitioner definition on front page)

a) By number of staff

Q14 Which of the following operational models **most closely relates** to your ENP service?

☐¹ **Dedicated role** (nurses only work as ENPs)

☐² **Rotational role** (Nurses work as ENPs on some shifts; on other shifts work as a staff/charge nurse)

☐³ **Integrated role** (ENP role combined with nursing duties; works as an ENP on an *ad hoc basis*)

Q15 Do your nurse practitioners work in *any other areas* of the hospital in *any nursing capacity* on a regular basis?

☐¹ No

☐² Yes

(Q15a) If **yes**, please tick **all** that apply

☐¹ General wards

☐² Theatre

☐³ Specific A&E ward

☐⁴ ITU

☐⁵ HDU

☐⁶ A&E follow-up clinic

☐⁷ Out patient clinics

Q16 What clinical grade are your nurse practitioners on? (**Exclude student ENPs**) (Please write the **NUMBER** of nurse practitioners **on each grade** in the appropriate box)

For example - F

C

D

E

F

G

H

I

Q17 Does your department have written protocols or guidelines for the nurse practitioners to work to?

☐¹ No

☐² Yes

Q18 What age ranges do you ENPs **commonly** treat?

(Tick **all** that apply)

- ☐¹ Adults (16yr. and over)
☐² Adolescents (13-15yr.)
☐³ Children (5-12 yr.)
☐⁴ Infants (1-4 yr.)
☐⁵ Babies (less than 1 yr.)
☐⁶ No specific age limit set

Q19 Are your nurse practitioners able to request any x-rays?

- ☐¹ No
☐² Yes

(Q19a) *If yes, are they also able to interpret any x-rays without reference to a doctor?*

- ☐¹ No
☐² Yes

Q20a What types of injury/condition(s) do your ENPs commonly treat.

(Tick **all** that apply)

- | | |
|--|--|
| <input type="checkbox"/> ¹ Minor head injuries | <input type="checkbox"/> ¹⁶ Treatment of insect bites |
| <input type="checkbox"/> ² Removal of superficial foreign bodies from eye | <input type="checkbox"/> ¹⁷ Treatment of animal bites |
| <input type="checkbox"/> ³ Flash burns to the eye | <input type="checkbox"/> ¹⁸ Treatment of human bites |
| <input type="checkbox"/> ⁴ Treatment of mild headaches | <input type="checkbox"/> ¹⁹ Treatment of subungual haematomas |
| <input type="checkbox"/> ⁵ Treatment of migraines | <input type="checkbox"/> ²⁰ Injuries to hand |
| <input type="checkbox"/> ⁶ Needlestick injuries | <input type="checkbox"/> ²¹ Injuries to the wrist & forearm |
| <input type="checkbox"/> ⁷ Removal of foreign bodies from the ear canal | <input type="checkbox"/> ²² Injuries to the elbow |
| <input type="checkbox"/> ⁸ Removal of foreign bodies from nose | <input type="checkbox"/> ²³ Injuries to the shoulder |
| <input type="checkbox"/> ⁹ Closure of uncomplicated wounds with streistrips | <input type="checkbox"/> ²⁴ Injuries to the clavicle |
| <input type="checkbox"/> ¹⁰ Closure of uncomplicated wounds with tissue adhesives | <input type="checkbox"/> ²⁵ Minor neck injuries (e.g. whiplash) |
| <input type="checkbox"/> ¹¹ Closure of uncomplicated wounds with sutures | <input type="checkbox"/> ²⁶ Injuries to the foot and ankle |
| <input type="checkbox"/> ¹² Closure of uncomplicated wounds with staples | <input type="checkbox"/> ²⁷ Injuries to the knee |
| <input type="checkbox"/> ¹³ Treatment of small area superficial burns | <input type="checkbox"/> ²⁸ Injuries to the hip |
| <input type="checkbox"/> ¹⁴ Treatment of small area partial thickness burns | <input type="checkbox"/> ²⁹ Lower back pain |
| <input type="checkbox"/> ¹⁵ Pulled elbows in young children | <input type="checkbox"/> ³⁰ Fast-tracking fractured neck of femur |

(Q20a1)

Others (please specify) *Attach separate sheet if you require additional space*

1. _____
 2. _____
 3. _____
 4. _____
 5. _____

6. _____
 7. _____
 8. _____
 9. _____
 10. _____

Q20b What medications can your nurse practitioners supply independently to patient? *(Tick all that apply)*

Analgesia

- ☐¹ Paracetamol
☐² Co-codamol
☐² Distalgesic
☐⁴ Ibuprofen
☐⁵ Other(s)_____

Antibiotics

- ☐⁶ Penicillin
☐⁷ Amoxicillin
☐⁸ Flucloxicillin
☐⁹ Augmentin
☐¹⁰ Metronidazole
☐¹¹ Other(s)_____

Others

- ☐¹² Tetanus immunisation
☐¹³ Tetanus immunoglobulin (HATI)
☐¹⁴ Morning after pill
☐¹⁵ Other(s)_____

Q21 What is the **minimum** level of training any one of your independently practising ENPs has had? (Do not include Student ENPs) *(Tick only one box)*

- ☐¹ No formal training
☐² On the job training
☐³ In house training
☐⁴ University accredited Nurse Practitioner course *(please specify)*_____
☐⁵ RCN nurse practitioner diploma/degree
☐⁶ Nurse Practitioner Masters degree *(please specify)*_____
☐⁷ Other *(please specify)*_____

Q22 What level of training have the **majority** of your independently practising ENPs had? *(Tick only one box)*

- ☐¹ No formal training
☐² On the job training
☐³ In house training
☐⁴ University accredited Nurse Practitioner course *(please specify)*_____
☐⁵ RCN nurse practitioner diploma/degree
☐⁶ Nurse Practitioner Masters degree *(please specify)*_____
☐⁷ Other *(please specify)*_____

Q23 What is the **highest** level of specific ENP training any one of your ENPs have undertaken? *(Tick only one box)*

- ☐¹ No formal training
☐² On the job training
☐³ In house training
☐⁴ University accredited Nurse Practitioner course *(please specify)*_____
☐⁵ RCN nurse practitioner diploma/degree
☐⁶ Nurse Practitioner Masters degree *(please specify)*_____
☐⁷ Other *(please specify)*_____

Q24 How many years qualified do your nurses have to have before they can begin training as a Nurse Practitioner?

- ☐¹ No minimum level specified
☐² Six months
☐³ 1 year
☐⁴ 2 years
☐⁵ 3 years
☐⁶ 4 years
☐⁷ 5 years
☐⁸ Other number (please specify)_____

Q25 What level of training do you think Nurse Practitioners should be trained to in the future?

- ☐¹ No specific training required
☐² On the job training sufficient
☐³ Short in-house course
☐⁴ Short university accredited course
☐⁵ Diploma
☐⁶ Degree
☐⁷ Masters degree
☐⁸ Clinical Doctorate

Q26 Do you have any other comments you would like to share with the research team regarding ENP training?

(Please continue on a separate piece of paper if necessary)

Q27 What do you consider are the main benefits that your Nurse Practitioners have brought to your department?

(Please continue on a separate piece of paper if necessary)

Q28 What do you consider are the main **disadvantages** that your Nurse Practitioners have brought to your department?

(Please continue on a separate piece of paper if necessary)

SECTION C: IF THERE ARE NO ENPs IN YOUR DEPARTMENT...

Q29 Is your department considering introducing the role of the nurse practitioner in the foreseeable future? *(Please tick the appropriate box)*

- ☐¹ Yes, definite plans are being made for their introduction before the end of 2001.
- ☐² Yes, definite plans are being made for their introduction, but not for this year.
- ☐³ Possibly, there have been some discussions about their introduction.
- ☐⁴ No, there are no plans are present to introduce nurse practitioners.

Thank you for your time completing this questionnaire

Please use the reply-paid envelope to return the questionnaire to:

Mark A. Cooper
Researcher/Practitioner
A&E Department
Glasgow Royal Infirmary
84 Castle Street
Glasgow G4 0SF

Name of person completing questionnaire

Position

If we need to clarify any information gathered with this survey, can we contact you? *Tick box if able*

☐

If you would like a copy of the results of this survey, when published, *please tick this box*.....

☐

If you would like a copy of the results of the 1998 survey, *please tick this box*.....

☐

If you have any other comments you would like to add please feel free to write them on a separate sheet of paper.

Appendix IV. Development of the *Documentation Audit Tool*

a NGT first round booklet and accompanying material

b NGT first round reference book

c Documentation Audit Tool

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Evaluation of Emergency Nurse Practitioner's Documentation

Nursing & Midwifery Studies
University of Glasgow
&
Glasgow Royal Infirmary

Introduction

Thank you for agreeing to participate in the development of a documentation audit tool (DAT) for emergency nurse practitioner documentation. The DAT is one of a number of tools currently being developed as part of a Chief Scientist Office funded study. It is hoped to use these tools in a future randomised controlled trial of emergency nurse practitioners.

The Importance of the Documentation Audit Tool (DAT)

In recent years there has been an increased recognition of the need for high quality documentation in healthcare for not only medico-legal purposes, but also for effective communication between the many members of the healthcare team who care for each and every patient within a modern healthcare system. Clinical notes also serve a wider purpose. They can also provide a record that can be used for teaching, research and clinical audit. Hence, the researchers feel it is important to consider the quality of the emergency nurse practitioners documentation as part of an evaluation of the ENP.

In order to evaluate clinical documentation for a wide variety of patients it was felt necessary to develop a method which is as objective as possible, reliable and valid. It is with the development of this tool that your help as a member of the selected expert panel is needed.

As this tool is being developed for use in a randomised controlled trial it will be used to evaluate a sample of the clinical documentation (in the form of A&E notes) from both the experimental group (patients seen by an ENP) and the control group (patients seen by an A&E Senior House Officer). It is expected to evaluate the ENPs clinical documentation at the standard expected of an A&E Senior House Officer (SHO). The tool will eventually be used by senior A&E clinicians to review these A&E notes.

An extensive search of the literature has been conducted and with discussions with colleagues, both medical and nursing, a small number of papers and books concerning documentation were found. From this material a list of criteria that were recommended to be included within the A&E notes of patients with minor injuries were drawn up. This list of criteria forms Section 2 of this folder. The definition of a minor injury for this study is an injury or condition that can be treated within the existing ENP treatment protocols at the research site (Glasgow Royal Infirmary) [see section 4 – separate document].

The criteria identified in Section 2 do not form a definitive list, further criteria may need to be added. It is hoped that by using a consensus technique known as the modified nominal group technique, the expert panel will agree to a list of criteria which should be found in the clinical documentation of patients with the types of minor injury the emergency nurse practitioners see and treat.

Modified Nominal Group Technique

The modified nominal group technique essentially involves two phases. The first phase consists of each expert ranking the importance of each of the criteria listed in section 2 and adding any which are felt to have been left out. The second phase involves a single meeting, which will last a half day. The meeting is highly structured in nature. Firstly the results of preliminary rating and the further criteria identified during the first phase will be presented to the panel. During this time discussion and clarification of each of the criteria will occur. After a set period of time participants on the panel will be asked to rate the most important criteria in private. The cumulative results of the individual ratings will be calculated and presented back to the panel at the end of the meeting. Hopefully at this time there will be a consensus. The results will then go on to inform the final development of the ‘documentation audit tool’.

It is anticipated that it will take approximately one hour to rate all the criteria listed in section 2. Hopefully most of the criteria should be fairly straight forward to rate. If more information is required about a particular criterion before you feel able to rate it, a number in [square] brackets identifies a paragraph in Section 3 which précis the original literature from where the criterion was identified. The original references are listed at the end of Section 3.

Before adding any further criteria please make sure they will be relevant to the types of minor injury the emergency nurse practitioners are likely to be treating. Section 4 contains, for your reference, the twelve protocols covering the types of injury the emergency nurse practitioners at the research site can treat.

Layout of Section 2

The criteria have been grouped into separate (and hopefully) fairly logical groups. It is anticipated that many criteria will be relevant to all sets of A&E notes compiled by the ENPs and these have been grouped into the first section ‘Core criteria’. Further criteria considered relevant only to certain patients have been grouped into further sections e.g. Wounds, Medication, X-rays etc.

Therefore for some patients the only relevant criteria for their notes will be the ‘Core criteria’ and others may require several. For example an twisted ankle injury with a laceration which is x-rayed and sutured will require the ‘Core criteria’ along with the extra criteria on ‘Wounds’, ‘Sutured wounds’, ‘Medication’, ‘Limb injuries’, ‘Lower limb injuries’ and ‘X-rays’.

Instructions

- Please read each of the criteria listed and tick the appropriate box to identify, in your opinion, the relative importance of this criterion being documented in the notes.
- Add any further criteria you feel is missing from the list (*Please make sure that the criteria you add are relevant to the types of patient and injury the ENPs are authorised to treat - If in doubt please add!*)
- Please return section 2 when you have completed it in the reply paid envelope enclosed. Please return the section before <last date> to allow analysis of phase 1 to be completed before the meeting on <meet date>

Timetable

Please return the completed section 2 by <last date>

Meeting will be held on <meet date> at <venue>. Starting at <start time> and finishing by <finish time>. Lunch will be provided.

Contact

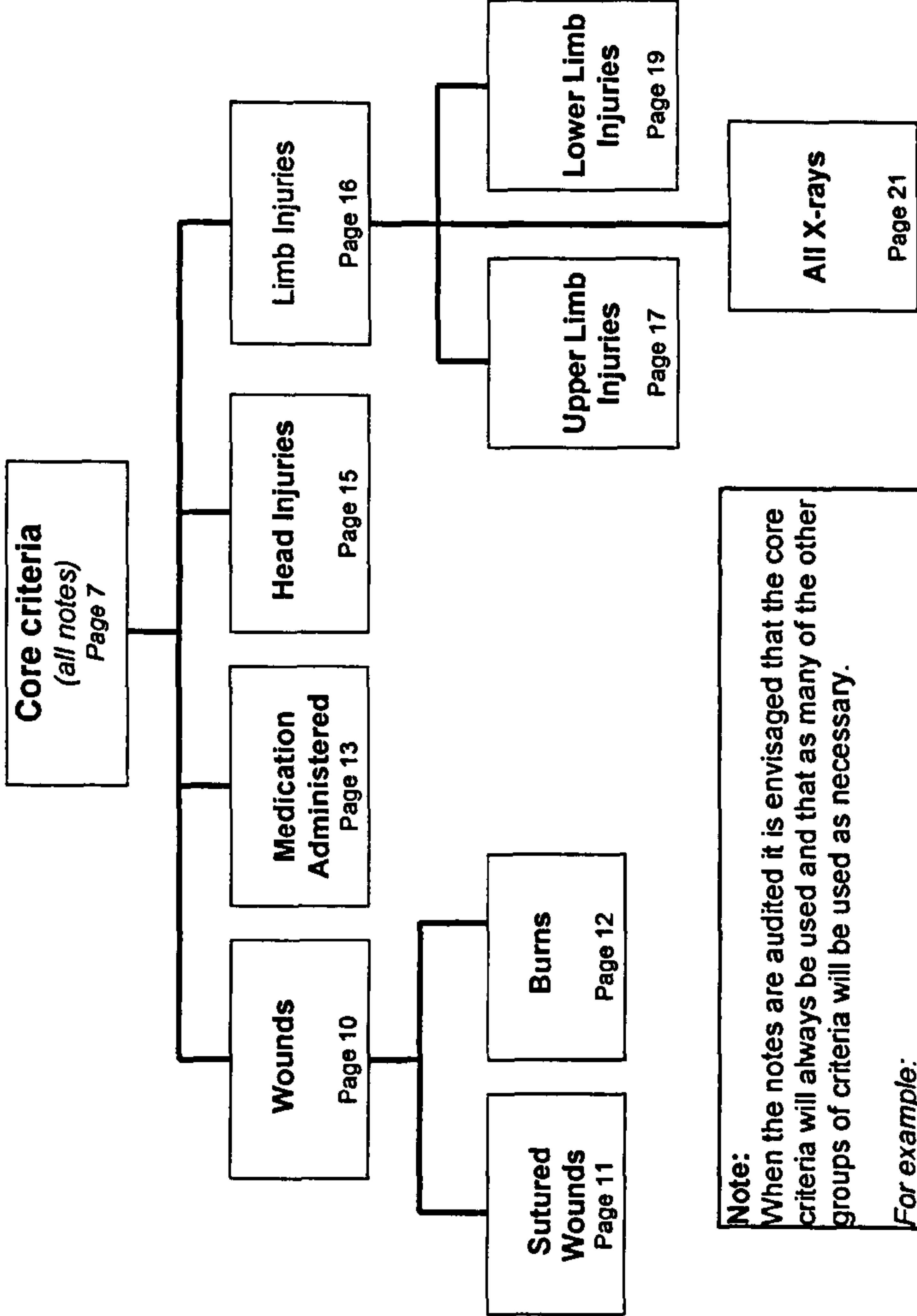
If you have any further questions or queries please contact me anytime on:

- 0141 330 3249 (University) Ansa-phone
- 0141 330 3539 (University) Fax
- 0141 950 1691 (Home) Ansa-phone and Fax
- Email: Mark.A.Cooper@clinmed.gla.ac.uk
- Radiopage: via switchboard at Glasgow Royal Infirmary 0141 211 4000

Your time and effort is greatly appreciated - Thank you

Section 2

INDEX - Documentation Criterion



Note:
When the notes are audited it is envisaged that the core criteria will always be used and that as many of the other groups of criteria will be used as necessary.

For example:
A patient's notes which detail the examination and treatment of a laceration caused by a broken glass may require the set of core criteria, plus the sets of criteria for wounds, x-rays and sutured wounds.
The documentation for a patient requiring a non-complicated ring removal may only need the set of core criteria in order to audit this documentation.

Core Criteria
(for all notes)

Listed in the following order:

- Demographic criteria
- General Criteria
- History
- Examination & Investigations
- Treatment & Follow-up

Please rank each of the listed criteria by ticking the appropriate box and add any other criteria you feel are missing from any of these sections in the table at the end of this core criteria section.

Demographic criteria

Criteria No.	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance Please ✓/the appropriate box				
		✓/not important	1	2	3	4 5
1.	The A&E number on every page ^{11,21}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	The patient's name on every page ¹¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Whether the patient is a new or a follow-up patient ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Date of birth ^{11,21}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Gender ^{11,21}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Address ¹¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Area of residence code (i.e. postcode) ^{11,21}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	A person to notify in an emergency (next of kin) ¹¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	The patient's General Practitioner ^{11,21}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Who the initiator of referral (e.g. Self referral) was ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Mode of arrival (e.g. Ambulance, Own transport) to the department ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Type of accident (e.g. RTA) ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Method of departure from the department ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Time patient books in (including the date) ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	The time the patient is seen by triage nurse ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

General Criteria

Criteria No.	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance Please ✓/the appropriate box				
		✓/not important	1	2	3 4	5
16.	The time the patient is first seen by a doctor ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	The time the patient leaves the department ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18.	The notes should be legible ^{13,1121}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	Only appropriate (accepted) abbreviations can be used in the notes ^{11,11}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.	Personal comments should be not be documented (e.g. 'This annoying little man' ^{13,7121})	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	The notes should follow an accepted standard layout ^{15,6,12,14,1}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	Entries should not be written in blue ink or pencil ¹³¹ and preferably be in black ink ¹²¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	The notes should be signed by the clinician ^{13,9,12,141}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.	Addition entries should be individually dated, timed and signed ^{13,41}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

History

Criteria No.	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance Please ✓/the appropriate box				
		✓/not important	1	2	3 4	5
25.	When the injury occurred ^{11,13,141}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	The mechanism of the injury ^{11,13,141}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27.	How (and why) did the injury occurred ^{11,13,141}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28.	What happened next ^{11,13,141}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29.	Any significant past medical history ^{11,13,141}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30.	Where the injury happened ^{11,13,141}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.	Who was involved ^{11,13,141}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continued over

Examination & Investigations

Criteria No.	Criteria	Ranking of importance Please ✓ the appropriate box				
		Very important	1	2	3	4 5 Important not important
32.	Details of the initial physical examination ⁽¹³⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33.	Provisional/ differential diagnosis should be written down prior to investigations being conducted ⁽¹⁴⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34.	If any investigations have been performed they are listed ⁽¹⁴⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.	All results of investigations (if conducted) ⁽¹⁴⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36.	Final diagnosis ⁽¹²⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Treatment & Follow up

Criteria No.	Criteria	Ranking of importance Please ✓ the appropriate box				
		Very important	1	2	3	4 5 Important not important
37.	The advice given to the patient is documented in summary form ⁽¹⁴⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38.	The arrangements for follow-up/referral/discharge ^(12,41)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39.	A letter to the GP ⁽¹³⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

Extra Criteria

Wounds

Extract from ENP protocols:

The nurse practitioners can treat minor wounds; superficial puncture wounds; pre-tibial lacerations (except patients suffering from peripheral vascular disease, diabetes or on steroid therapy - these patients must be referred to a doctor); superficial burns and scalds; sub-ungal haematomas; pulp injuries to fingers; minor injuries to toes* and embedded earrings/butterflies. (see protocols [Section 4] 1, 2, 6, 7, 8, 9 and 10)

*A minor toe injury is when there is no deformity, dislocation or crushing of the toe, minimal swelling and no neurovascular deficit

Criteria No.	Criteria	Ranking of importance Please ✓ the appropriate box				
		Very important	1	2	3	4 5 Important not important
40.	The tetanus immunisation status of the patient ⁽¹⁶⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41.	The type of wound ⁽¹⁷⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42.	The location of the wound ⁽¹⁷⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43.	The direction and shape of the wound ⁽¹⁷⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44.	The size (inc. length and width) of the wound ⁽¹⁷⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45.	The depth of the wound ⁽¹⁷⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46.	Nerve and Tendon function distal to the wound ⁽¹⁷⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47.	In wounds caused by blunt forces: Evidence of underlying bony injury ⁽¹⁷⁾		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

Criteria

Further criteria for sutured wounds overleaf

Sutured Wounds

Criteria No	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance Please ✓/the appropriate box						
		Very important	1	2	3	4	5	Not important
48.	The time the wound was sutured ^[18]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49.	The type of local anaesthetic used ^[18]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50.	The tourniquet time (if used) ^[18]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51.	Type of suture ^[18]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52.	Numbers of sutures ^[18]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53.	What cleaning and debridement was done ^[18]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54.	What exploration of the wound was done ^[18]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

Criteria

Burns

Extract from ENP protocols:

The ENP can assess, treat and discharge patients with superficial burns and scalds*.

(See protocol 8 [section 4])

*A minor burn is defined as covering less than 3% of body surface in an adult and does not involve genitalia or the face. The causative agent was wet heat e.g. steam or dry heat e.g. hot plate. Electrical, chemical or circumferential burns should be referred to medical staff.

Criteria No.	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance Please ✓/the appropriate box				
		<i>Very important</i> 1	2	3	4	<i>Not important</i> 5
55.	The time the burn injury occurred ^[19]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56.	The mechanism of the burn injury ^[19]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57.	The duration of burning ^[19]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58.	What first aid / other treatment has already been performed ^[19]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59.	The location of burn on the body ^[19]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60.	The size of burn ^[19]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61.	The depth of burn ^[19]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

Criteria

Medication Administered

The Nurse Practitioner can administer (from a protocol) paracetamol, co-codomal, ibuprofen and tetanus (ATT). Antibiotics must be prescribed by a doctor.
(See protocols [Section 4] 1,2,3,5,6,7,8,9,11 and 12)

Criteria No	Criteria The following should be included in the documentation:	Ranking of importance Please ✓/the appropriate box						
		very important	1	2	3	4	5	not important
62.	The name of drug ^[20]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63.	The dosage prescribed ^[20]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64.	The frequency of administration ^[20]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65.	The duration the medication should be taken for or the total amount of medication given ^[20]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66.	Other medications the patient is on ^[20,21]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67.	Any allergies the patient has, if no allergies then this should be recorded ^[20]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68.	Any bad experiences with medication the patient has had ^[21]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
69.	List of previous hospital treatments ^[21]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70.	List of previous treatment from a family doctor ^[21]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71.	List of treatment from alternative practitioners ^[21]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72.	List of self-prescribed medication ^[21]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73.	List of treatments not involving medicines (e.g. massage) ^[21]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74.	List of what medicines are kept at the patient's home ^[21]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75.	Immunisation status 'where clinically important' ^[18]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continued over

Please add below any criteria you feel is missing

Criteria

Minor Head Injuries

Extract from ENP protocols:
The ENP can assess, treat and discharge patients with a minor head injury* providing the patient is not under the influence of alcohol or drugs and is accompanied by a responsible adult.
(See protocol 4 [Section 4])

*A minor head injury is defined as a blow to the head which has not resulted in, a loss of consciousness, amnesia, neurological deficit, accompanying neck pain, abnormal drowsiness, significant scalp laceration

Criteria No	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance <i>Please ✓/the appropriate box</i>				
		Very important	1	2	3	4 5 Not important
76.	Any loss of consciousness. If no loss of consciousness this should be recorded ^[22,40]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77.	Any change in consciousness/drowsiness ^[22]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78.	Any nausea or vomiting should be inquired about and recorded ^[22,40]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79.	Any headache should be inquired about and documented ^[22,40]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80.	Any photophobia should be inquired about and documented ^[22,40]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81.	The GCS (Glasgow Coma Score) ^[24]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
82.	Any associated wounds, bruises etc. ^[24]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
83	Any signs of a basal skull fracture? e.g. Ears, Eyes, Battle's sign should be looked for ^[22]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
84.	Whether a responsible adult is able to care for the patient overnight ^[24]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

Criteria

Further criteria for upper and lower limb injuries overleaf

Limb Injuries

Extract from ENP protocols:
The ENP can assess, treat and discharge patients with soft tissue injuries distal to the knee/elbow. Including minor injuries to toes.*
(See protocols [Section4] 1,2,3 and 9)

*A minor toe injury is when there is no deformity, dislocation or crushing of the toe, minimal swelling and no neurovascular deficit

Criteria No	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance Please ✓ the appropriate box					
		very important	1	2	3	4	5 not important
85.	The presence or absence of any swelling or effusion (joint injuries) ^[23]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
86.	The point of maximum tenderness ^[23]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87.	The range of movement ^[23]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88.	The stability of any joint involved ^[23]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
89.	Examination of the joints either side of the injury ^[24]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
90.	The function of the limb ^[24]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
91.	The side of the injury (Left or Right)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

Criteria

Upper Limb Injuries

Listed in the following order:

- Hand injuries
- Wrist injuries (traumatic)
- Forearm injuries (traumatic)
- Non-traumatic wrist and forearm problems

Hand injuries

Criteria No	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance <i>Please ✓/the appropriate box</i>				
		<i>Very important</i> 1	2	3	4	<i>Not important</i> 5
92.	Nerve and tendon function distal to the wound ^[25]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93.	The digits should always be named and never numbered ^[25]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
94.	Whether the hand is the dominant or non-dominant hand ^[25]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
95.	Occupation and hobbies (<i>where of relevance</i>) ^[25]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
96.	Diagram of wounds to hand (or a detailed description) ^[25]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
97.	Stability of thumb joint (if fracture excluded) ^[25]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
98.	The ability to oppose thumb and little finger ^[25]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99.	If no evidence of a fracture exists on x-ray, but the history and examination suggest there may be, then rotatory deformity of the metacarpals should be looked for and documented ^[26]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100.	The stability of the collateral ligaments should be tested for and findings documented ^[27]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Wrist injuries (traumatic)

Criteria No	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance <i>Please ✓/the appropriate box</i>				
		<i>Very important</i> 1	2	3	4	<i>Not important</i> 5
101.	The anatomical snuff-box should be palpated and findings documented ^[28]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continued over

Forearm injuries (traumatic)

Criteria No	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance <i>Please ✓/the appropriate box</i>				
		<i>Very important</i> 1	2	3	4	<i>Not important</i> 5
102.	In traumatic injuries to the forearm examinations of elbow, wrist and radio-ulna joints should be conducted and documented ^[29]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Non-traumatic wrist and forearm problems

Criteria No	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance <i>Please ✓/the appropriate box</i>				
		<i>Very important</i> 1	2	3	4	<i>Not important</i> 5
103.	Tests for De Quervain's syndrome should be performed and the findings documented ^[30]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
104.	Tinel test for carpal tunnel syndrome should be performed and the findings documented ^[30]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

Criteria

Lower Limb Injuries

- Listed in the following order:
- All lower limb injuries
 - Forefoot injuries
 - Non-traumatic calf pain
 - Non-traumatic shin pain

All lower limb injuries

Criteria No.	Criteria	Ranking of importance Please ✓ the appropriate box				
	The following should be included in the documentation:	very important				
		1	2	3	4	5
105.	A description of the patient's gait ^[23, 32]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
106.	The patient's ability to weight bear ^[24]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
107.	Consideration for an x-ray if can't weight bear ^[24]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
108.	If there is any possibility of a Achilles tendon injury, Simmond's test should be performed ^[33]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
109.	The popliteal nerve should be examined in all cases with a fracture of the upper fibula ^[34]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
110.	If there is a calcaneal fracture then the opposite foot and also lumbar spine should be examined ^[34]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
111.	Toes should be correctly named ^[35] [Current recommendations listed in Section 3 para 36]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Forefoot injuries

Criteria No.	Criteria	Ranking of importance Please ✓ the appropriate box				
	The following should be included in the documentation:	very important				
		1	2	3	4	5
112.	Past Medical History should be noted especially in cases of Peripheral Vascular Disease (PVD), Diabetes Mellitus (DM) and causes of peripheral neuropathy ^[37]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
113.	If there is a history of peripheral vascular disease (PVD) then distal pulses should be recorded ^[37]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.	If there is a history of diabetes mellitus then blood glucose level should be documented ^[37]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continued over

Non-traumatic calf pain

Criteria No.	Criteria	Ranking of importance Please ✓ the appropriate box				
	The following should be included in the documentation:	very important				
		1	2	3	4	5
115.	Documentation should reflect the fact that a DVT has been considered ^[38]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Non-traumatic shin pain

Criteria No.	Criteria	Ranking of importance Please ✓ the appropriate box				
	The following should be included in the documentation:	very important				
		1	2	3	4	5
116.	In non-traumatic cases of shin pain the history should include any recent exertion and training schedules ^[39]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
117.	Examination should look for crepitus of ^[39] tenosynovitis and findings documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

X-Rays

Nurses can request peripheral skeletal x-rays at one site only and skull x-rays after a minor head injury.

Criteria No	Criteria <i>The following should be included in the documentation:</i>	Ranking of importance <i>Please ✓the appropriate box</i>				
		Very important		Not important		
		1	2	3	4	5
118.	The time the patient returns from X-ray ^[9]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
119.	Fractures should be described as either closed or compound ^[31]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
120.	The location of any fracture should be clearly described ^[31]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
121.	Type of fracture ^[31]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
122.	Any displacement of fracture should be documented ^[31]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
123.	The type of displacement (if displacement present) should be documented ^[31]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please add below any criteria you feel is missing

Criteria

Section 3

Extracts on
A&E documentation
from the literature

Paragraph	1	<p>The Royal College of Surgeons has prepared guidelines on medical records and notes this states that a "record must be maintained for every patient. Each record should contain the following identification data:</p> <ul style="list-style-type: none"> i) A unique medical record number or reference on every page ii) Name in full on every page iii) Address and postcode iv) Date of birth v) Sex vi) Person to notify in an emergency (next of kin) viii) General Practitioner" 	(Royal College of Surgeons of England, 1990)
	2	<p>The Steering group on Health Services Information (DHSS) recommended that the minimum data set for each A&E patient should be:</p> <ul style="list-style-type: none"> i) Accident and emergency number ii) New or follow-up patient iii) Time and date of arrival iv) Date of birth v) Sex vi) Area of residence code vii) Code of General Practitioner viii) Initiator of referral ix) Mode of arrival x) Patient group xi) Type of accident xii) Method of departure 	(Korner, 1982)
	3	<p>The UKCCs document 'Standards for Records and Record Keeping' (UKCC 1993) lists 8 essential elements which nurses should fulfil when completing records. These are:</p> <ul style="list-style-type: none"> • The record must be written legibly and indelibly • The record must be clear and unambiguous • The record must be accurate in each entry as to date and time • Ensure that alterations are made by scoring out with a single line followed by the initialled, dated and timed correct entry • Ensure that additions to existing entries are individually dated, timed and signed • Not include abbreviations, meaningless phrases and offensive subjective statements unrelated to the patient's care and associated observations • Not allow the use of initials for major entries, and where their use is allowed for other entries, ensure that local arrangements for identifying initials and signatures exist • Not include entries made in pencil or blue ink, the former carrying the risk of erasure and the latter (where photocopying is required) or poor quality reproduction 	(UKCC, 1993)

Paragraph	4	(Montague, 1996)
5	Montague and Hopper (1996) make several other important points regarding A&E documentation. They state that all clinical notes should contain in proper order: <ul style="list-style-type: none">• history• physical findings• investigations• diagnosis• treatment (if any)• outcome or disposal	(Montague, 1996) p12
6	The Audit Commission in their report 'Setting the Records Straight' (Audit Commission 1995) identified a set of good practice principles for record keeping these were: <ul style="list-style-type: none">• the patient should be clearly identified, and the casenotes should set out the diagnosis, history, treatment results and care plans• notes should be kept neat and tidy with legible entries signed and dated, preferably in black ink• they should be kept up-to-date and filed with the most recent on top• casenotes should have a clear structure which is agreed with users and should be organised into sections• there should be a policy determining which documents should remain in the casenotes after discharge (culling)• there should be one set of casenotes for each patient	(Audit Commission, 1995)
7	In court the opposition will descend 'with glee' upon any pejorative remark, and will draw out an explanation in the witness box.	(Montague, 1996) p13
8	John Tingle, a lecturer in law, in a paper on record-keeping stated that "Health records must be compiled with the assumption that they will be seen by the patient, under the Access to Health Records Act 1990. There will now be pressure to see that health records are compiled objectively, carefully, not omitting essential or valuable information and that casual, ill-considered judgmental and personal comments are excluded"	(Tingle, 1991)

Paragraph	13	<p>The history of an injury should always contain the following information:</p> <ul style="list-style-type: none">• When did it happen• Mechanism of injury• How (and why) did it happen• What happened next• Any significant past medical history <p>Sometimes the history will also need to contain:</p> <ul style="list-style-type: none">• Where it happened• Who was involved <p>(Guly, 1996) p13</p>
	14	<p>The Royal College of Surgeons have produced guidelines which suggest that all clinical records should contain the following details:</p> <p>I) An initial patient history with details of previous illnesses, the social and environmental context of the illness when appropriate and details of medication</p> <p>II) Details of the initial physical examination</p> <p>III) A working diagnosis and medical care plan should be written down, sign and dated by the appropriate doctor</p> <p>The guidelines go on to suggest that the notes should be "supplemented and updated regularly to include details and reports of all investigations, treatments and verbal advice given to the patient and his or her relatives"</p> <p>(Royal College of Surgeons of England, 1990)</p>
	15	<p>GP Letters</p> <p>As General Practitioners have the responsibility for the continuing care of the patient in the community setting they should be informed of their patient's attendance at the A&E department, and in any letter sent to a GP it is important to consider what information the GP needs to manage the patient.</p> <p>(Guly, 1996) p34-35</p>
	16	<p>In an article written about paediatric emergency department records Rosenberg (1989) states that immunisation status should be documented when it is clinically important.</p> <p>Guly (1996) is a little clearer about when tetanus immunisation status should be documented and that is in all patients with any sort of wound. He adds that it is not sufficient to write in the notes 'tetanus injection 5 years ago' and assume the patient is protected. Instead the clinician must ensure that the patient has had a full course.</p> <p>(Guly, 1996) p46</p>

Paragraph	9	<p>Henry Guly in a recent book on record keeping in A&E recommends that A&E notes should follow a basic pattern where:</p> <p>i) Every entry in the notes should be dated and timed</p> <p>ii) Left and right are never abbreviated</p> <p>iii) Notes must be legible, and;</p> <p>iv) The clinician's name should be written under their signature</p> <p>Guly argues that dates and times are important for establishing a chronological record of the care given. He goes on to give an example of how a set of notes might document even for a relatively minor problem For example these notes should include the</p> <p>i) The time the patient books in</p> <p>ii) The time the patient is seen by triage nurse</p> <p>iii) The time the patient is first seen by doctor</p> <p>iv) The time the patient returns from x-ray</p> <p>v) The times any wounds are sutured</p> <p>vi) The time the patient leaves the department</p> <p>Guly argues that times are important for audit, planning and generations of statistics. They can also be important for specific clinical conditions (e.g. patients with a dislocation of the hip).</p> <p>(Guly, 1996) p8</p>
	10	<p>Guly also argues that as increasingly doctors' handwriting has to be read and transcribed by clerks it is even more important that notes are legible as these clerks who have had no medical training are less able to interpret words from their medical context.</p> <p>"Undecipherable notes can lead to wasted time and inaccurate information"</p> <p>(Guly, 1996) p9</p> <p>(Kozak et al. 1994)</p>
	11	<p>Guly (1996) argues strongly that 'left' and 'right' should never be abbreviated as mistakes are sometimes made and even when the side is correctly identified. He also point out that L and R when written quickly can end up looking remarkably similar.</p> <p>On abbreviations generally Guly (1996) suggests that they can be used in notes as long as they are standard and would be understood country-wide. However, they should not be used in letters to GPs or to doctors in other specialities who may not understand the abbreviation or use the same abbreviation to describe another disease.</p> <p>(Guly, 1996) p9-10</p>
	12	<p>Guly 1996 suggests that A&E notes should have the following arrangement</p> <ul style="list-style-type: none">• History• Examination (inc. provisional or differential diagnosis, x-rays or other investigations performed, results of x-rays or other interventions)• Final Diagnosis• Treatment• Advice to patient• Follow-up arrangements• Signature <p>In addition details of important telephone calls should be recorded and avoid imprecise statements as 'discussed with orthopaedic registrar' but rather 'discussed with Mr X'.</p> <p>(Guly, 1996) p10</p>

Paragraph

17

Wounds: Assessment

The following should be noted:

- History
 - How? Where? When?
 - Tetanus, Allergy, Medications (TAM)
- Examination
 - Wound size, type, depth, other features(e.g. patient's occupation and leisure interests)
 - Integrity and function of other structures (especially nerves and tendons)
- Investigations
 - X-ray for fractures/foreign bodies/deep structure penetration
 - Bacteriology (seldom indicated)
 - Blood (rarely: haematology/clotting)
- Documentation
 - Use diagrams (one picture is worth a thousand words)
 - Record all findings (not written down=not done, in legal cases)

(Wardrope and Smith, 1992) p12-20

18

Guly (1996) points out that many different types of practical procedure are performed in A&E; he suggests that these should be described in the same detail as would be done in an operating theatre. The type of anaesthesia should be noted as should the position of any incisions. Tourniquet time, if a tourniquet is used, should be recorded.

When discussing suturing he makes the point that wound repair is much more than just suturing. The opportunity provided by the local anaesthesia for this should be taken to fully clean and debride the wound and to explore its depths to exclude other injury and this should all be described

(Guly, 1996) p29-30

19

Wardrope and Smith (1992) in their book on the management of wounds and burns list several key points which should be asked when dealing with minor burns. These include a detailed history of the injury and ascertaining the exact nature of the burning agent as this will indicate the probability of deep/full-thickness burns. The length of time the skin was in contact with the burning agent as again this relates to the depth of burn. Also the time lapsed from burning is important as if it is greater than 6 hours and the skin is blistered then it is more likely that the wound will be infected. They emphasise that tetanus status must be ascertained as adequate tetanus prophylaxis is often forgotten in minor burns.

(Wardrope and Smith, 1992) p216-224

Guly notes that any treatment given prior to arrival at A&E should be documented, and as a burn is a wound the essential information to record for a burn is the same as that required for any wound i.e. the location, size and depth. He also states that a burn should only be described according to its actual pathology i.e.

- erythema
- partial thickness
- full thickness
- mixed
- indeterminate (if necessary)

(Guly, 1996) p 177-178

Paragraph

20

The A&E record card may be used for prescribing drugs given in the department. Any prescription made this way must contain the same information as any other prescription:

- Drug dosage
 - Frequency
 - Duration (or total number of tablets prescribed)
- but before giving any other drug, it is important to ask about medical history, other medication and allergies.

(Guly, 1996) p28-29

21

Drug history - A framework. Herxheimer (1989) describes a framework for taking a detailed drug history in his paper "A framework for taking a treatment history".

He suggests that the areas which should be enquired about include the following:

- I) Medicines currently being taken
- II) Previous hospital treatment
- III) Previous treatment from the family doctor
- IV) Treatment from 'alternative' practitioners e.g. homeopathic or herbal medicines, acupuncture, and for patients from an unfamiliar culture, 'ethnic' medicines
- V) Self-prescribed treatment e.g. 'medicines you have bought yourself'
- VI) Any past bad experiences with medicines
- VII) Treatment not involving a medicine e.g. exercises, heat, massage, meditation
- VIII) What medicines are kept in the home

(Herxheimer, 1989)

22

In his chapter on head injuries and note taking Guly (1996) emphasises that "it is important to ask enough questions to understand fully the mechanism of the head injury". The mechanism of injury being important to appreciate the possibility of other associated injuries. He also stresses the importance of elucidating the sequence of events. Did the patient lose consciousness and then fall, striking their head, or did they trip, hit their head and become unconscious as a result of their head injury? In the patient who has had a head injury and who had a fit it is important to try and determine whether the fit caused the head injury or was it a complication of the head injury.

It is also important to discover how patient was immediately after the injury. Symptoms that may occur and which need to be asked about include: nausea, vomiting, headache, drowsiness and photophobia. Guly stresses that the most important observation to measure in a head-injured patient is their level of consciousness (LOC) and this can and, he suggests, should be measured using the Glasgow Coma Scale. Other observations including pulse, blood pressure and respirations should also be recorded in any patient with a significant head injury.

All wounds and bruises, must be noted and wounds inspected. The examination of the head should include a search for the signs of a basal skull fracture.

Finally, he makes the point that a patient who has suffered an acute head injury should only be discharged to the care of a responsible adult. Therefore their social circumstances should therefore always be enquired about and recorded.

(Guly, 1996) p61-67

Paragraph

23 Note keeping for a joint injury
The notes of the examination of a joint injury should, as a minimum, always include details of:

- Presence or absence of any effusion or swelling
- Point of maximum tenderness
- Range of movement
- Stability
- Gait (lower limb injuries)

(Guly, 1996) p42

24 Note keeping for a bony injury
The following should *always* be noted:

- Presence or absence of deformity and swelling
- Point of maximum tenderness
- Examination of the joint at either end
- Function

(Guly, 1996) p44

25 "The digits should always be named"
(Medical Defence Union and Royal College of Nursing, 1978)
To avoid confusion the digits are called

- Thumb
- Index finger
- Middle finger
- Ring finger
- Little finger

Guly (1996) points out that whether the injured arm is the dominant or non-dominant is important in any upper limb injury and even more important in injuries of the hand. He also states that it is important to know, not only a patient's occupation, but also their hobbies and interests and where this may be of relevance it should be noted.

As not only is the hand frequently injured, but it is also the site of congenital deformities and other problems which patients may not have recognised and may blame on acute injury. Therefore he suggests that previous problems may need to be asked about, as problems are frequently bilateral, examination of the other hand can be useful.

With any wound on the limb it is important to examine tendon and nerve function distal to that wound. As the description of wounds on the hand can be difficult Guly recommends that diagrams are essential.

In his discussion of thumb injuries he states that if a joint is injured, its movement should be measured, but as a test of function it may be useful to measure the composite movement of opposition. Ligamentous sprains at the first MCP joint are very common, but he stresses, it is essential not to miss a complete rupture of the ulna collateral ligament at this joint as this is a very disabling injury. Although it is easily repaired if diagnosed early. In all injuries of this joint its stability should be tested (although it can wait until after x-ray if a fracture at this site is suspected).

(Guly, 1996) p133-137

Paragraph

26 Closed metacarpal and finger fractures
Fractures of the metacarpals, proximal and middle phalanges, and any associated displacement or angular deformity will usually be seen easily on an x-ray. However, this will not demonstrate rotatory deformity which can only be detected clinically. Therefore rotatory deformity must be looked for and corrected in any fracture of these bones and a note should be made that this has been done.

(Guly, 1996) p139

27 Proximal interphalangeal joint injuries
In all proximal interphalangeal joint sprains, it is important to test the stability of the collateral ligaments and consider the possibility of an extensor tendon central slip rupture

(Guly, 1996) p140

28 Wrist injuries
The anatomical snuff box should be routinely palpated and such is the medico-legal importance of the fractured scaphoid that it is useful to routinely note the result.

(Guly, 1996) p128

29 Forearm injury
The only specific point to make about the examination of the injured forearm, apart from the usual routine of: look, feel; move, circulation; and nerve supply distal to any fracture, is that one needs to examine elbow, wrist and radio-ulna joints.

(Guly, 1996) p124

30 Non-traumatic wrist and forearm problems
Guly (1996) suggest there are some additional tests which should be done in certain circumstances, for example non-traumatic wrist and forearm injuries. Tenosynovitis crepitans is caused by over-use and presents with pain and a characteristic palpable crepitus when the wrist is moved. In any patient with soft tissue pain in the lower forearm and certainly in any patient diagnosed as 'tenosynovitis' or 'tenosynovitis' he suggest that this should be looked for and its presence or absence recorded.

De Quervain's syndrome (tenovaginitis of the tendons of the abductor pollicis longus and extensor pollicis brevis) is another common cause of wrist or thumb pain so thumb movements should be examined and noted in anyone with pain on the radial side of the wrist and tests for de Quervain's syndrome should be done frequently

(Guly, 1996) p131

Carpal Tunnel syndrome
This is a common cause of wrist, forearm, and hand pain presenting in A&E. Early in the disease the patient may have symptoms on waking and after use but there may be no signs on examination. The history is therefore all important and should contain details of:

- Possible causes (e.g. trauma, pregnancy)
- Timing of symptoms especially pain at night and paraesthesiae on waking.
- Which fingers are affected?

...the patients symptoms may be reproduced by tapping the anterior surface of the wrist over the carpal tunnel (Tinnel test) If any of the symptoms are atypical a full neurological examination of the arms performed.

(Guly, 1996) p132

Paragraph

31 When describing a fracture, the following should be noted

- Closed or compound (if compound, the wound needs to be described as well).
- Location, e.g. for a long bone: base, midshaft, junction of upper $\frac{1}{3}$ and lower $\frac{2}{3}$
- Type e.g. transverse, oblique, spiral, comminuted, segmental, greenstick epiphyseal (what type?).
- The type of displacement e.g. shift, angulation, rotation.

(Guly, 1996) p26

32 No patient with a lower limb or back problem should be allowed home without a comment on their gait recorded in the notes, and a patient with a seemingly minor injury who will not weight bear must be re-examined. It is almost certain that in these cases it will need to be x-rayed"

(Guly, 1996) p142

33 **Pain in calf**
If there is any possibility of an Achilles tendon injury, Simmond's test must be performed. The patient lies prone with their feet over the edge of the trolley and the calf is squeezed. If the Achilles tendon is intact, the foot will planter flex, but if the tendon is ruptured, the foot remains still

(Guly, 1996) p157-158

34 **Upper fibula fractures**
The lateral popliteal nerve may be injured in association with fractures of the upper fibula and so should be examined in all patients with such injuries.

(Guly, 1996) p158

35 **Calcaneal fractures**
A fall onto the heels from a height commonly causes bilateral fractures of the calcaneum and may also cause a crush fracture of the vertebra In any patient with a calcaneal fracture, it is necessary to ensure that this is not bilateral and also to examine and, if necessary, x-ray the lumbar spine.

(Guly, 1996) p164

36 **Toe injunes**
In patients with toe injuries (or other toe problems), the toe should be correctly identified to avoid confusion.

(Guly, 1996) p167

Current recommendations are

- 1st toe (or big toe or hallux)
- 2nd toe
- 3rd toe
- 4th toe
- 5th toe (or little toe)

(Medical Defence Union and Royal College of Nursing, 1978)

Paragraph

37 **Forefoot injuries**
"If a patient presents with a foot injury and their past medical history reveals peripheral vascular disease, diabetes mellitus, or to a lesser extent, other causes of peripheral neuropathy, this should be emphasised in their notes The notes of many non-traumatic foot problems should not be considered complete without mention of the state of the foot pulses and documentation of the blood sugar.

(Guly, 1996) p168

38 **Non-traumatic pain in the calf**
One of the most serious causes of pain in the calf is deep vein thrombosis (DVT) and the notes should make it clear that this has been considered.

(Guly, 1996) p160

39 **Non-traumatic pin in the shin**
There are many causes of shin pain, but the majority of patients with this symptom in A&E are athletes and the differential diagnosis will include a stress fracture, shin splints, chronic strain of the muscular attachments to bone, and tenosynovitis. Recent exertion and training schedules should be noted and on examination crepitus of tenosynovitis should be looked for and resisted movements of the ankles and toes examined to see if they reproduce the pain.

(Guly, 1996) p160

40 In a book (The Minor Illness Manual) written by 3 GPs and mainly aimed at practice nurses running their own 'nurse-led' emergency clinics a number of important questions are listed which should be documented in minor head injury patients. These are:

- How did it happen?
- Was there any loss of consciousness?
- Was/is there any confusion or any convulsions?
- Was there any vomiting?
- Is there any nervous system disturbance (e.g. numbness, paralysis, double vision)?
- Does the patient have any bleeding disorder or on any anticoagulants
- Are the pupils equal and reacting to light
- Is there any photophobia?

(Johnson et al. 1997)

41 Montague and Hopper (1996) state, in their discussion about referrals, that referrals should be recorded, naming the person to whom the referral is made and the time of the referral, otherwise they suggest there is little the A&E department staff can do to avoid responsibility for any harm that may follow the failure of an in-patient specialist's junior to attend or to give proper advice.

(Montague, 1996) p13

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Guidance Notes Documentation Audit Tool (DAT)

Background

The tool (DAT) has been developed to rate the clinical notes of Emergency Nurse Practitioners and A&E Senior House Officers. DAT is designed to measure the number of essential items of information (or criteria) which have been recorded in the notes of certain types of *minor injury*.

These items of essential information have been chosen by a panel composed of A&E consultants, middle grade A&E doctors and emergency nurse practitioners. The criteria listed in the tool are the items of essential information the panel felt should *always* be recorded in the clinical notes of the different types of minor injury.

Layout of documentation audit tool

The items of information have been grouped into sections. These sections relate to the different types of minor injuries the ENPs and SHOs treat. The sections have been colour coded to make it easier to use the tool. Not all sections will be relevant to all notes. The sections are:

- Section 1 - Core criteria - *for use with all notes*
- Section 2 - Investigations, medication and discharge
- Section 3 - Wounds & Burns
- Section 4 - Limb injuries - i.e. Sprains, strains and fractures etc.
- Section 5 - Minor head injuries

Section 1 is used with all notes. Section 2 will have certain sections relevant to many notes and sections 3-5 will be used only when the notes detail these types of injury. Each section contains a number of *groups of criteria* that are for more specific types of injury. Not all groups of criteria in any one section will always be applicable. Instructions on the use of any particular group of criteria are given in each section.

As you would expect certain types of injury warrant more detail written in the notes than others. For example minor head injuries have eleven criteria that should always be recorded in a head injury whereas a minor burn only has five criteria listed.

Using the Documentation Audit Tool

To use the Documentation Audit Tool, read the notes and decide which sections of the tool are necessary for auditing a particular set of notes. The core criteria listed in section 1 will always be applicable.

Further sections may be relevant depending on the type of injury. Within sections there are further groups of criteria that are specific to certain types of injury. Groups of criteria with grey shading in the heading can be used on their own. Groups of criteria with no shading must always be used in conjunction with a preceding group. *Specific instructions are written by each group of criteria. All will hopefully become clear on using the tool!*

Documentation Audit Tool

Evaluation of Emergency Nurse Practitioner's Clinical Case Notes

Nursing & Midwifery Studies
University of Glasgow
&
Glasgow Royal Infirmary

DAT Reference Number ☐☐☐☐

A separate score sheet is included to record the total scores for each of the relevant sections and groups of criteria. Please write the 'DAT reference number' on the top of the score sheet and on the front of the DAT booklet. This number can be found highlighted on the front of the A&E notes.

Go through each group of criteria you have chosen to use and tick the appropriate box if the information is present. It is hoped that the tool is fairly objective, however for several of the criteria a subjective clinical judgement may need to be made. For example, surrounding the accuracy of the time of injury or the detail about the exact location of a wound. The importance of the level of accuracy will depend on the specific injury and other information recorded in the notes. This is where your clinical experience and judgement will be needed. After completing each section enter the total score for each group onto the score sheet.

The total score given to a set of notes will be calculated from the maximum possible score available in each of the sections and groups of criteria you have used.

Finally, as the notes are copies of the original A&E notes some have notes written in the clinics or notes written by the clinician who accepted the referral. This information should not be reviewed, as the tool is designed to measure the quality of the notes written by the ENP or SHO who originally saw the patient. The information has, however, been left in the copies of the notes to allow you to see the record in its entirety.

If you have any queries please do not hesitate to get in touch. As this is the final stage of development of the tool I would be extremely interested in any comments you have regarding problems you've experienced using the tool or any suggestions you have for improvements which could be made. I apologise about it's bulky nature and its apparent complexity. However, I hope you will agree that once you've used it a couple of times it is fairly straightforward.

To calculate final score
Add up the total number of criteria correctly documented in the notes [Total score]. Add up the maximum possible score for that particular set of notes (i.e. the maximum score in each of the groups of criteria used in each section) [Maximum possible score].

Divide the *total score* by the *maximum possible score* and multiply by 30. This will give you your final score for that set of notes.

Good luck!

Section 1 - Core criteria

The core criteria must be used for all notes

Core criteria - ALL NOTES		
Demographic criteria		Tick if present
The A&E number on every page(i.e. on each sheet on the notes)		<input type="checkbox"/>
The patients name on every page (i.e. on each sheet on the notes)		<input type="checkbox"/>
Date of birth		<input type="checkbox"/>
Gender		<input type="checkbox"/>
Address or documented 'No fixed Abode'		<input type="checkbox"/>
Area of residence code (i.e. Postcode –at least first part)		<input type="checkbox"/>
A person to notify in an emergency (next of kin) or documented 'no next of kin'		<input type="checkbox"/>
The patient's General Practitioner or documented 'No GP'		<input type="checkbox"/>
The time the patient books in (including the date)		<input type="checkbox"/>
The time the patient is seen by the triage nurse		<input type="checkbox"/>
General Criteria		
The time the patient is first seen by a doctor or ENP		<input type="checkbox"/>
Notes are legible (i.e. the reviewer is able to read!)		<input type="checkbox"/>
Only appropriate abbreviations used (Listed on page 12)		<input type="checkbox"/>
No personal comments have been made		<input type="checkbox"/>
Notes have been signed by the clinician		<input type="checkbox"/>
The time of injury or onset of illness/condition (detailed enough to be clinically relevant)		<input type="checkbox"/>
The mechanism of injury is documented		<input type="checkbox"/>
Details of physical examination are documented		<input type="checkbox"/>
Final diagnosis		<input type="checkbox"/>
Arrangements for follow-up/referral/discharge		<input type="checkbox"/>
The name of the doctor or ENP should be clearly documented		<input type="checkbox"/>
Total		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> /21

Section 2 - Investigations, medication and discharge investigations

Use these criteria whenever any investigations have been conducted

All Investigations (e.g. X-rays, ECG, Blood tests etc.)	Tick if present
Any investigations that are performed are listed	<input type="checkbox"/>
All results of investigations (if conducted)	<input type="checkbox"/>
Total	<input type="checkbox"/> /2

X-rays

Use these criteria whenever x-rays have been taken and show a fracture or dislocation

Only X-rays with fractures or dislocations	Tick if present
The location of any fracture should be clearly described	<input type="checkbox"/>
The type of fracture	<input type="checkbox"/>
Any displacement should be documented if no displacement this should be stated	<input type="checkbox"/>
Any angulation should be documented (if present) if no angulation this should be documented (e.g. in alignment)	<input type="checkbox"/>
Total	<input type="checkbox"/> /4

Use this criterion only when displacement of a fracture is mentioned use in conjunction with the above criteria on x-rays which show fractures and dislocations

Displaced fractures	Tick if present
The type of displacement should be documented	<input type="checkbox"/>
Total	<input type="checkbox"/> /1

Medication

Use these criteria whenever a drug has been administered excluding local anaesthetic. If several drugs have been administered then the box can only be ticked if the information is present for all of the drugs.

Medication administered	Tick if present
The name of the drug(s)	<input type="checkbox"/>
The dosage(s) prescribed	<input type="checkbox"/>
The frequency of administration	<input type="checkbox"/>
The duration the medication(s) should be taken or the total amount of medication given	<input type="checkbox"/>
Any allergies the patients has, if none then this should be recorded	<input type="checkbox"/>
The route of administration	<input type="checkbox"/>
Total	<input type="checkbox"/> /6

Discharge

Discharge criteria should be used for all notes where the SHO or ENP has discharged the patient from the department.
Do not use if the patient was directly referred to another clinician whilst in A&E or admitted.

Discharge criteria (only if SHO/ENP has discharged the patient)	Tick if present
The advice given to the patient is documented in summary form	<input type="checkbox"/>
A letter to the GP	<input type="checkbox"/>
Total	<input type="checkbox"/> /2

Section 3 - Wounds & Burns

Wounds

These criteria should be used in all cases where a wound is mentioned excluding burns (there are separate criteria for burns and scalds listed on the next page)

Wounds (Excluding burns)		Tick if present
The tetanus immunisation status of the patient		<input type="checkbox"/>
The type of wound		<input type="checkbox"/>
The location of wound including the side of the body (description or diagram)		<input type="checkbox"/>
The direction and shape of the wound (description or diagram)		<input type="checkbox"/>
The size (i.e. length/width) of the wound		<input type="checkbox"/>
Nerve and tendon function distal to the wound		<input type="checkbox"/>
Details of any contamination or infection of the wound		<input type="checkbox"/>
Total		<input type="checkbox"/> /7

Use this criterion along with the previous group on wounds, for wounds with potential foreign bodies

Wounds with potential Foreign bodies		Tick if present
Consideration for x-ray should be documented in cases where a FB may be present		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Use this criterion along with the previous group on wounds for which have needed suturing

Sutured wounds		Tick if present
What cleaning was done		<input type="checkbox"/>
Number of sutures		<input type="checkbox"/>
The length of time sutures should remain in situ		<input type="checkbox"/>
Instructions on removal of sutures e.g. where to get sutures removed i.e. GP		<input type="checkbox"/>
The type of local anaesthetic used (includes strength if relevant)		<input type="checkbox"/>
The volume of local anaesthetic used		<input type="checkbox"/>
Total		<input type="checkbox"/> /6

Burns

Use these criteria for all burns and scalds only- there are separate criteria for all wounds created by different mechanisms of injury

Burns and scalds		Tick if present
What first aid / other treatment has already been performed		<input type="checkbox"/>
The location of burn on the body including the side of the body (description or diagram)		<input type="checkbox"/>
The size of burn		<input type="checkbox"/>
The depth of burn		<input type="checkbox"/>
The tetanus immunisation status of the patient		<input type="checkbox"/>
Total		<input type="checkbox"/> /5

Use this criterion, plus the above criteria on burns, if the burn was sustained in a house fire

Burns caused in house fires		Tick if present
In 'house fires' whether there is any evidence of inhalation of smoke or fumes		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Section 4 –Limb injuries (Sprains, strains and fractures etc.)

All Limb Injuries

Use the following criteria for all limb injuries - addition criteria follow for various upper and lower limb injuries

All limb injuries	Tick if present
The point of maximum tenderness	<input type="checkbox"/>
The function of the limb	<input type="checkbox"/>
The side of the injury (Left or Right)	<input type="checkbox"/>
Total	<input type="checkbox"/> /3

Use this criterion along with the criteria on limb injuries for any injuries that involve joints

Joint Injuries	Tick if present
The presence or absence of any swelling or effusion	<input type="checkbox"/>
Total	<input type="checkbox"/> /1

Use this criterion along with the criteria on limb injuries for any fractures or dislocations

Fractures or dislocations	Tick if present
Examination of distal circulation and sensation	<input type="checkbox"/>
Total	<input type="checkbox"/> /1

Now go to:-

Page 8 for further criteria on upper limb injuries
Page 9 for further criteria on lower limb injuries

Further Criteria for Upper limb injuries

Use this criterion along with the criteria on limb injuries for any injuries that involve fingers

Finger Injuries	Tick if present
The digits should always be named and never numbered	<input type="checkbox"/>
Total	<input type="checkbox"/> /1

Use this criterion along with the criteria on limb injuries for any injuries that involve thumb injuries with no fracture

Thumb Injuries with no fracture	Tick if present
If thumb injury, stability of thumb joint(s) (if fracture excluded)	<input type="checkbox"/>
Total	<input type="checkbox"/> /1

Use these criteria along with the criteria on limb injuries for any injuries that involve wrist and/or forearm injuries

Wrist and forearm injuries (traumatic)	Tick if present
In traumatic injuries to the forearm examinations of elbow, wrist and radio-ulna joints should be conducted and documented	<input type="checkbox"/>
The anatomical snuff-box should be palpated and findings documented	<input type="checkbox"/>
Total	<input type="checkbox"/> /2

Forefoot injuries with a history of PVD		Tick if present
If there is a history of peripheral vascular disease then distal pulses should be recorded		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Use this criterion along with the criteria on limb injuries and the criterion on lower limb injuries for any injuries that involve non-traumatic calf pain

Non-traumatic calf pain		Tick if present
Documentation should reflect the fact that a DVT has been considered		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Further Criteria for Lower limb injuries

Use this criterion along with the criteria on limb injuries for any injuries that involve injuries to the lower limb(s)

Lower limb injuries		Tick if present
The patient's ability to weight bear		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Use this criterion along with the criteria on limb injuries and the criterion on lower limb injuries for any injuries that are non-weight bearing

Non-weight bearing injuries		Tick if present
Consideration for an x-ray if can't weight bear or an x-ray		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Use this criterion along with the criteria on limb injuries and the criterion on lower limb injuries for any injuries that involve toe injuries

Toe Injuries		Tick if present
The toes should be identified correctly		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Use this criterion along with the criteria on limb injuries and the criterion on lower limb injuries for any injuries that could include a possible Achilles tendon injury

Possible Achilles tendon injury		Tick if present
If there is any possibility of an Achilles tendon injury, Simmond's test should be performed		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Use this criterion along with the criteria on limb injuries and the criterion on lower limb injuries for any injuries that involve a fractured upper fibula

Fractured upper fibula		Tick if present
The popliteal nerve should be examined in all cases with a fracture of the upper fibula		<input type="checkbox"/>
Total		<input type="checkbox"/> /1

Use this criterion along with the criteria on limb injuries and the criterion on lower limb injuries for any injuries that involve a forefoot injury in patients with a documented history of peripheral vascular disease

Section 5 – Minor Head Injuries

Minor Head Injuries

Use these criteria whenever a minor head injury has been sustained

Minor head injuries	Tick if present
Any loss of consciousness. If no loss of consciousness this should be recorded	<input type="checkbox"/>
Any change in consciousness/drowsiness should be documented	<input type="checkbox"/>
Any nausea or vomiting should be inquired about and recorded	<input type="checkbox"/>
Any headache should be inquired about and documented	<input type="checkbox"/>
The GCS	<input type="checkbox"/>
Any associated wounds, bruises etc.	<input type="checkbox"/>
Any signs of a basal skull fracture? should be looked for	<input type="checkbox"/>
Whether a responsible adult is able to care for the patient overnight	<input type="checkbox"/>
Enquiry and documentation of post traumatic amnesia	<input type="checkbox"/>
Examination and documentation of pupils	<input type="checkbox"/>
Enquiry and documentation of any visual disturbance	<input type="checkbox"/>
Total	<input type="checkbox"/> <input type="checkbox"/> /11

Acceptable abbreviations

#	Fracture
ACJ	Acromio-clavicular joint
AF	Atrial fibrillation
ATT	Anti tetanus toxoid
Bk PoP	Below knee plaster of Paris
C/O	Complaining of
CN	Cranial nerves
CP	Chest pain
CSM	Circulation Sensation Movement
DW	Discussed with
DIPJ	Distal interphalangeal joint
DOA	Dead on arrival
EMV	Eyes Motor Vocal
F/U	Follow up
FB	Foreign body
FROEM	Full range of eye movements
FROM	Full range of movement
FWB	Fully weight bearing
FXR	Facial x-rays
GCS	Glasgow Coma Scale
HI	Head injury
LBBB	Left bundle branch block
MCPJ	Metacarpo phalangeal joint
MI	Myocardial infarction
MTPJ	Metatarsal phalangeal joint
NAD	No abnormality detected
NBI	No bony injury
NOF	Neck of femur
NSAID	Non steroidal anti-inflammatory drug
NT	Non tender
OD	Overdose
PED	Pedestrian
PERLA	Pupils equal and reactive to light and accommodation
PIPJ	Proximal inter phalangeal joint
POP	Plaster of Paris
PTE	Pulmonary thrombo embolism
PWB	Partial weight bearing
RBBB	Right bundle branch block
ROS	Removal of sutures
RTA	Road traffic accident
SCH	Sub conjunctival haemorrhage
SIJ	Sacro-iliac joint
SLR	Straight leg raising
UAP	Unstable angina pectoris
UTD	Up to date
VF	Ventricular fibrillation
VT	Ventricular tachycardia

Appendix V. RCT of ENP-led care instruments

a Patient satisfaction questionnaire – ENP patients

b Patient satisfaction questionnaire – SHO patients

c Clinical treatment form

d Clinic referral form

e Original diary

f Patient follow-up questionnaire

PATIENT QUESTIONNAIRE

Thank you for agreeing to complete this short questionnaire about your visit to the Accident and Emergency department at Glasgow Royal Infirmary. The University of Glasgow is evaluating the minor injury service at the Royal Infirmary and your answers will help us to find out how well the service is working. When you have completed the questionnaire would you please return it by post in the envelope provided. All information you provide on this questionnaire will be treated in the strictest confidence.

- 1

Were you well treated on arrival?

Very

Quite

Not at all

☐☐☐
- 2

How long did you wait to see the nurse practitioner?

30 mins or less

30 mins to 1 hour

1 to 2 hours

More than 2 hours

☐☐☐☐
- 3

Was the time you had to wait?

Acceptable

Unacceptable

No opinion

☐☐☐

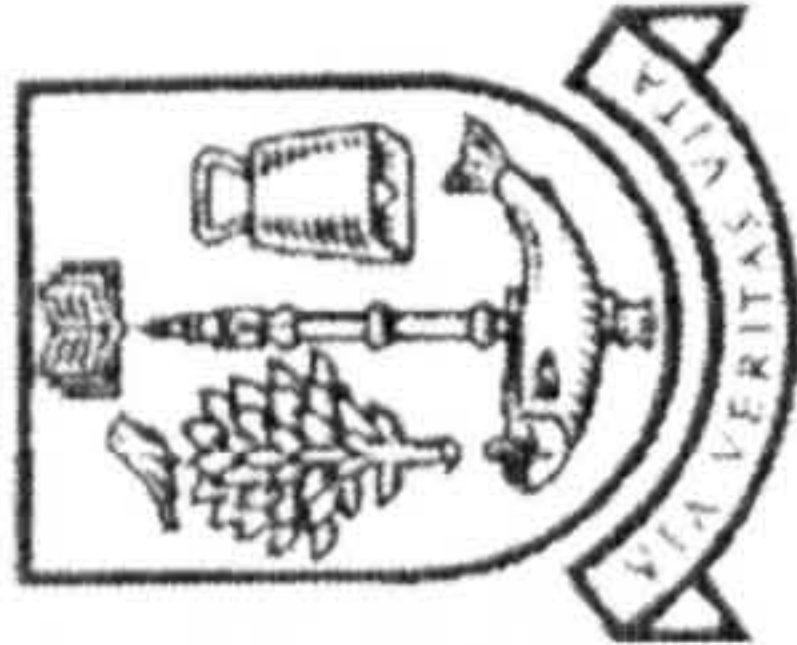
Please tick (✓) the box which most closely represents how much you agree or disagree with each statement about your consultation you have just had with the nurse practitioner.

Please read each statement very carefully		strongly disagree	disagree	unsure	agree	strongly agree
4	I feel the nurse practitioner <i>listened</i> to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	I felt it <i>difficult to ask questions</i> about my injury/condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	I feel the nurse practitioner gave me <i>enough information</i> about my injury/condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	I felt able to <i>ask questions</i> about my injury/condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	I feel the nurse practitioner could have given me <i>more time</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	I felt it <i>difficult to talk</i> to the nurse practitioner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	I feel the nurse practitioner gave me <i>enough time</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	The nurse practitioner gave me advice on how to <i>avoid illness/injuries</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	I felt it <i>easy to tell</i> the nurse practitioner about my injury/condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	I <i>understood the advice</i> the nurse practitioner gave me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	I am satisfied with the <i>treatment</i> the nurse practitioner gave me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please turn over

Have you any further comments about the service, for example anything you really liked or did not like, we would be interested to hear.

15 Comments:



UNIVERSITY
of
GLASGOW

ACCIDENT & EMERGENCY

PATIENT QUESTIONNAIRE

Glasgow Royal Infirmary NHS Trust
and
Nursing & Midwifery Studies
University of Glasgow

Thank you very much for you time and co-
operation completing this questionnaire.

Your Minor Injuries project ID number is:

PATIENT QUESTIONNAIRE

Thank you for agreeing to complete this short questionnaire about your visit to the Accident and Emergency department at Glasgow Royal Infirmary. The University of Glasgow is evaluating the minor injury service at the Royal Infirmary and your answers will help us to find out how well the service is working. When you have completed the questionnaire would you please return it by post in the envelope provided. All information you provide on this questionnaire will be treated in the strictest confidence.

- | | | | |
|---|--|-------------------|--------------------------|
| 1 | Were you well treated on arrival? | Very | <input type="checkbox"/> |
| | | Quite | <input type="checkbox"/> |
| | | Not at all | <input type="checkbox"/> |
| 2 | How long did you wait to see the doctor? | 30 mins or less | <input type="checkbox"/> |
| | | 30 mins to 1 hour | <input type="checkbox"/> |
| | | 1 to 2 hours | <input type="checkbox"/> |
| | | More than 2 hours | <input type="checkbox"/> |
| 3 | Was the time you had to wait? | Acceptable | <input type="checkbox"/> |
| | | Unacceptable | <input type="checkbox"/> |
| | | No opinion | <input type="checkbox"/> |

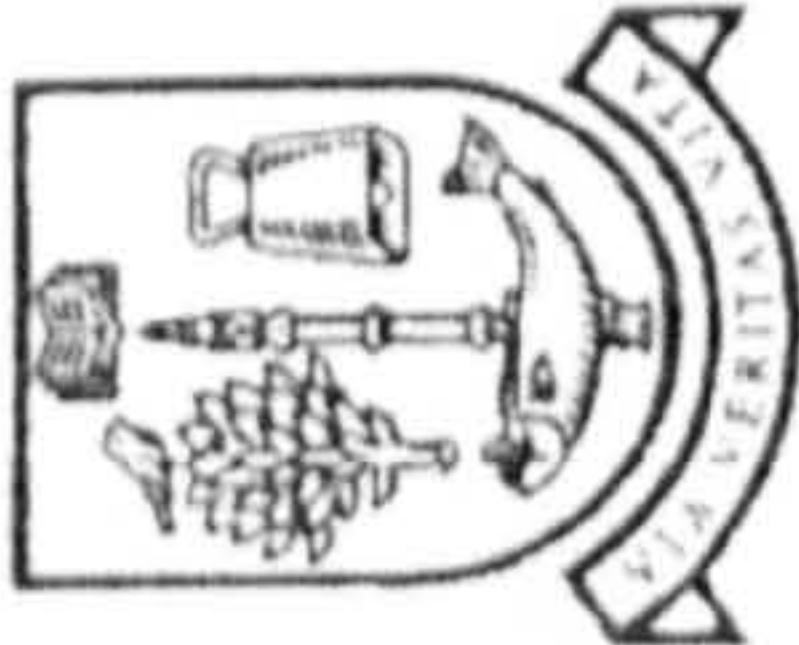
Please tick (✓) the box which most closely represents how much you agree or disagree with each statement about your consultation you have just had with the doctor.

- | Please read each statement very carefully | | strongly
disagree | disagree | unsure | agree | strongly
agree |
|--|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 4 | I feel the doctor <i>listened</i> to me | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | I felt it <i>difficult to ask questions</i> about my injury/condition | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | I feel the doctor gave me <i>enough information</i> about my injury/condition | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | I felt able to <i>ask questions</i> about my injury/condition | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 | I feel the doctor could have given me <i>more time</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9 | I felt it <i>difficult to talk</i> to the doctor | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 | I feel the doctor gave me <i>enough time</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11 | The doctor gave me advice on how to <i>avoid illness/injuries</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 | I felt it <i>easy to tell</i> the doctor about my injury/condition | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 | I <i>understood the advice</i> the doctor gave me | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14 | I am satisfied with the <i>treatment</i> the doctor gave me | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Please turn over

Have you any further comments about the service, for example anything you really liked or did not like, we would be interested to hear.

15 Comments:



UNIVERSITY
of
GLASGOW

ACCIDENT & EMERGENCY

PATIENT QUESTIONNAIRE

Glasgow Royal Infirmary NHS Trust
and
Nursing & Midwifery Studies
University of Glasgow

Thank you very much for you time and co-
operation completing this questionnaire.

Your Minor Injuries project ID number is:

Treatment record



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Information in shaded areas is essential

Please fill in as much information on the form as possible - Thank you

A&E number

AA 0 0

Instructions:

This form has been attached to the A&E notes of patients involved with the A&E minor injuries project currently underway in the department.

Please complete the whole of the front of this form (A) and leave the form attached to the A&E notes. The back of the form is for the researcher's use only.

A separate form (B) should be completed by whoever conducts the patients treatment.

The study is funded by the Chief Scientist Office and the GRI.

If you have any queries regarding the study please contact the researcher:
Mark Cooper
Research Training Fellow
on 0141 330 3249 or
radiopage via switch board

Thank you for you help with this valuable research.

ADVICE

Q1

Did you consult with anyone else regarding this patient?

Yes ☐

No ☐

If YES what did you consult for advice about?

(tick all that apply)

☐ Diagnosis

☐ X-ray interpretation

☐ Treatment

☐ Other (please specify)

If YES who was the advice sought from?

(tick all that apply)

☐ A&E Consultant

☐ A&E Middle grader

☐ A&E SHO

☐ ENP

☐ Orthopaedic Reg

☐ Radiographer

☐ Hand Reg

☐ Nursing staff (not ENP)

☐ Other Speciality
(please specify)

☐ Other (please specify)

Treatment

Q2

Who conducted the treatment?

☐ Nursing Staff

☐ Medical staff

☐ No treatment required

☐ Patient refused treatment

☐ Patient left before treatment conducted

Referred to other specialty or hospital

☐ Orthopaedics

☐ Yorkhill hospital

☐ Hand surgeon

☐ Other (please specify)

☐ A&E medical staff

Discharge
time

Thank you

Comments Box

(Please use this box if you wish to add any comments about this particular consultation and treatment)

Glasgow Royal Infirmary University NHS Trust
A&E Minor Injuries Project



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of
GLASGOW

Treatment Record

To be completed by whoever conducts treatment

A&E number

AA 0 0

Treatment		Office use only														
Q1	Who conducted treatment? (tick all that apply - if necessary) <table border="0"> <tr> <td><input type="checkbox"/> Charge nurse/ Sister</td> <td><input type="checkbox"/> ENP</td> </tr> <tr> <td><input type="checkbox"/> Staff nurse</td> <td><input type="checkbox"/> A&E SHO</td> </tr> <tr> <td><input type="checkbox"/> Enrolled nurse</td> <td><input type="checkbox"/> other grade of Doctor</td> </tr> <tr> <td><input type="checkbox"/> Student nurse</td> <td><input type="checkbox"/> No treatment required</td> </tr> <tr> <td><input type="checkbox"/> Auxiliary nurse</td> <td><input type="checkbox"/> Pt. refused treatment</td> </tr> <tr> <td><input type="checkbox"/> Medical student</td> <td><input type="checkbox"/> Pt. left before treatment conducted</td> </tr> </table>	<input type="checkbox"/> Charge nurse/ Sister	<input type="checkbox"/> ENP	<input type="checkbox"/> Staff nurse	<input type="checkbox"/> A&E SHO	<input type="checkbox"/> Enrolled nurse	<input type="checkbox"/> other grade of Doctor	<input type="checkbox"/> Student nurse	<input type="checkbox"/> No treatment required	<input type="checkbox"/> Auxiliary nurse	<input type="checkbox"/> Pt. refused treatment	<input type="checkbox"/> Medical student	<input type="checkbox"/> Pt. left before treatment conducted	<input type="checkbox"/>		
<input type="checkbox"/> Charge nurse/ Sister	<input type="checkbox"/> ENP															
<input type="checkbox"/> Staff nurse	<input type="checkbox"/> A&E SHO															
<input type="checkbox"/> Enrolled nurse	<input type="checkbox"/> other grade of Doctor															
<input type="checkbox"/> Student nurse	<input type="checkbox"/> No treatment required															
<input type="checkbox"/> Auxiliary nurse	<input type="checkbox"/> Pt. refused treatment															
<input type="checkbox"/> Medical student	<input type="checkbox"/> Pt. left before treatment conducted															
Q2	Was advice about treatment sought from anyone else? Yes <input type="checkbox"/> No <input type="checkbox"/>	<input type="checkbox"/>														
Q2a	If advice was sought who was it sought from? (tick all that apply) <table border="0"> <tr> <td><input type="checkbox"/> ENP</td> <td><input type="checkbox"/> A&E Middle grader</td> </tr> <tr> <td><input type="checkbox"/> Charge Nurse</td> <td><input type="checkbox"/> A&E SHO</td> </tr> <tr> <td><input type="checkbox"/> Staff Nurse</td> <td><input type="checkbox"/> A&E Consultant</td> </tr> <tr> <td><input type="checkbox"/> Enrolled Nurse</td> <td><input type="checkbox"/> Other Doctor</td> </tr> <tr> <td><input type="checkbox"/> Auxiliary Nurse</td> <td><input type="checkbox"/> Other (please specify)</td> </tr> <tr> <td><input type="checkbox"/> Student Nurse</td> <td></td> </tr> </table>	<input type="checkbox"/> ENP	<input type="checkbox"/> A&E Middle grader	<input type="checkbox"/> Charge Nurse	<input type="checkbox"/> A&E SHO	<input type="checkbox"/> Staff Nurse	<input type="checkbox"/> A&E Consultant	<input type="checkbox"/> Enrolled Nurse	<input type="checkbox"/> Other Doctor	<input type="checkbox"/> Auxiliary Nurse	<input type="checkbox"/> Other (please specify)	<input type="checkbox"/> Student Nurse				
<input type="checkbox"/> ENP	<input type="checkbox"/> A&E Middle grader															
<input type="checkbox"/> Charge Nurse	<input type="checkbox"/> A&E SHO															
<input type="checkbox"/> Staff Nurse	<input type="checkbox"/> A&E Consultant															
<input type="checkbox"/> Enrolled Nurse	<input type="checkbox"/> Other Doctor															
<input type="checkbox"/> Auxiliary Nurse	<input type="checkbox"/> Other (please specify)															
<input type="checkbox"/> Student Nurse																
Q3	What treatment was carried out? (tick all that apply) <table border="0"> <tr> <td><input type="checkbox"/> Support bandaging</td> <td><input type="checkbox"/> Advice only</td> </tr> <tr> <td><input type="checkbox"/> POP</td> <td><input type="checkbox"/> Analgesia</td> </tr> <tr> <td><input type="checkbox"/> Crutches</td> <td><input type="checkbox"/> Antibiotics</td> </tr> <tr> <td><input type="checkbox"/> Wound cleaning</td> <td><input type="checkbox"/> ATT</td> </tr> <tr> <td><input type="checkbox"/> Wound dressing</td> <td><input type="checkbox"/> Other (please specify)</td> </tr> <tr> <td><input type="checkbox"/> Steristrips / Glue</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Sutures</td> <td></td> </tr> </table>	<input type="checkbox"/> Support bandaging	<input type="checkbox"/> Advice only	<input type="checkbox"/> POP	<input type="checkbox"/> Analgesia	<input type="checkbox"/> Crutches	<input type="checkbox"/> Antibiotics	<input type="checkbox"/> Wound cleaning	<input type="checkbox"/> ATT	<input type="checkbox"/> Wound dressing	<input type="checkbox"/> Other (please specify)	<input type="checkbox"/> Steristrips / Glue		<input type="checkbox"/> Sutures		
<input type="checkbox"/> Support bandaging	<input type="checkbox"/> Advice only															
<input type="checkbox"/> POP	<input type="checkbox"/> Analgesia															
<input type="checkbox"/> Crutches	<input type="checkbox"/> Antibiotics															
<input type="checkbox"/> Wound cleaning	<input type="checkbox"/> ATT															
<input type="checkbox"/> Wound dressing	<input type="checkbox"/> Other (please specify)															
<input type="checkbox"/> Steristrips / Glue																
<input type="checkbox"/> Sutures																
Discharge time	<input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/>															

Instructions:

This form is part of the essential information required by the minor injuries project. The patients have agreed to be involved in the trial and your help to collect this information is very important if the effort the patient is putting into the study is to be realised. Please tick the appropriate boxes on the front of this form when you conduct this patients treatment and return the form to the box at triage afterwards.

Thank you.

The study is funded by the Chief Scientist Office and the GRI.

If you have any queries regarding the study please contact the researcher:
Mark Cooper
Research Training Fellow
on 0141 330 3249 or
radiopage via switch board

Thank you for you help with this valuable research.

Please place completed form in box at triage - *Thank you*



A&E
Minor Injuries
Project



A&E Number (or label)

AA00

To the reviewing doctor:

This patient has volunteered to participate in the A&E Minor Injuries Project, please complete this short form, detach and place in one of the project folders kept in the clinic. *Thank you.*

Please tick the appropriate boxes:

1. Which clinic?

Please ✓ appropriate boxes

Soft tissue ☐

Fracture ☐

Hand ☐

Burns ☐

2. Grade of reviewing doctor:

Consultant ☐

Middle Grader (SHO III, Staff grade, SPR) ☐

SHO ☐

3. Is this patient, *in your opinion*, an appropriate referral to this clinic?

Yes - Appropriate referral ☐

No - Inappropriate referral ☐ *please comment*

Borderline ☐ *please comment*

Comments (if any)

4. Was the management of care in A&E satisfactory?

Yes - Management of care was satisfactory ☐

No - Management of care was unsatisfactory ☐ *please comment*

Borderline ☐ *please comment*

Comments (if any)

5. Was the initial treatment in A&E likely to adversely effect clinical outcome?

No ☐

Yes ☐ *please comment*

Comments (if any)

If a patient did not attend (DNA) the clinic - please complete: DNA ☐

Action: No further appointment ☐, New appointment ☐, Letter to GP ☐

Further comments may be written on reverse if necessary

Thank you for your time completing this form.

6. I am employed / unemployed / retired / housewife / at school / at college (delete as appropriate)

7. Please tick the box next to the appropriate statement

- ☐ a) I had to have ☐ days off work / school / college but have now returned (Please fill in number of days)
- ☐ b) I am still off work / school / college
- ☐ c) I did not take any time off work / school / college

8. Please tick the box next to the appropriate statement

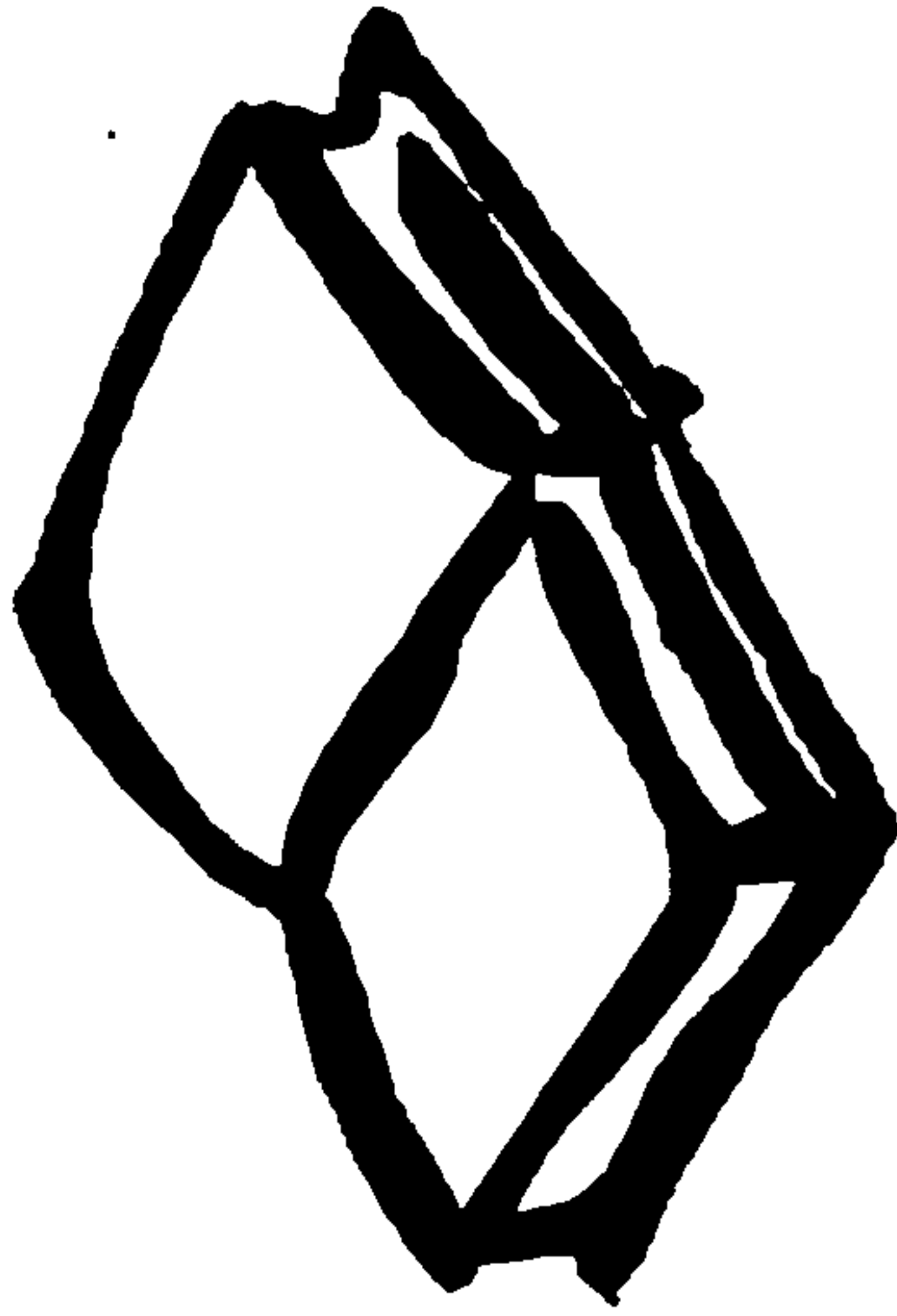
- ☐ a) I felt I had recovered completely from my injury ☐ days after first attending A&E (Please fill in number of days)
- ☐ b) I have still not recovered fully from my injury
- ☐ c) I felt I had recovered completely straight away

9. I needed further medical or nursing advice due to problems with my injury (in addition to routine follow-up appointments at hospital or with my GP) Yes ☐ No ☐

10. For patients suffering cuts or lacerations only I am / am not satisfied with the appearance of the scar (delete as appropriate)

Please return in the pre-paid envelope to:
Mr. Mark A. Cooper
Research Training Fellow
Accident & Emergency
Glasgow Royal Infirmary
84 Castle Street, Glasgow, G4 0SF

Thank you



PATIENT DIARY

Thank you for agreeing to help us with the minor injuries project. As you are aware this project is being conducted with the University of Glasgow and all information collected as part of this project will be treated with the strictest confidence.

Would you be kind enough to fill in the diary this evening (Day 1) and on the other appropriate days as listed until the 28th day, and then return it in the reply-paid envelope provided. If your injury is completely better before then you may return the diary earlier. Before you return the diary could you complete the questions on the back page.

Thank you for your valuable time.

1. Pain severity

On a scale of 0 to 10 how sore are you? (0 is no pain and 10 is the worst pain imaginable)

Put a cross on the line where you feel your pain is

Example

Day 7

X

No pain

Worse pain ever

Day 1 (Tonight)

No pain

Worse pain ever

Day 7

No pain

Worse pain ever

Day 14

No pain

Worse pain ever

Day 21

No pain

Worse pain ever

Day 28

No pain

Worse pain ever

Please fill this in tonight and then every night.

Date

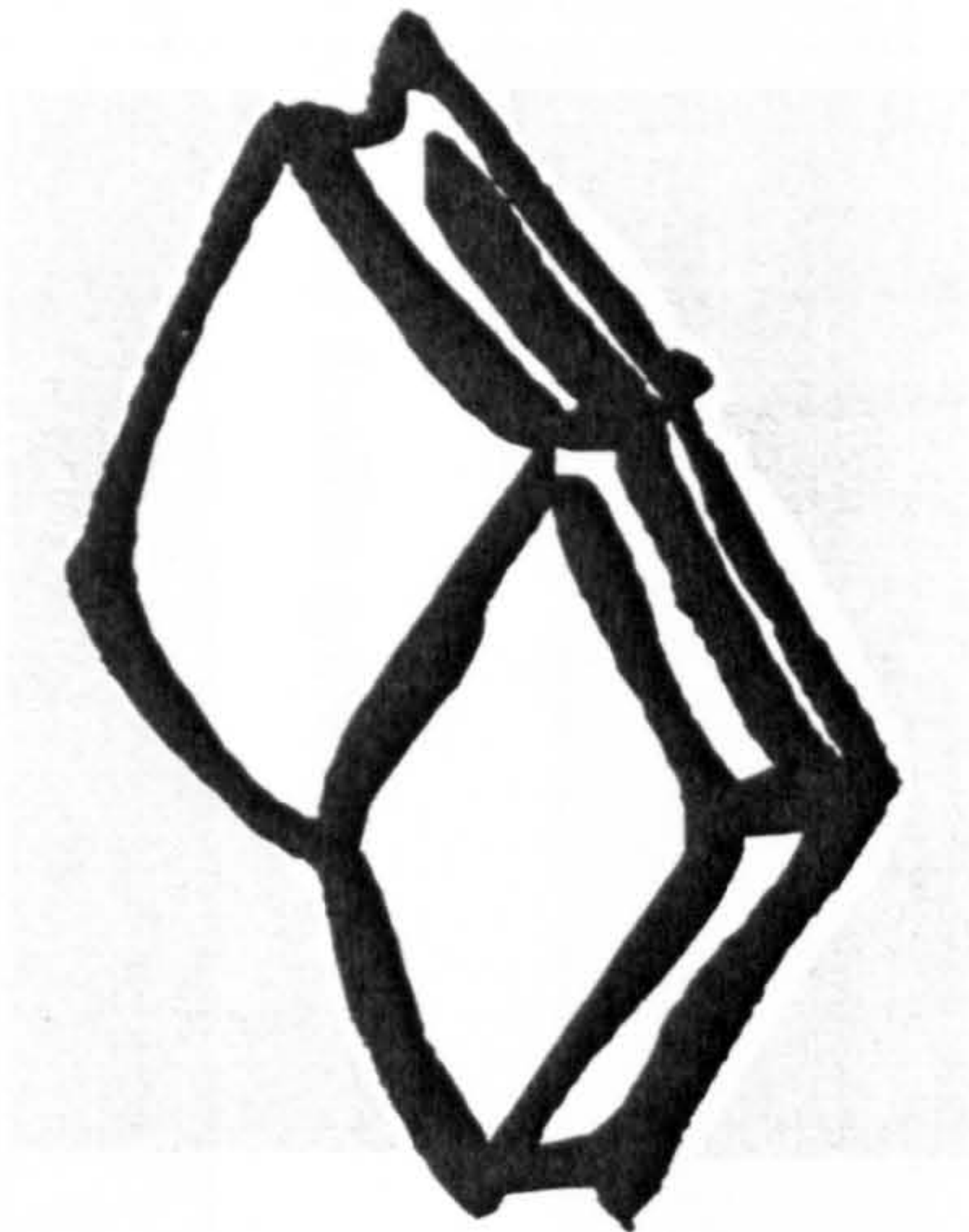
	Day 1	Day 7	Day 14	Day 21	Day 28
2. Do you get any pain from your injury? (tick one of these boxes each day)					
Never	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Now & then	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Most of the time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All of the time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please fill this in tonight and then every night.

Date

	Day 1	Day 7	Day 14	Day 21	Day 28
3. Have you taken any pain killers today? (tick one of these boxes each day)					
No pain killers taken today	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain killers taken now and then	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain killers taken regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Other symptoms (tick any that apply each day)					
Swelling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stiffness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wound not healing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wound bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wound septic (infected)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Activity (tick whichever of these applies each day)					
Looking after myself as normal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Need some help looking after myself because of my injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking as well as usual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking difficult because of injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Able to go to work/school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unable to go to work/school because of injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sleep normal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sleep disturbed because of injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Accident & Emergency Minor injuries project



PATIENT FOLLOW-UP QUESTIONNAIRE

Thank you for agreeing to help us with the minor injuries project. As you are aware this project is being conducted with the University of Glasgow and all information collected as part of this project will be treated with the strictest confidence.

Would you be kind enough to complete this questionnaire, and then return it in the reply-paid envelope provided. Before you return the questionnaire could you make sure you have completed the questions on the back page.

Thank you for your valuable time.

Your Minor Injuries project ID number is:

--	--	--	--	--	--	--	--

7. I am employed / unemployed / retired / housewife / at school / at college (circle as appropriate)

8. Please tick the box next to the appropriate statement

- ☐ a) I had to have days off work / school / college but have now returned (Please fill in number of days)
- ☐ b) I am still off work / school / college
- ☐ c) I did not take any time off work / school / college

9. Please tick the box next to the appropriate statement

- ☐ a) I felt I had recovered completely from my injury days after first attending A&E (Please fill in number of days)
- ☐ b) I have still not recovered fully from my injury
- ☐ c) I felt I had recovered completely straight away

10. I needed further medical or nursing advice due to problems with my injury (in addition to routine follow-up appointments at hospital or with my GP)

- ☐ Yes
- ☐ No

11. For patients suffering cuts only

I am / am not satisfied with the appearance of the scar (delete as appropriate)

12. Are there any comments to wish to make about your treatment or recovery?

.....

.....

.....

.....

Please return in the enclosed envelope - Thank you

PATIENT QUESTIONNAIRE

1. Type of injury/problem

Please describe the illness or injury which made you come to the Accident & Emergency (Casualty) department

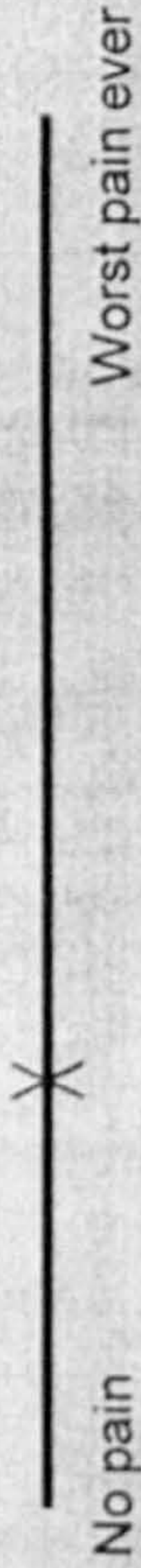
.....

2. How sore are you today?

The line below represents your level of pain, from no pain on the left to the worst pain you can imagine on the right.

Put a cross on the line where you feel your pain is

Example



No pain

Worst pain ever

3. Do you still get any pain from your injury?

(tick one of these boxes)

- Never
- Now & then
- Most of the time
- All of the time

☐

☐

☐

☐

4. Have you taken any pain killers today?

(tick one of these boxes)

- No pain killers taken today
- Pain killers taken now and then
- Pain killers taken regularly

☐

☐

☐

5. Do you have any of these symptoms?

(tick any that apply)

- Swelling
- Stiffness
- Wound not healing
- Wound bleeding
- Wound septic (infected)

☐

☐

☐

☐

☐

6. Activity

(tick whichever of these apply)

Looking after myself as normal

☐

Need some help looking after myself because of my injury

☐

Walking as well as usual

☐

Walking difficult because of injury

☐

Able to go to work/school

☐

Unable to go to work/school because of injury

☐

Sleep normal

☐

Sleep disturbed because of injury

☐

Please turn over

Appendix VI. Unplanned follow-up study questionnaire



ACCIDENT & EMERGENCY Patient Follow-up Questionnaire

We are interested in how your recovery from your recent injury has progressed since your visit to the Accident and Emergency (A&E) Department in Glasgow Royal Infirmary one month ago. Please just tick the answer(s) to the questions which are nearest your views. Please feel free to add comments or further explanations next to any question.

SECTION A: EXPERIENCE IN ACCIDENT & EMERGENCY DEPARTMENT

1. Why did you attend the A&E department?

2. Overall how would you rate the care and treatment you received for your injury?

Very Good ☐

Good ☐

Satisfactory ☐

Poor ☐

Very Poor ☐

3. Did the care and treatment you received in A&E meet your expectations?

Yes ☐

No ☐

No opinion ☐

If no, can you tell us why?

4. Approximately, how long did you have to wait before you were seen by a doctor or nurse practitioner?

30 mins or less ☐

30 mins to 1 hour ☐

1 to 2 hours ☐

More than 2 hours ☐

Can't recall ☐

5. In your opinion, was the time you had to wait acceptable?

Yes ☐

No ☐

No opinion ☐

6. Did anyone (e.g. friend/relative/carer) accompany you when you saw the doctor or nurse practitioner?

Yes ☐

No ☐

Can't recall ☐

Office use
only

Q1

Q2

Q3

Q3a

Q4

Q5

Q6

T

X

X

X

X

X

7. Did you feel you were given sufficient information on how to look after your injury? (e.g. rest, elevation, etc)

Yes ☐
No ☐
No opinion ☐

8. Did you feel you were given enough information on what to expect during your recovery? (e.g. length of time to heal, how much pain to expect etc)

Yes ☐
No ☐
No opinion ☐

SECTION B: FOLLOW-UP APPOINTMENTS

9. Were you advised to attend for a follow-up appointment at the hospital? (e.g. were you given a fracture clinic, soft tissue clinic, burns clinic or another clinic appointment).

Yes ☐
No ☐
No, but felt I should have been given an appointment ☐

If yes, were you able to keep this appointment?

Yes ☐
No ☐

If you couldn't keep the appointment, could you tell me why? (Tick as many as apply)

Felt better ☐
Nobody to look after children / elderly parent etc. ☐
Felt appointment wasn't necessary ☐
Didn't have time ☐
Forgot ☐
Couldn't get time off work ☐
Couldn't get an appointment at a suitable time ☐
Returned to A&E instead ☐
Couldn't get to appointment due to transport problems ☐
Other, please specify _____ ☐

10. Were you advised to make an appointment with your GP (family doctor) or practice nurse?

Yes ☐
No ☐

If yes, Why were you asked to make this appointment? (Tick as many as apply)

To get stitches taken out ☐
To get your wound re-dressed ☐
For further supplies of medication ☐
To see about another medical problem ☐
For routine follow-up ☐
Other, please specify _____ ☐

Did you make this appointment?

Yes ☐
No ☐

Were you able to keep this appointment?

Yes ☐
No ☐

Office use
only



C-T



Office use
only

If you didn't make an appointment or didn't manage to keep the appointment please tick which reasons listed below were applicable (*Tick as many as apply*)

- Felt better ☐
 Nobody to look after children / elderly parent etc. ☐
 Felt appointment wasn't necessary ☐
 Didn't have time ☐
 Forgot ☐
 Couldn't get time off work ☐
 Couldn't get an appointment at a suitable time ☐
 Not registered with a GP ☐
 Returned to A&E instead ☐
 Couldn't get to appointment due to transport problems ☐
 Other, please specify _____ ☐

Q10d



X

C-T

11. At any time in the month after your attendance in A&E, have you (or someone on your behalf) had to seek further medical or nursing advice due to problems with your initial injury (*in addition to routine follow-up appointments at hospital or with your GP*)?

Yes ☐
No ☐

Q11



X

If yes, how many days after your visit to A&E did you first go for further advice?
Please write in box below.

Q11a

If yes, Where did you seek that advice from? (*Tick as many as apply*)

	Visit	Telephone Advice
General Practitioner (GP) :	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Doctor (e.g. GEMS) :	<input type="checkbox"/>	<input type="checkbox"/>
Occupational Health Doctor/Nurse :	<input type="checkbox"/>	<input type="checkbox"/>
Practice Nurse :	<input type="checkbox"/>	<input type="checkbox"/>
District Nurse :	<input type="checkbox"/>	<input type="checkbox"/>
Physiotherapist :	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacist :	<input type="checkbox"/>	<input type="checkbox"/>
Glasgow Royal Infirmary A&E department :	<input type="checkbox"/>	<input type="checkbox"/>
Stobhill Hospital Casualty department :	<input type="checkbox"/>	<input type="checkbox"/>
Western Infirmary (Glasgow) A&E department :	<input type="checkbox"/>	<input type="checkbox"/>
Monklands Hospital A&E department :	<input type="checkbox"/>	<input type="checkbox"/>
Victoria Infirmary (Glasgow) A&E department :	<input type="checkbox"/>	<input type="checkbox"/>
Southern General A&E department :	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify _____	<input type="checkbox"/>	<input type="checkbox"/>

Q11b
Q11c

X

C-T X2

If you needed to seek further advice, why was this? (*Tick as many reasons as apply*)

- Wanted a second opinion ☐
 Injury not healing as fast as expected ☐
 Wound became infected ☐
 Felt I needed an x-ray ☐
 Felt I needed pain killers ☐
 Felt I needed antibiotics ☐
 Problems with plaster cast ☐
 Problems with the wound dressing ☐
 Felt I needed physiotherapy ☐
 Needed a sick line for work ☐
 Re-injured myself ☐
 Other, please specify _____ ☐

Q11d



X

C-T

If yes, was your treatment changed at all?

Yes ☐No ☐

If yes, what changes were made to your treatment? (Tick all that apply)

- Given a support bandage and/or sling ☐
Given some painkillers and/or antibiotics ☐
Given an appointment for physiotherapy ☐
Given a plaster cast ☐
Had a small surgical procedure under local anaesthetic ☐
Asked to return to A&E ☐
Given an appointment for a hospital out-patients clinic ☐
Admitted to hospital ☐
Other, please specify _____ ☐

SECTION C: ABOUT YOU

12. Which of the following best describes you?

- Employed ☐
Self-employed ☐
Unemployed ☐
Retired ☐
At College/University/School ☐
At home with dependants (e.g. children) ☐

13. As a result of your injury, did you have to take any time off work/school/college etc?

Yes ☐No ☐

If yes, How many days did you need to take off? Please write in box below.

SECTION D: YOUR COMMENTS & SUGGESTIONS

14. Do you have any suggestions on how we can improve our service for patients with minor injuries?

15. Are there any comments you would like to make about your treatment or subsequent recovery?

Thank you for completing this questionnaire.
Your contribution to this project is greatly appreciated.

Q11e

Q11f

C-T

Q12

Q13

Q13a

Q14

Q15

Appendix VII. Emergency nurse practitioner protocols

a Glasgow Royal Infirmary ENP protocols (1998)

b North Glasgow University Hospitals NHS Trust ENP protocols (2001)

Accident & Emergency Department

Emergency Nurse Practitioner

Protocols

1998

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2.	Finger pulp injuries	4-4
3.	Soft tissue injuries distal to elbow/knee	4-5
4.	Minor head injury	4-6
5.	Restricting ring	4-7
6.	Pre-tibial lacerations	4-8
7.	Minor wounds	4-9
8.	Superficial burns & scalds	4-10
9.	Minor toe injuries	4-11
10	Repair/replace plaster casts	4-12
11.	Embedded earrings/butterflies	4-13
12.	Tetanus immunisation	4-14

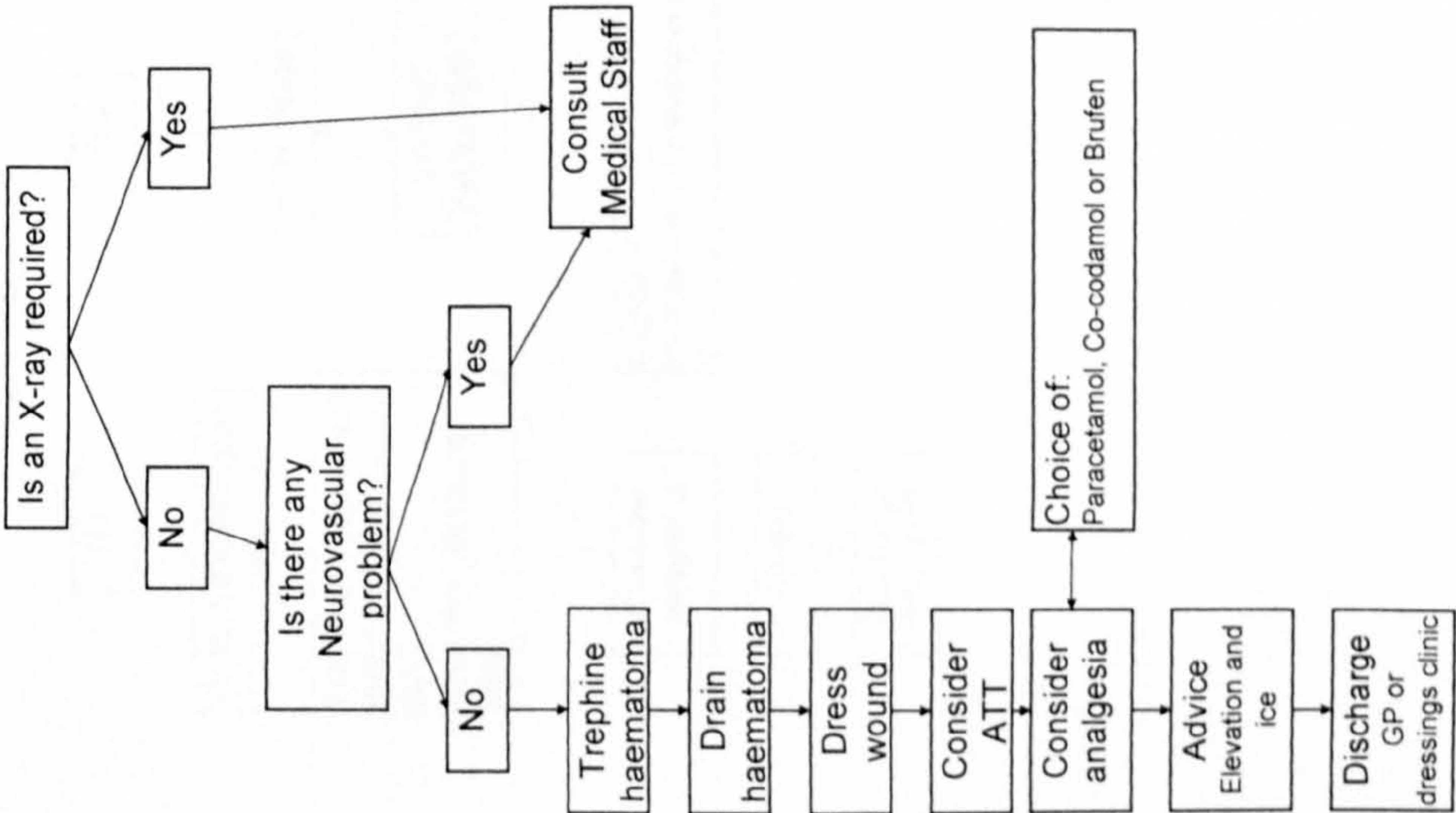
Protocol 1

The ENP can assess, treat and discharge patients with a sub-ungual haematoma.

In notes include:

- History
- Mechanism of injury
- Size of wound
- Anatomical area
- Tetanus status

Examination:



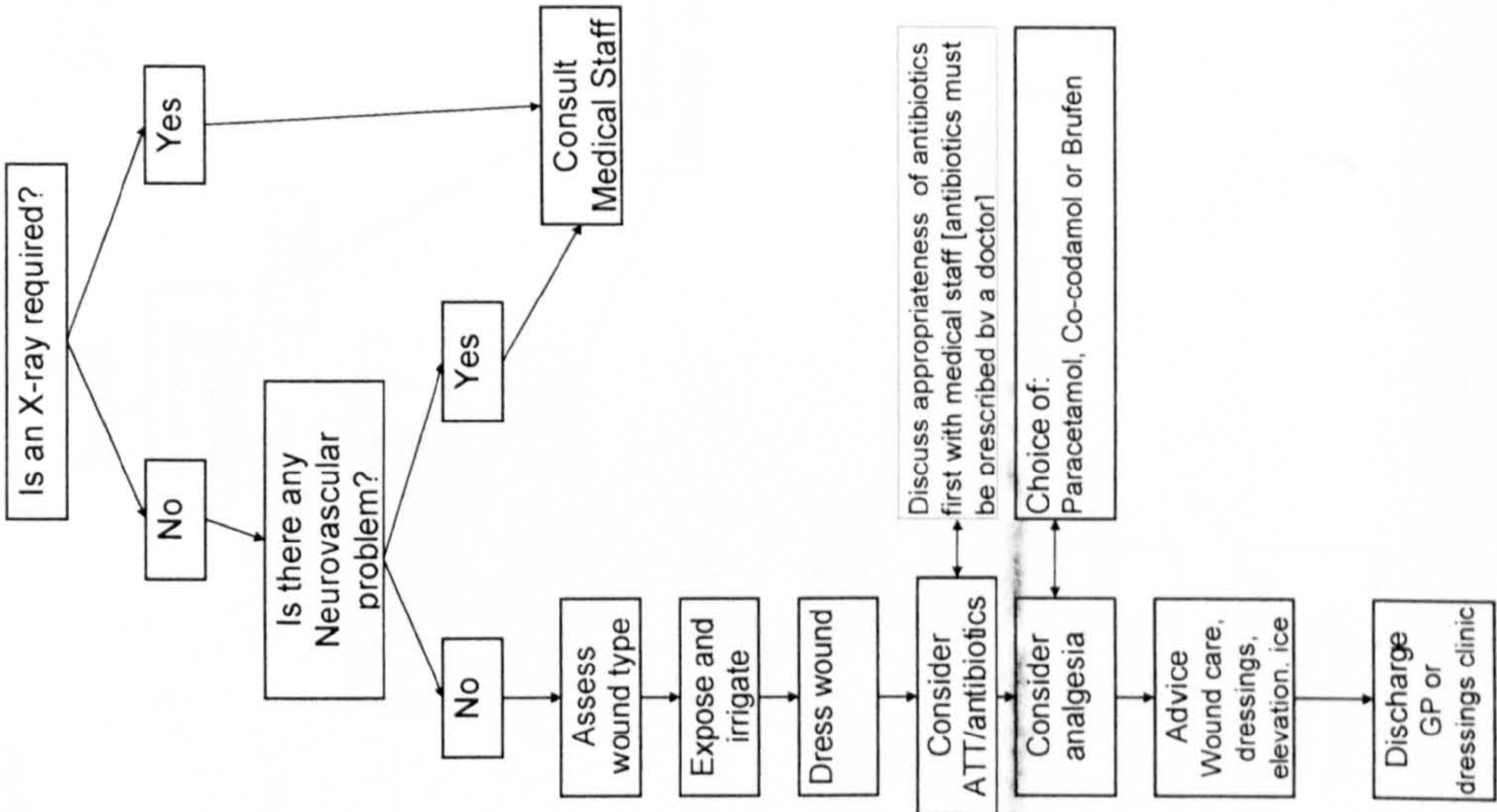
Protocol 2

The ENP can assess, treat and discharge patients with pulp injuries to fingers

In notes include:

- Date and time
- History
- Mechanism of injury
- Size of wound
- Anatomical area
- Tetanus status

Examination:

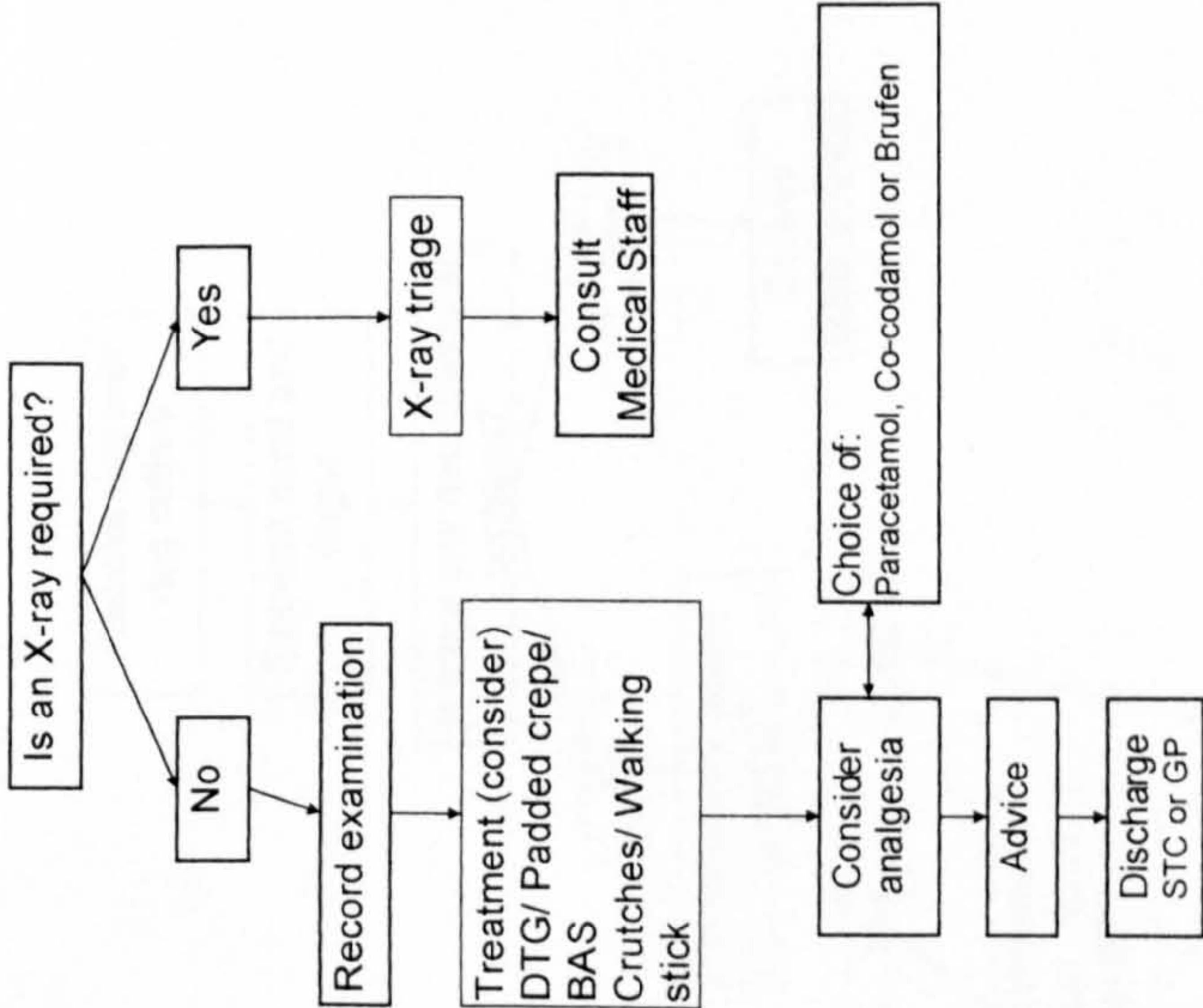


Protocol 3

The ENP can assess, treat and discharge patients with soft tissue injuries distal to the knee/elbow.

- In notes include:*
History
Mechanism of injury
Remove rings

Examination:



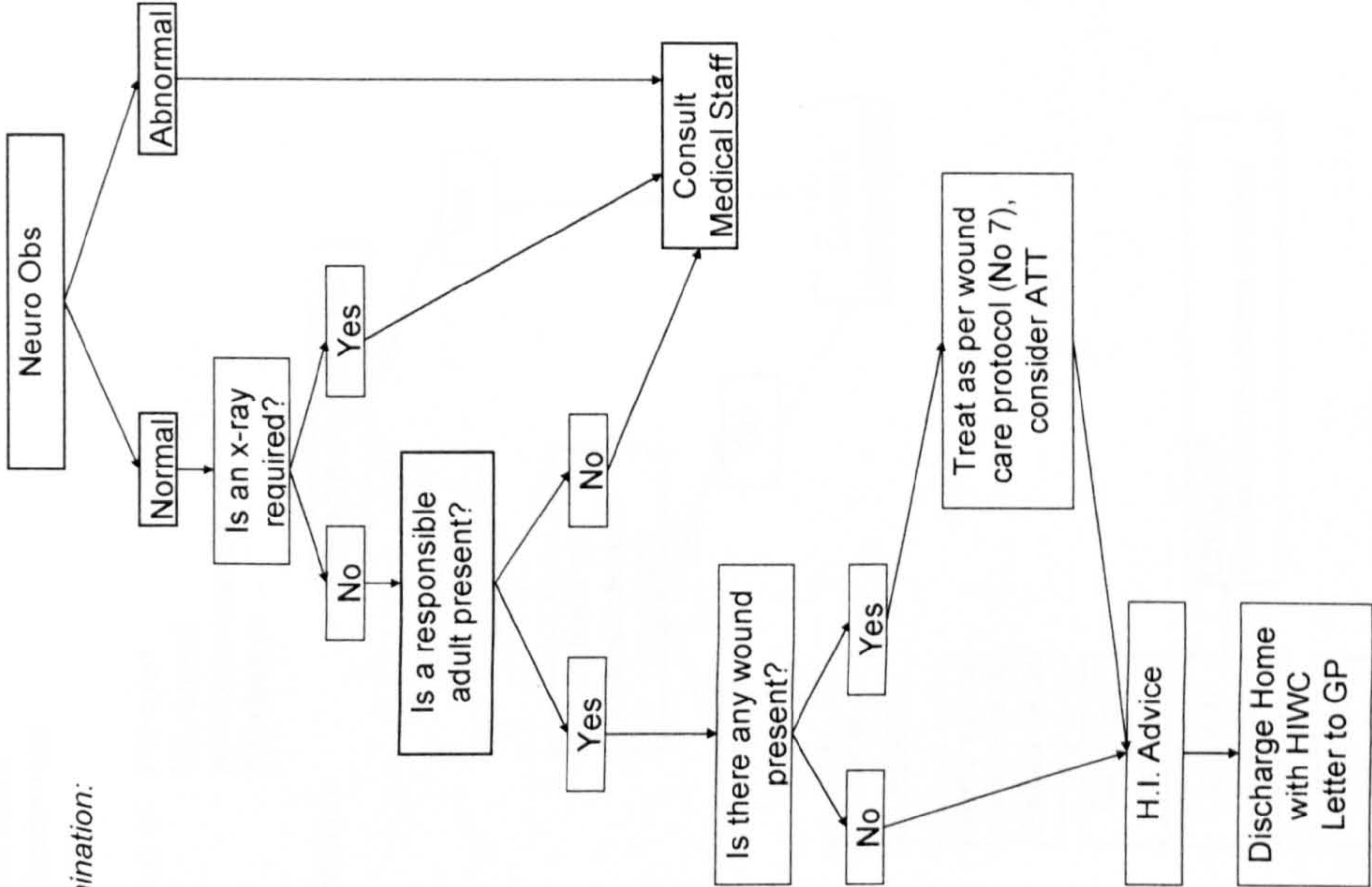
Protocol 4

The ENP can assess, treat and discharge patients with a minor head injury* providing the patient is not under the influence of alcohol or drugs and is accompanied by a responsible adult.

*A minor head injury is defined as a blow to the head which has not resulted in, a loss of consciousness, amnesia, neurological deficit, accompanying neck pain, abnormal drowsiness, significant scalp laceration.

- In notes include:*
History
Mechanism of injury

Examination:

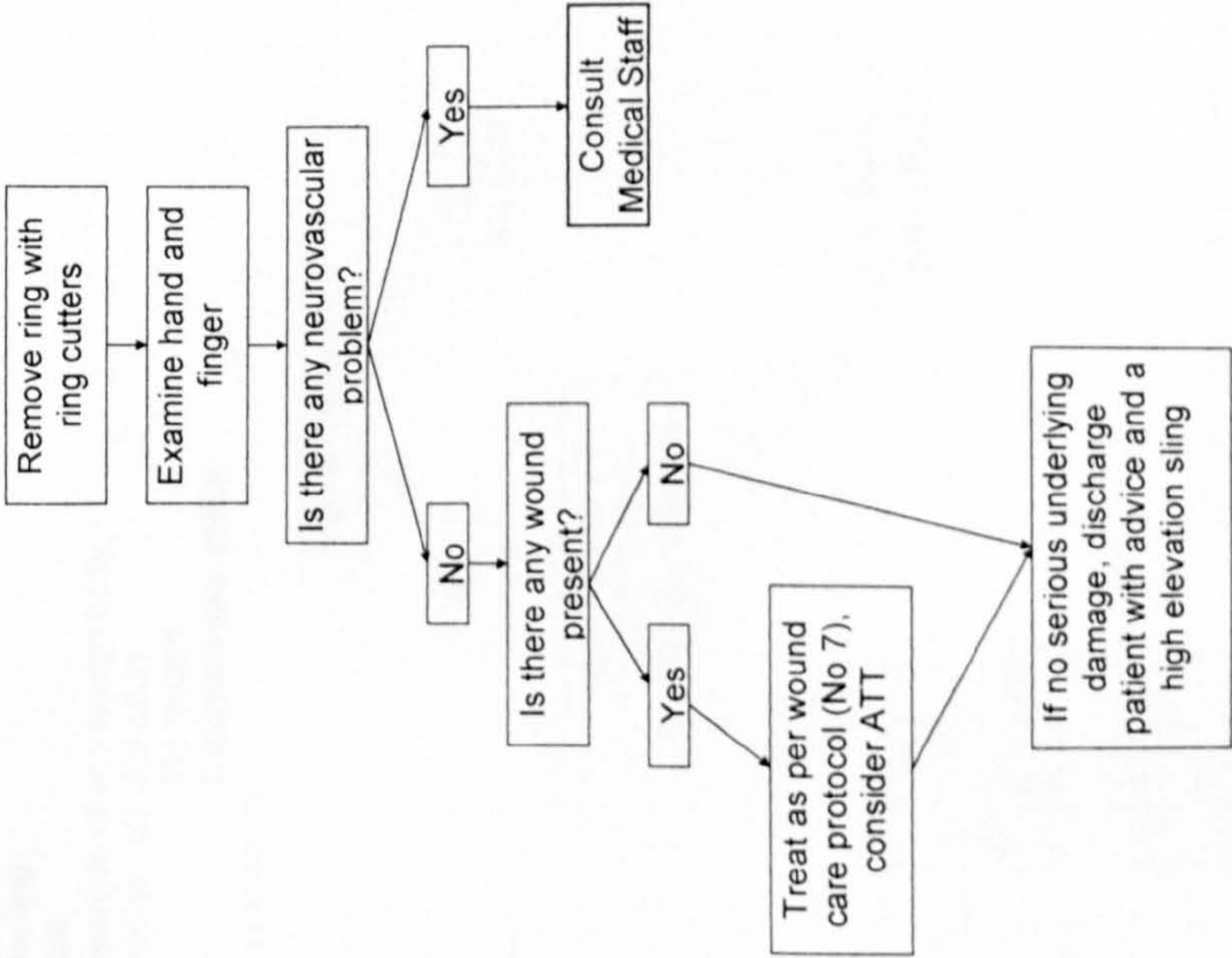


Protocol 5

The ENP can assess, treat and discharge patients with a restricting ring.
[Removal of ring(s)] Providing the ENP is satisfied that there is no underlying damage to the digit.

In notes include:
History

Examination:

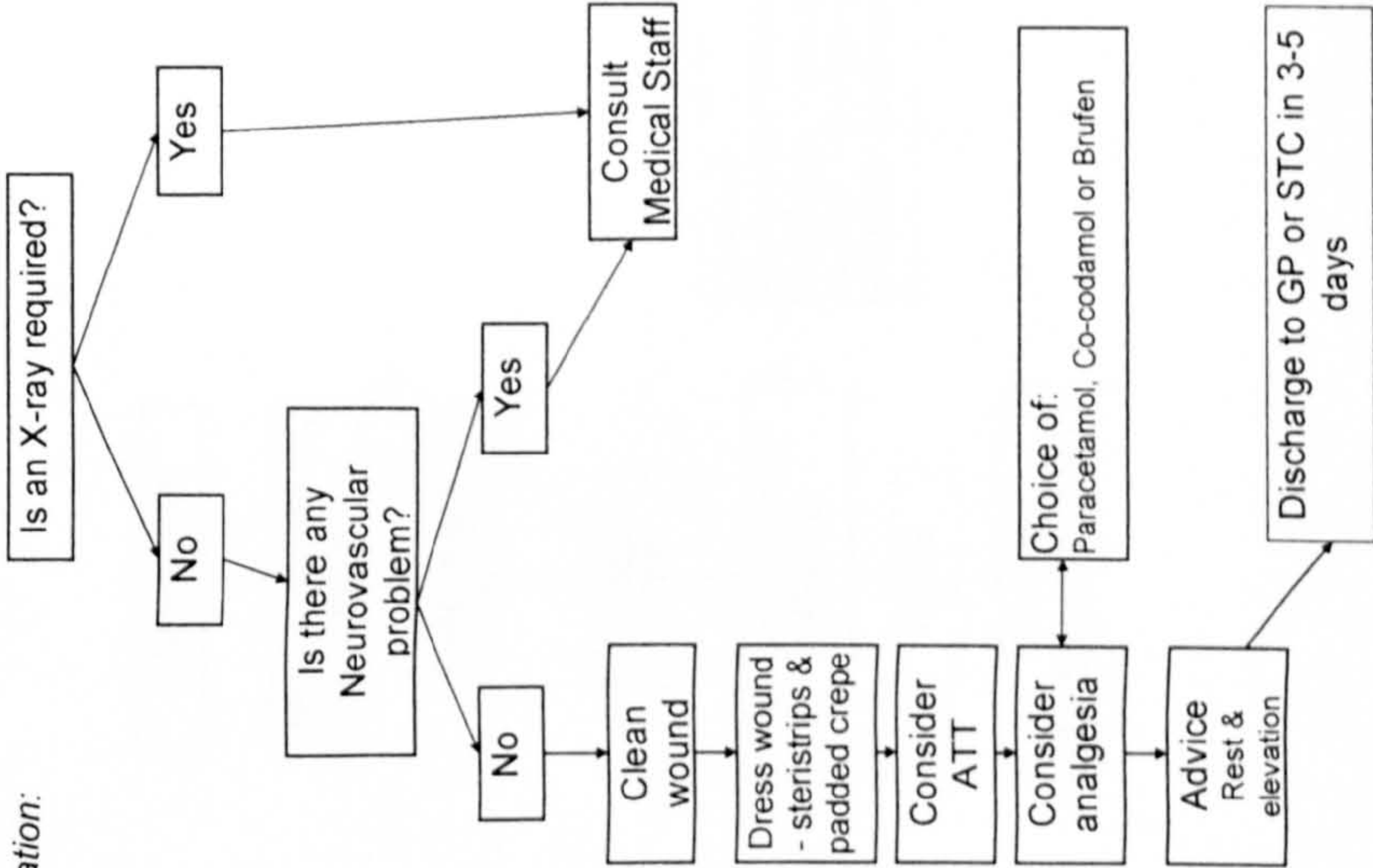


Protocol 6

The ENP can assess, treat and discharge patients with pre-tibial lacerations.
Except patients suffering from peripheral vascular disease, diabetes or on steroid therapy (these patients must be referred to a doctor).

In notes include:
History
Mechanism of injury
Size of wound
Anatomical area
Tetanus status
Bony tenderness
Swelling
Pain
Any loss of: Function
Movement
Neurovascular deficit
Skin/tissue

Examination:



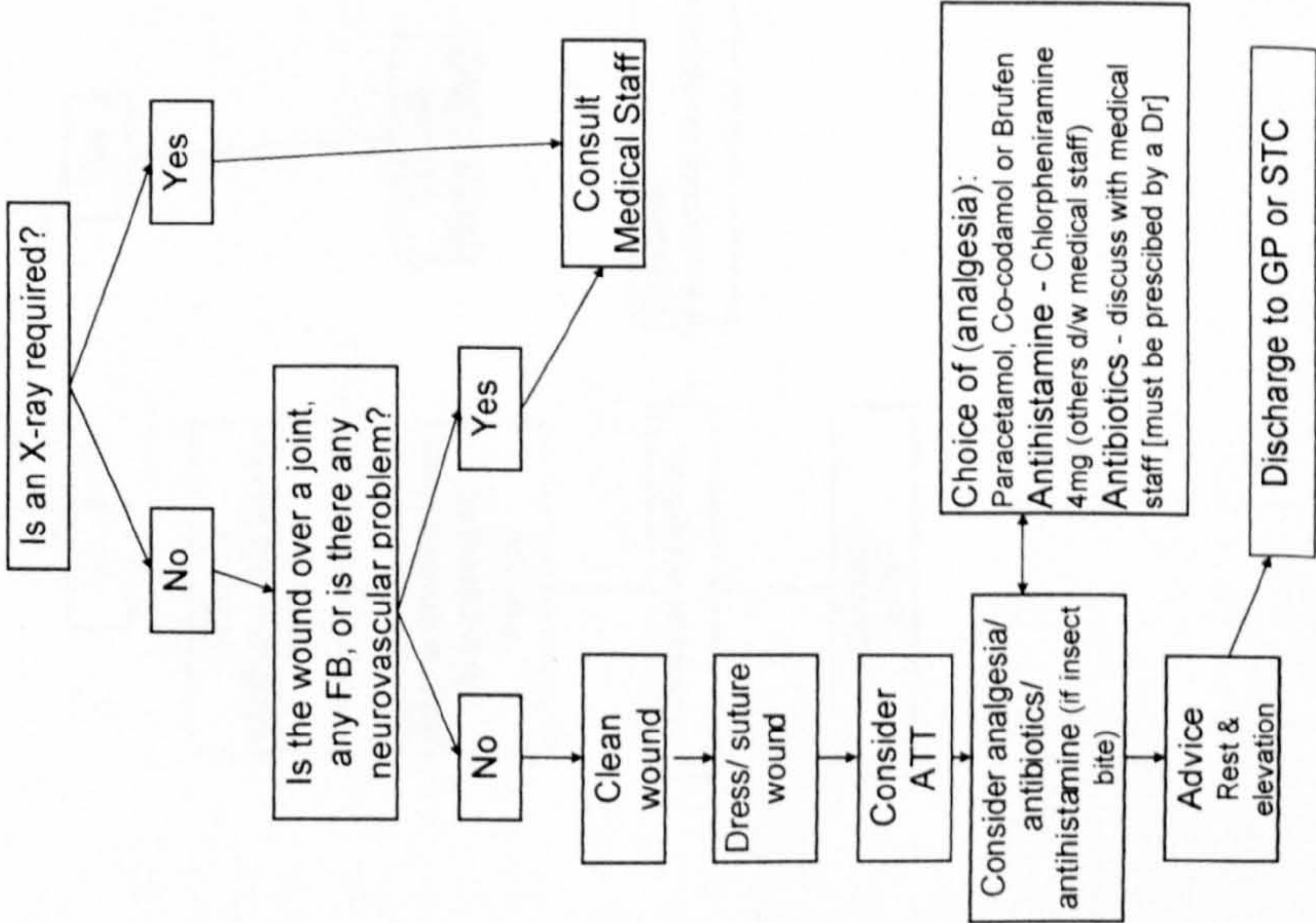
Protocol 7

The ENP can assess, treat and discharge patients with minor wounds and superficial puncture wounds (including insect bites).

In notes include:

- History
- Mechanism of injury
- Size and depth of wound
- Whether wound is over a joint
- Anatomical area
- Tetanus status
- Bony tenderness
- Swelling
- Pain
- Presence of any foreign body
- Any loss of: Function
- Movement
- Neurovascular deficit

Examination:



Protocol 8

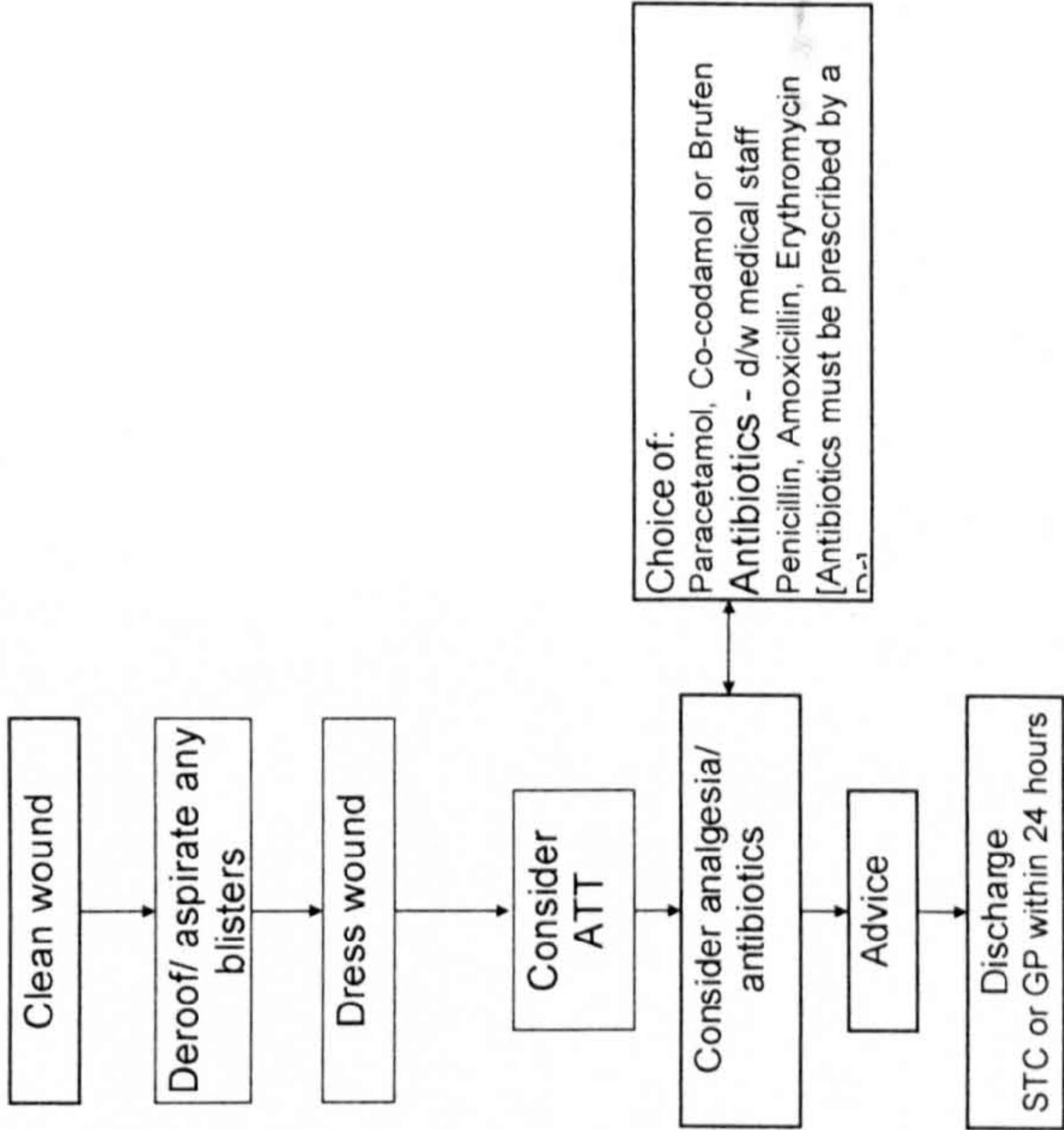
The ENP can assess, treat and discharge patients with superficial burns and scalds*.

*A minor burn is defined as covering less than 3% of body surface in an adult and does not involve genitalia or the face. The causative agent was wet heat e.g. steam or dry heat e.g. hot plate. Electrical, chemical or circumferential burns should be referred to medical staff.

In notes include:

- History
- Mechanism of injury
- Anatomical area
- Depth of burn
- Area of burn including skin loss and erythema
- Swelling
- Pain
- Causative agent
- Any loss of: Function
- Movement
- Neurovascular deficit

Examination:



Protocol 9

The ENP can assess, treat and discharge patients with minor injuries to their toes*.

*A minor injury is when there is no deformity, dislocation or crushing of the toe, minimal swelling and no neurovascular deficit.

In notes include:

History

Mechanism of injury

Anatomical area

Swelling

Pain

Any loss of:

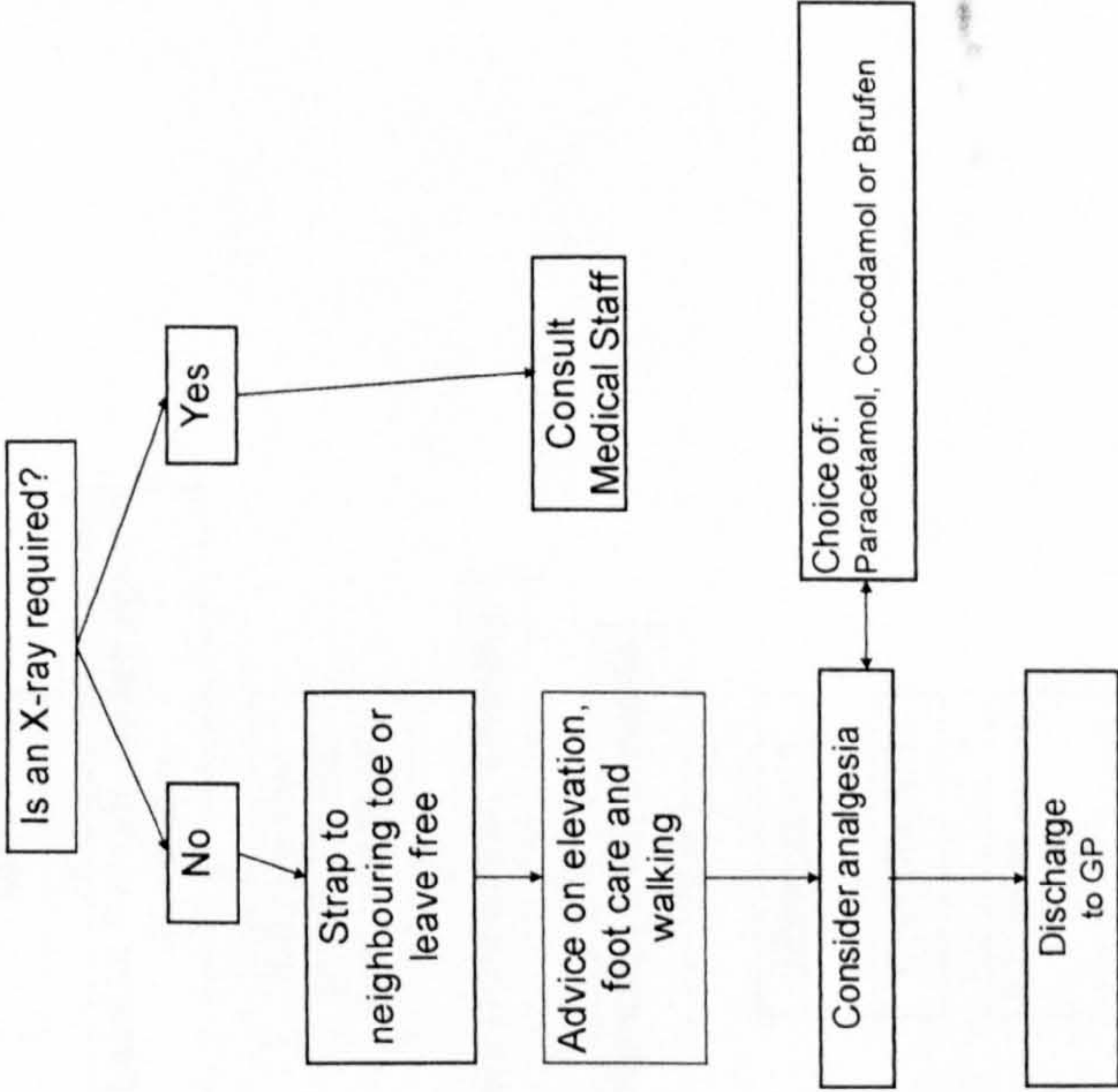
Function

Movement

Neurovascular deficit

Ability to weight bear

Examination:



Protocol 10

The ENP can authorise the repair or replacement of plaster of paris cast where the plaster has been damaged by getting wet, cracked by over use, loose because underlying swelling has settled.

When the plaster has been replaced/repared the patient should be advised to keep their original follow up clinic appointment and given instructions for care of the plaster cast and affected limb. The ENP must not authorise the final removal of a plaster cast or remove any plaster if the patient has had a recent manipulation or orthopaedic/hand surgery.

Any patient who is complaining of pain under a particular area of plaster must be referred to a doctor, who may decide to cut a window in the plaster and inspect for plaster sores.

Any patient with a vascular or neurological complication arising from the position of the plaster must be referred to as doctor.

Protocol 11

The ENP can assess, treat and discharge patients who present with embedded earrings/butterflies in the ear lobes provided there are no significant signs of infection.

Notes must include:

History

Mechanism of injury

Note any:

Swelling

Pain

Erythema

Infection

Tetanus status

Examination

Position patient
under a clear bright
light

If child Use EMLA cream and see again in
45 minutes

Infiltrate area
around FB with
local anaesthetic

Make small incision if required

Remove FB with mosquito
forceps

Dress wound

Consider ATT

Advice on wound
care

Consider if
antibiotics are
required

Antibiotics (choice of) -
d/w medical staff first
Penicillin, Amoxicillin, Erythromycin
[Antibiotics must be prescribed by a Dr]

Discharge to GP
or STC

Protocol 12

The ENP can administer ATT to patients requiring anti-tetanus only or combined with treatment for wounds when tetanus could be a consequence.

An injection of 0.5ml absorbed tetanus vaccine is given by intramuscular or deep subcutaneous injection. The following guidelines should be adhered to:

Immunisation of Infants and under ten years old

Under normal circumstances tetanus immunisation is given in conjunction with the triple vaccine to infants. This consists of injections at two, three and four months. This completes their primary immunisation against tetanus and gives cover until around five years.

A reinforcing dose is usually given at primary school age around five years and this gives cover for a further ten years.

Immunisation of adults and over ten years old

For primary immunisation (i.e. those who did not complete their primary immunisation course), the course consists of three doses of 0.5ml absorbed tetanus vaccine by the usual route, with intervals of one month between each dose.

A reinforcing dose ten years after the primary course and again ten years later maintains a satisfactory level of protection which should be continued life long.

For immunised adults, booster doses at less than ten year intervals are not recommended since they have been shown to be unnecessary and can cause local reactions.

Tetanus Prophylaxis

Tetanus prone wound:

- Any wound or burn sustained more than six hours before surgical treatment of the wound or burn.
- Any wound or burn at any interval after injury that shows one or more of the following characteristics:
 1. A significant degree of devitalised tissue
 2. Puncture type wound
 3. Contact with soil or manure likely to harbour tetanus organisms
 4. Clinical evidence of sepsis

Clean wound:

Any wound less than six hours old, clean, incised or superficial.

Immunisation Status	Tetanus Prone Wound	Clean Wound
Complete ATT course or booster within the last 10 years	Nothing (a dose of HATI may be given if risk of infection considered especially high (e.g. contamination with stable manure)	Nothing
Complete ATT course or last booster over 10 years ago	ATT booster plus HATI	ATT booster
Never completed course or immunity unknown	A full course of ATT plus HATI	full ATT course

HATI 250iu in 1ml is given IM at a different site to the ATT

Adverse reactions

- Local reactions, such as pain, redness and swelling round the injection site may occur and persist for several days. General reactions, which are uncommon, include headache, lethargy, malaise, myalgia and pyrexia. Acute anaphylactic reactions and urticaria may occasionally occur and, rarely, peripheral neuropathy. Persistent nodules at the injection site may arise if the injection is not given deeply enough.

Contraindications

- Tetanus vaccine should not be given to an individual suffering from acute febrile illness except in the presence of a tetanus-prone wound. Minor infections without fever or systemic upset are not reasons to postpone immunisation.
- Immunisation should not proceed in individuals who have had an anaphylactic reaction to a previous dose. Research suggests that an adverse reaction to tetanus toxoid does not preclude future immunisation with the same material. Although if it is done it is best performed in a setting where there are facilities to deal with any allergic reactions.

Adapted from: DoH (1996) *Immunisation against infectious disease*. London:HMSO

North Glasgow University Hospitals NHS Trust

Accident & Emergency Departments

Emergency Nurse Practitioner

Core
Minor Injury
Protocols

2001

Index

Protocol No:	Protocol	Page No:
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2.	Finger pulp injuries	4
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9.	Minor toe injuries	15
10	Repair/replace plaster casts	16
11.	Embedded earrings/butterflies	17
12.	Tetanus immunisation	18

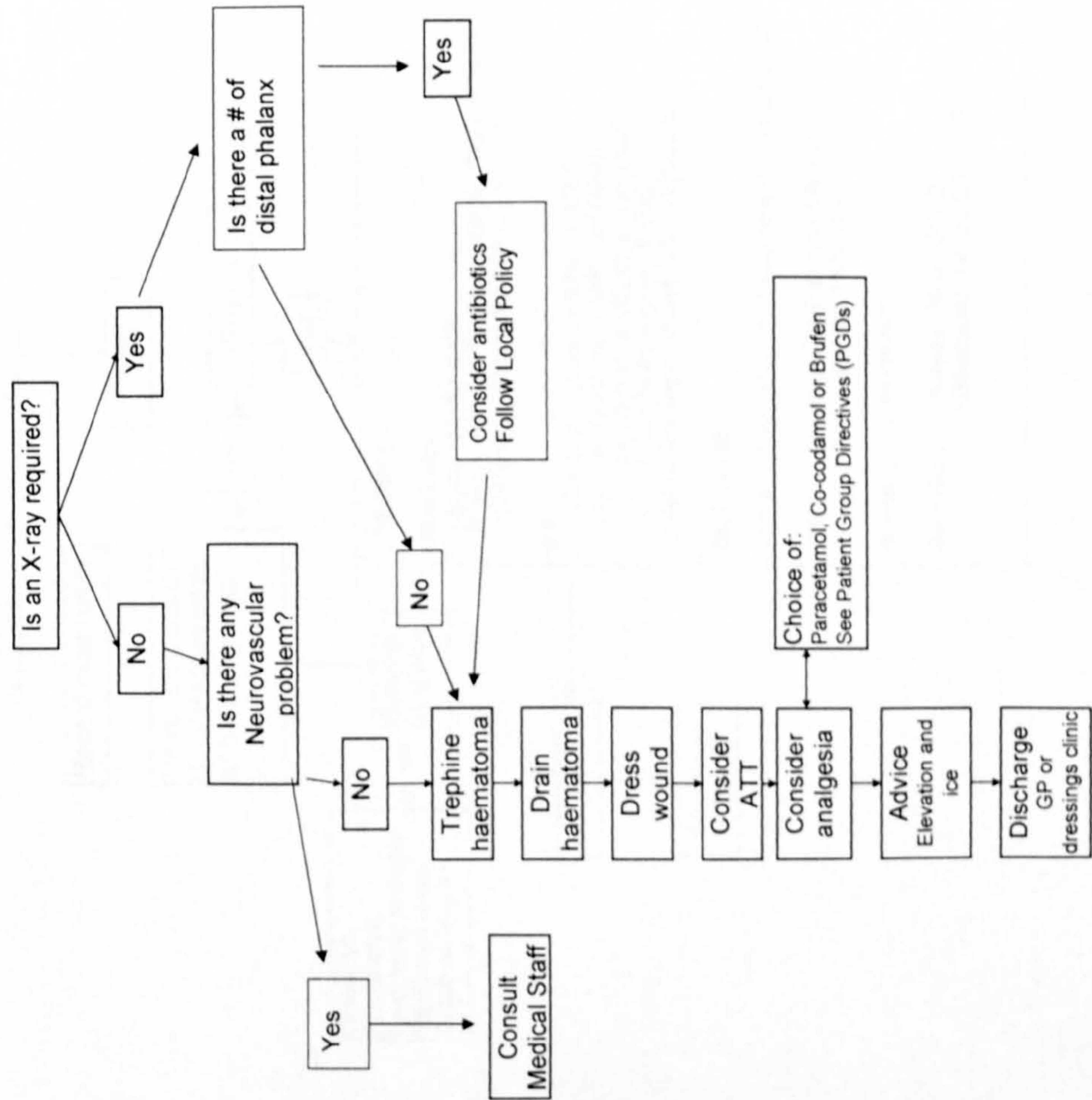
Protocol 1

The ENP can assess, treat and discharge patients with a sub-ungual haematoma.

In notes include:

- History
- Mechanism of injury
- Size of wound
- Anatomical area
- Tetanus status

Examination:



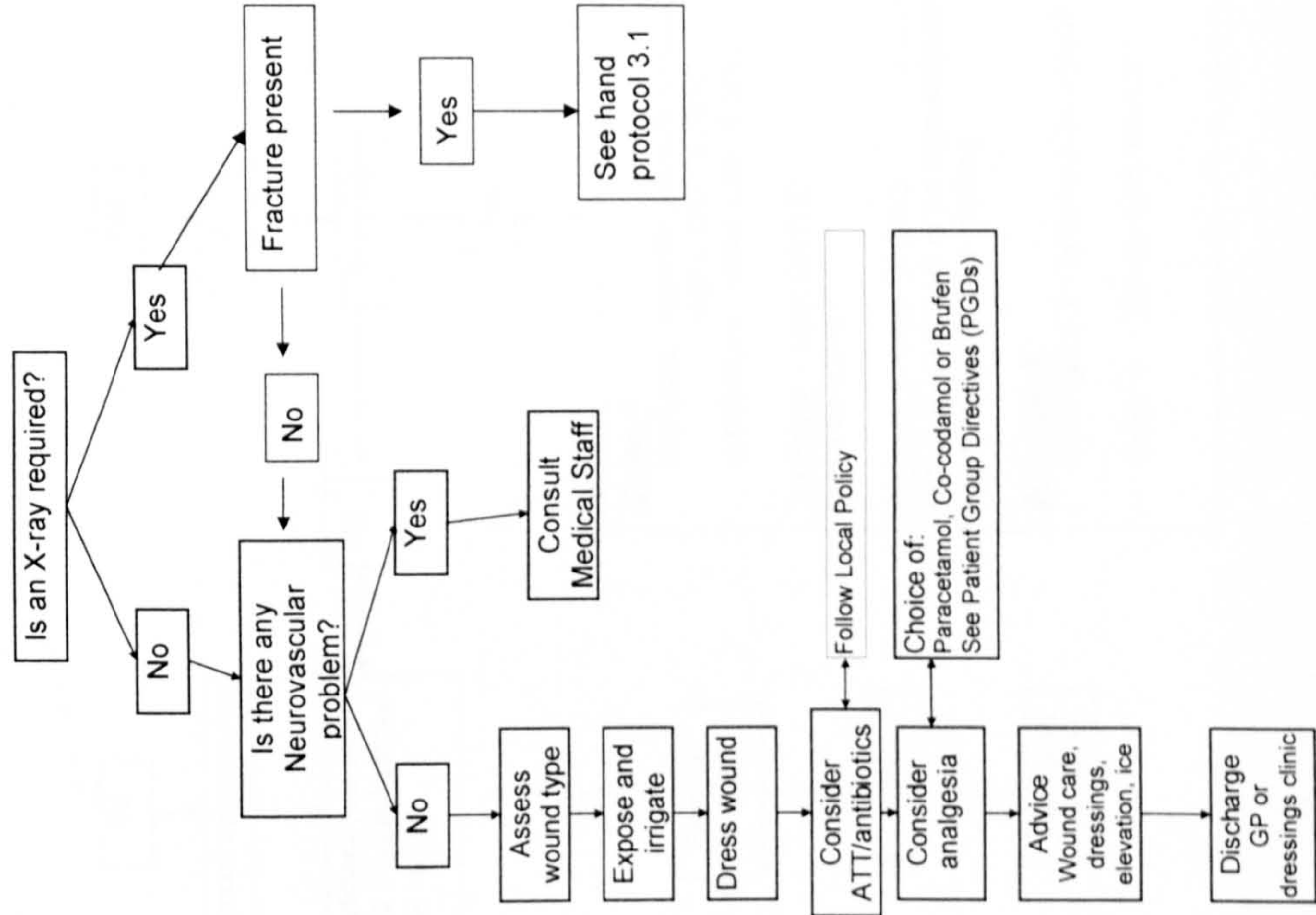
Protocol 2

The ENP can assess, treat and discharge patients with pulp injuries to fingers

In notes include:

- Date and time
- History
- Mechanism of injury
- Size of wound
- Anatomical area
- Tetanus status

Examination:

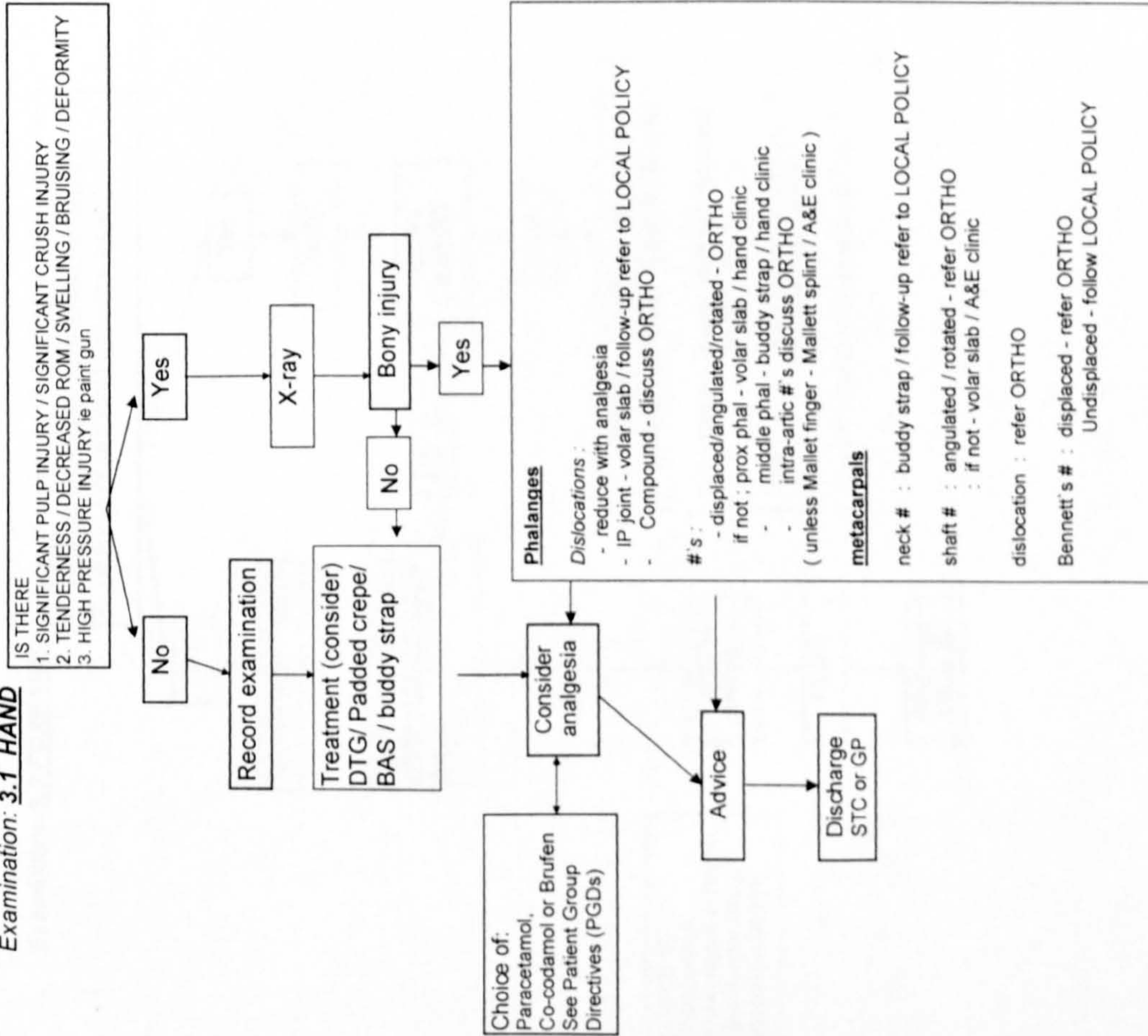


Protocol 3 (3.1 Hand)

The ENP can assess, treat and discharge patients with injuries distal to the knee/elbow.

In notes include: History / Mechanism of injury / Remove rings

Examination: **3.1 HAND**

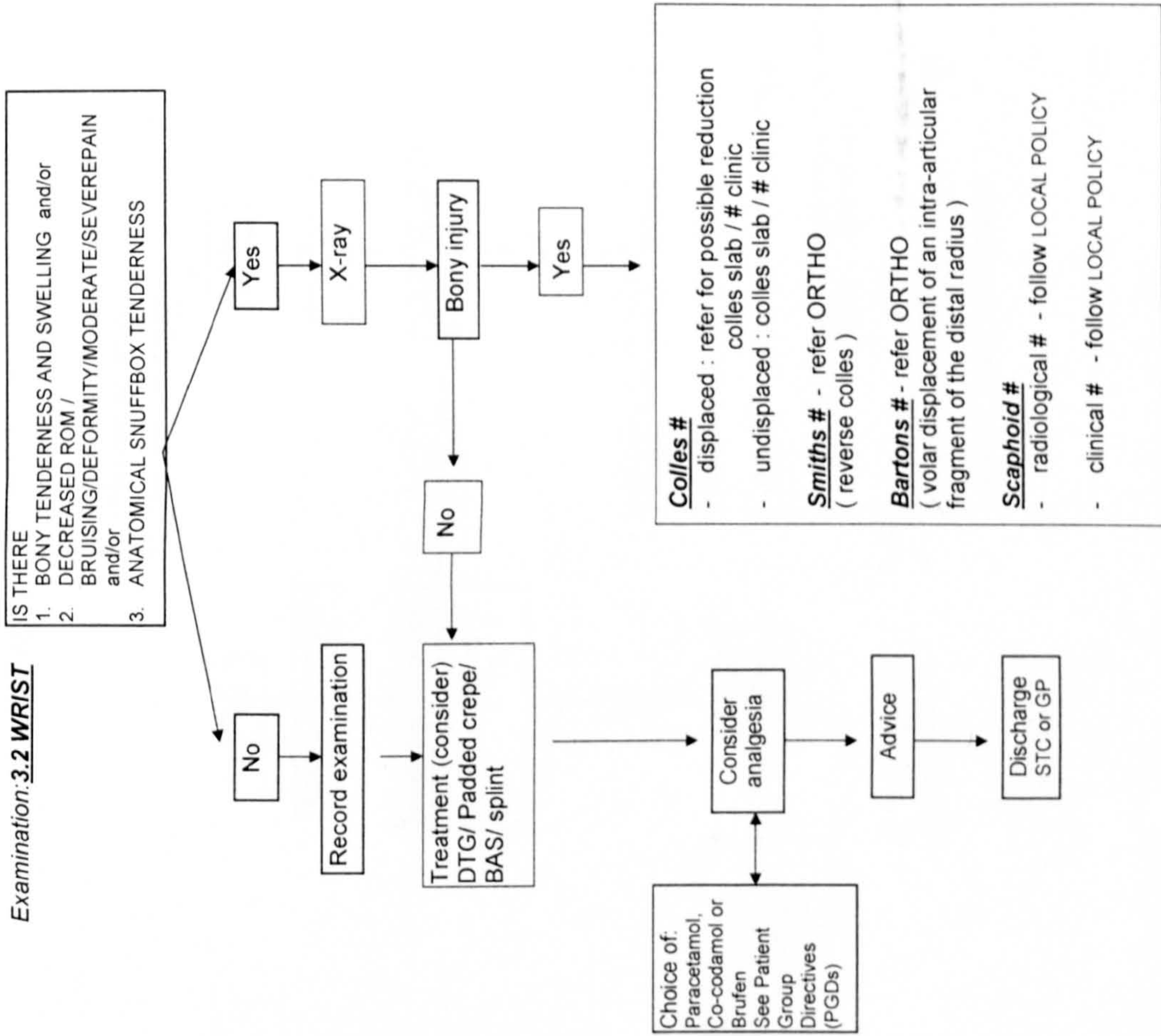


Protocol 3 (3.2 Wrist)

The ENP can assess, treat and discharge patients with injuries distal to the knee/elbow.

In notes include: History / Mechanism of injury / Remove rings

Examination: **3.2 WRIST**

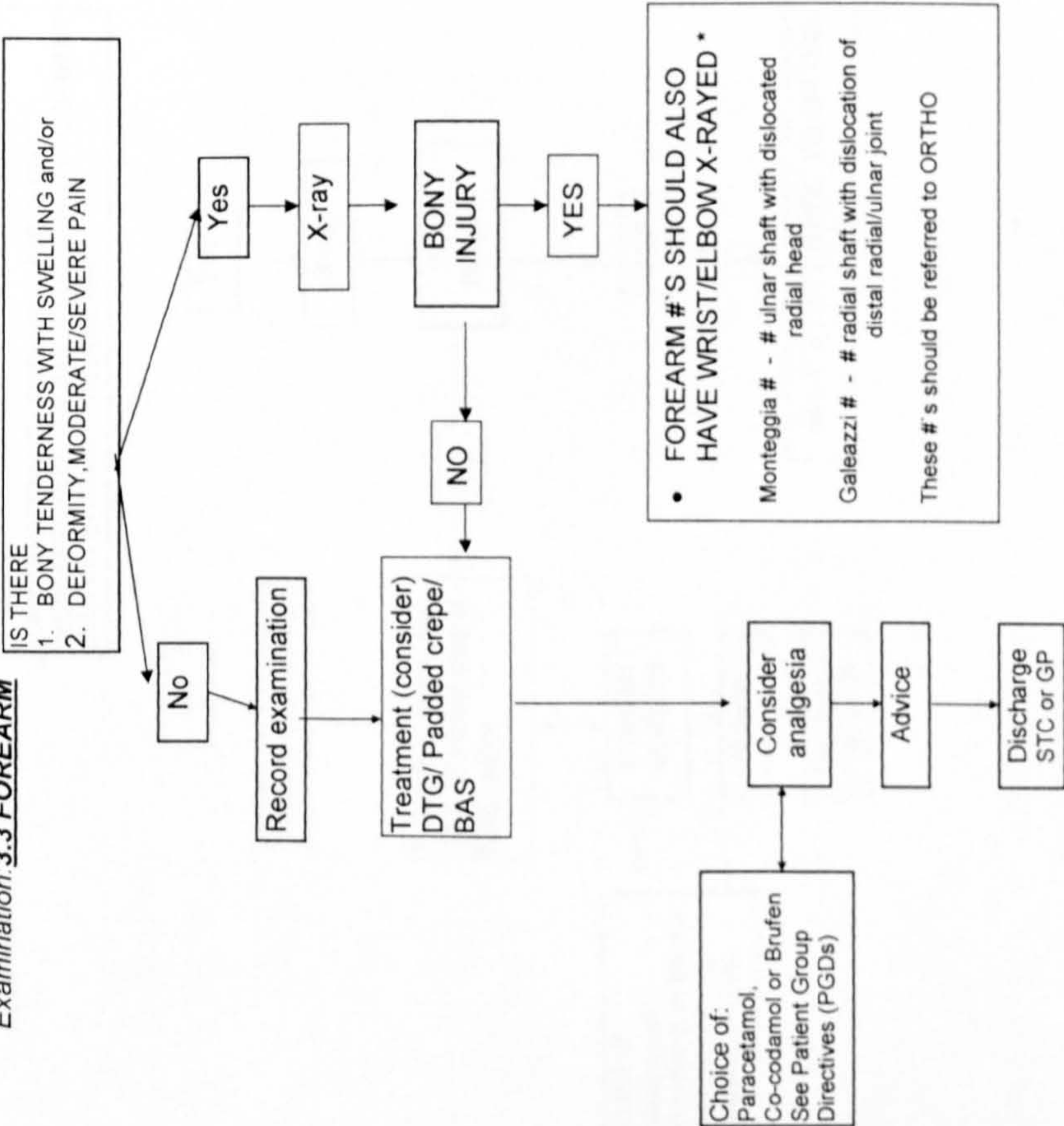


Protocol 3 (3.3 Forearm)

The ENP can assess, treat and discharge patients with soft tissue injuries distal to the knee/elbow.

In notes include: History / Mechanism of injury / Remove rings

Examination: **3.3 FOREARM**

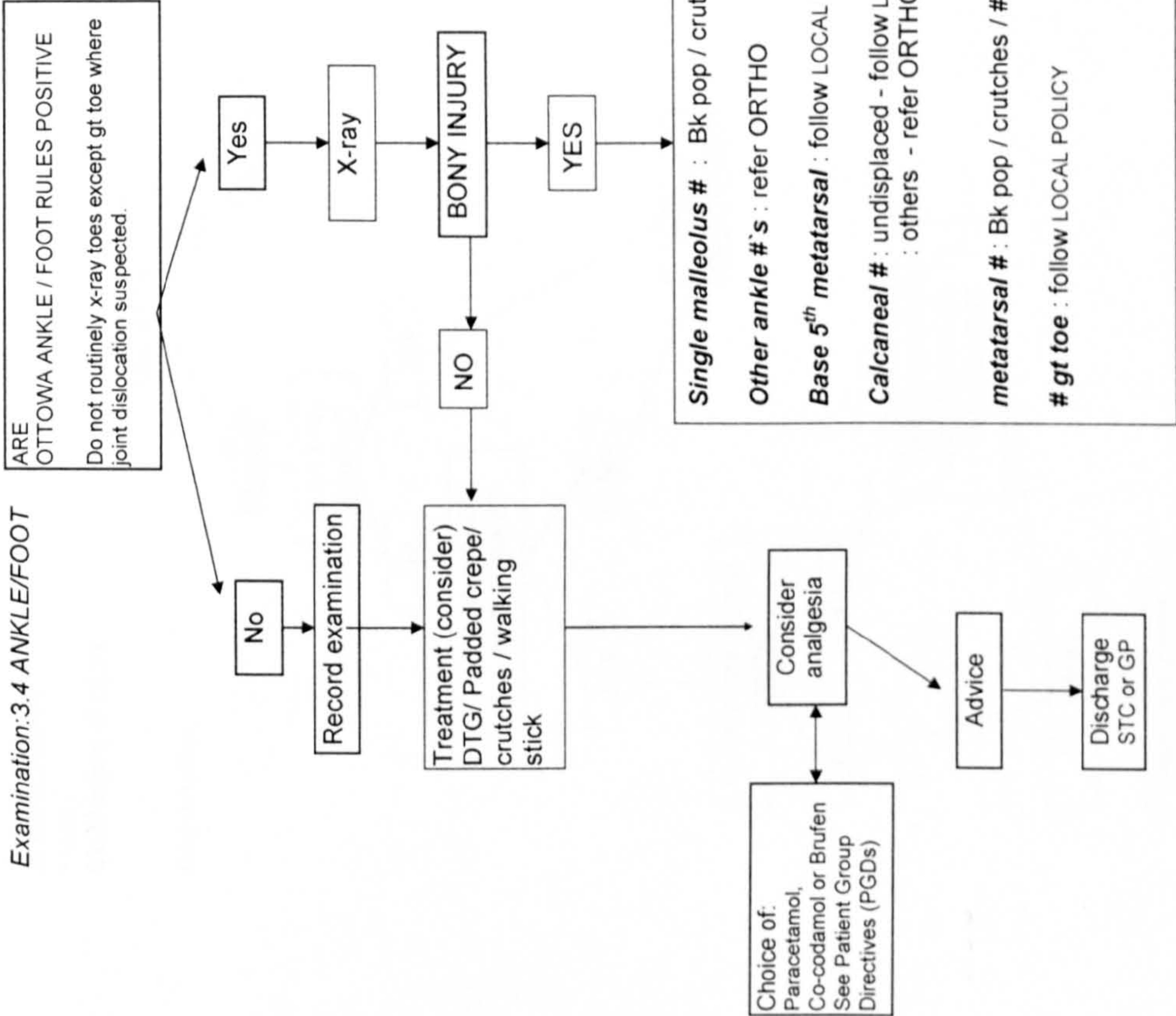


Protocol 3 (3.4 ankle/foot)

The ENP can assess, treat and discharge patients with injuries distal to the knee/elbow.

In notes include: History / Mechanism of injury

Examination: **3.4 ANKLE/FOOT**

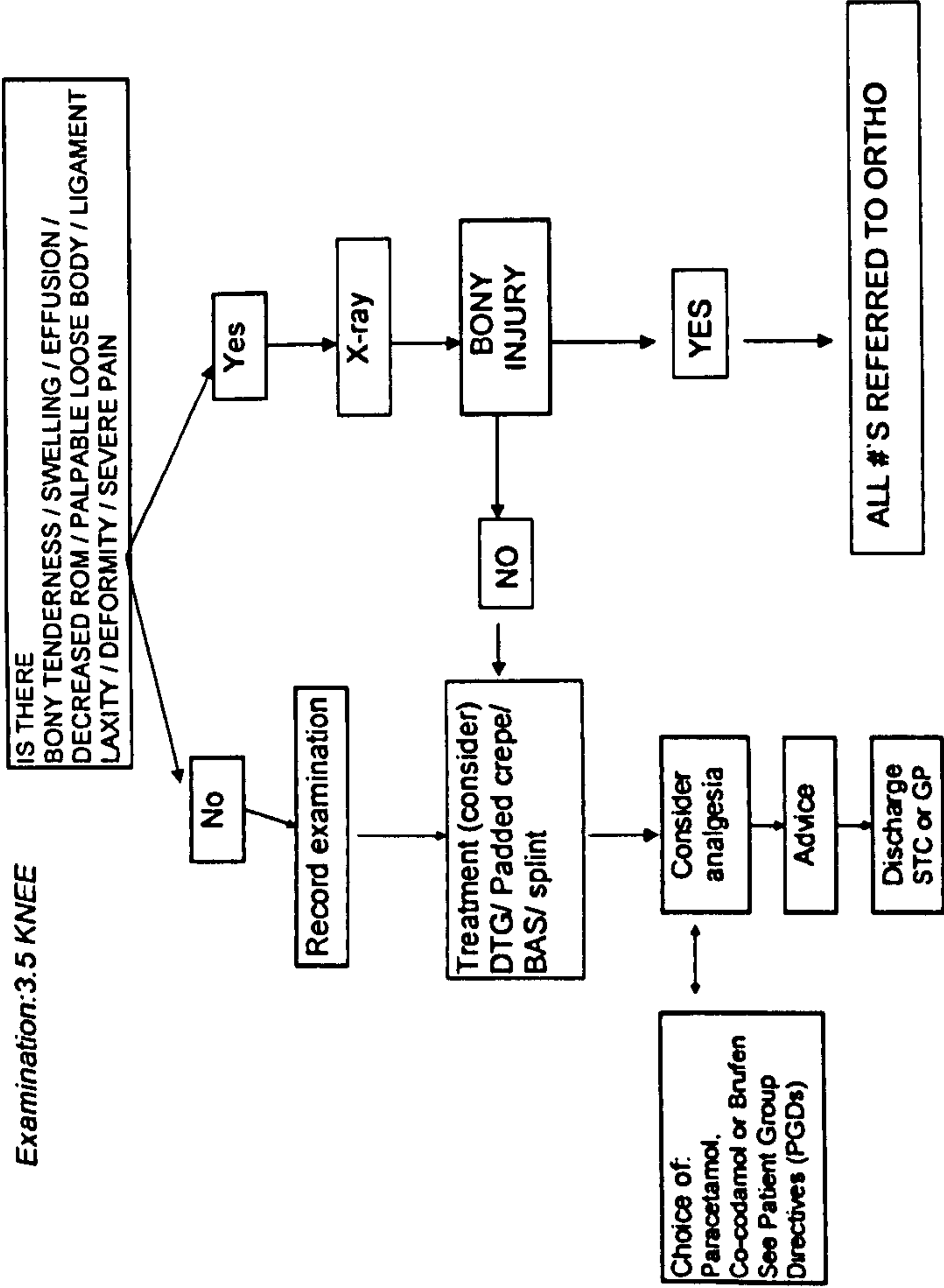


Protocol 3 (3.5 Knee)

The ENP can assess, treat and discharge patients with injuries distal to the knee/elbow.

In notes include: History / Mechanism of injury

Examination: 3.5 KNEE



Protocol 4

The ENP can assess, treat and discharge patients with a minor head injury* providing the patient is not under the influence of alcohol or drugs and is accompanied by a responsible adult.

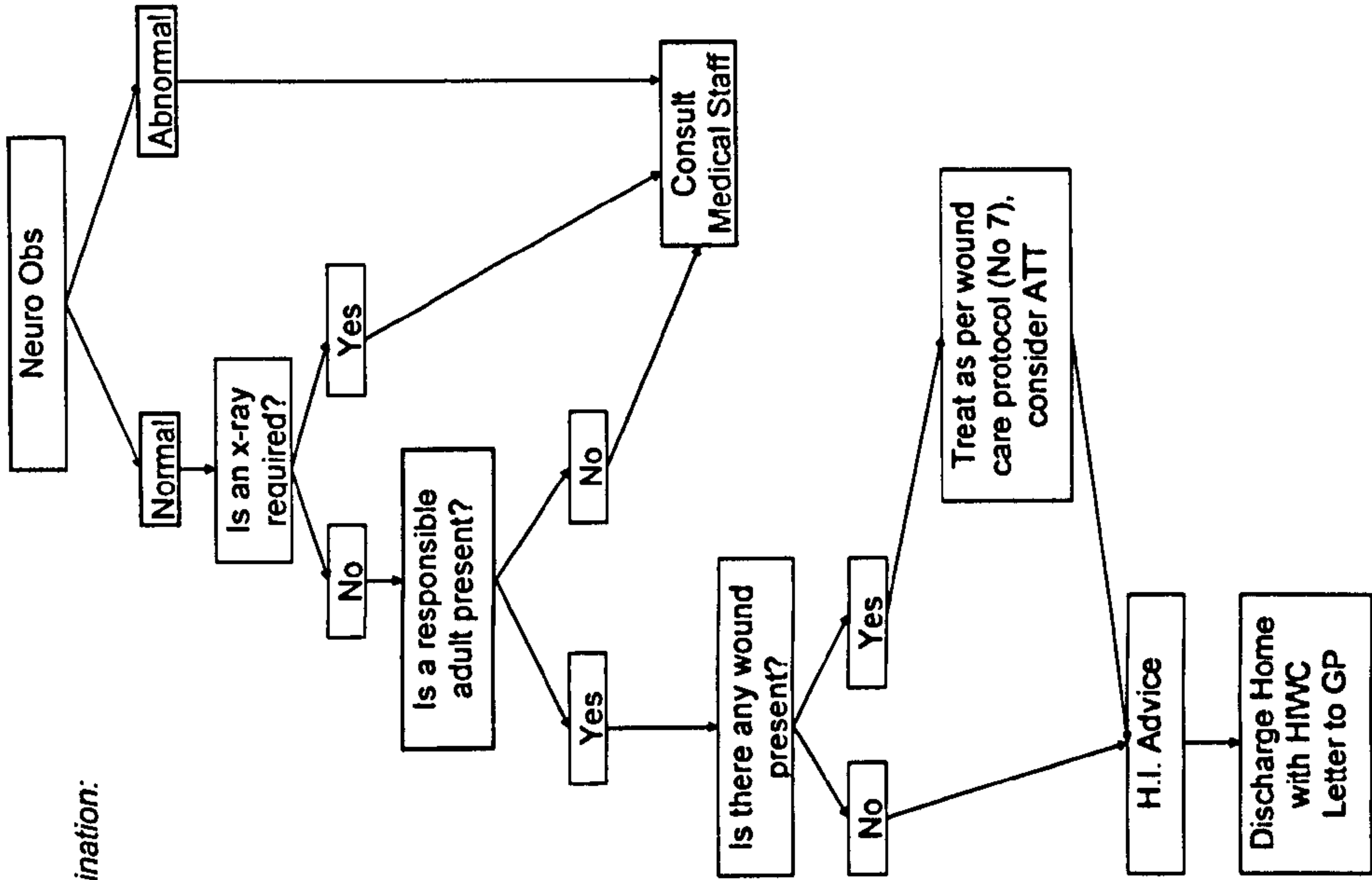
*A minor head injury is defined as a blow to the head which has not resulted in, a loss of consciousness, amnesia, neurological deficit, accompanying neck pain, abnormal drowsiness, significant scalp laceration

In notes include:

History

Mechanism of injury

Examination:

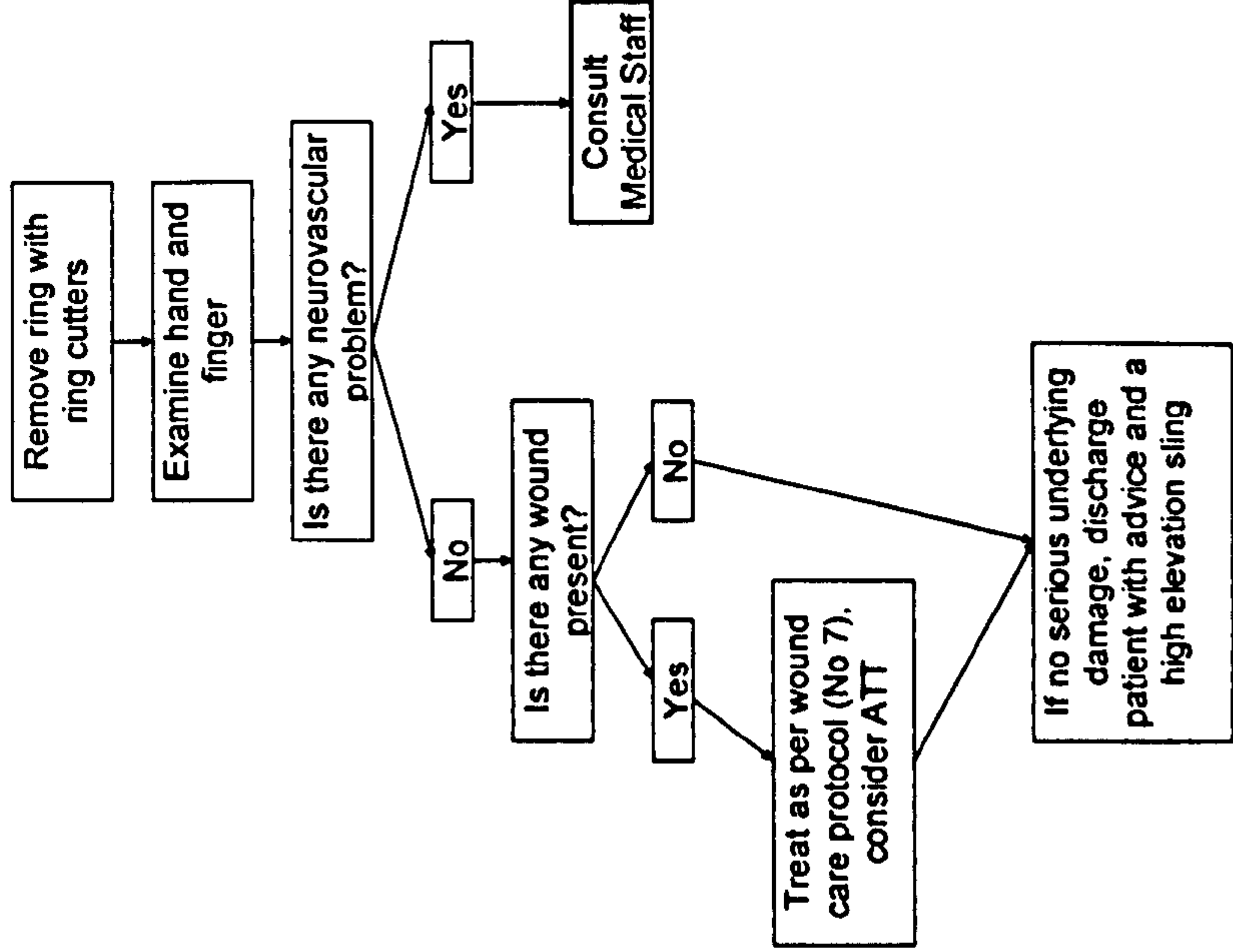


Protocol 5

The ENP can assess, treat and discharge patients with a restricting ring.
[Removal of ring(s)] Providing the ENP is satisfied that there is no underlying damage to the digit.

In notes include:
History

Examination:



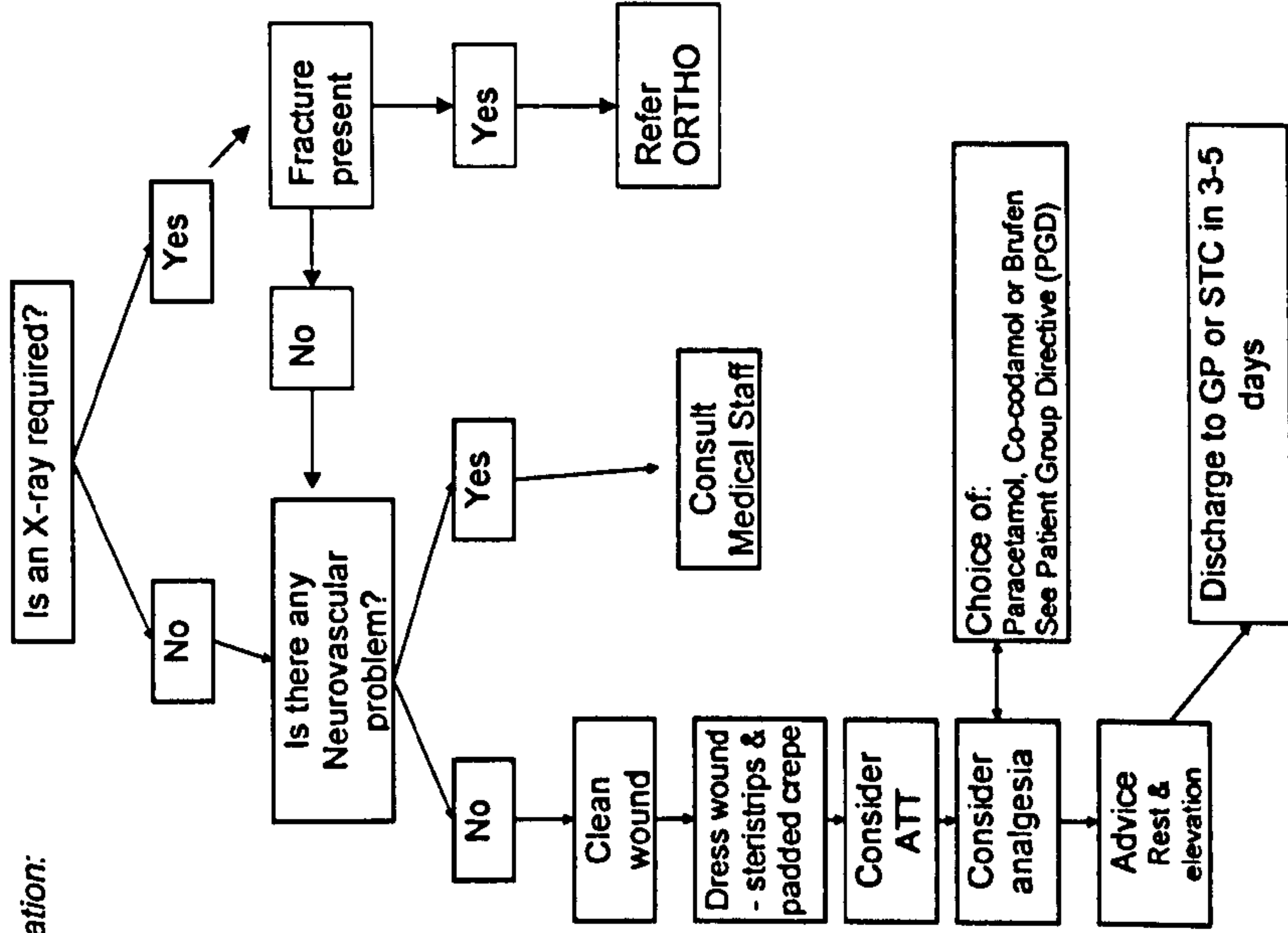
Protocol 6

The ENP can assess, treat and discharge patients with pre-tibial lacerations.
Except patients suffering from peripheral vascular disease, diabetes or on steroid therapy (these patients must be referred to a doctor).

In notes include:

- History
- Mechanism of injury
 - Size of wound
 - Anatomical area
 - Tetanus status
 - Bony tenderness
 - Swelling
 - Pain
- Any loss of:
- Function
 - Movement
 - Neurovascular deficit
 - Skin/tissue

Examination:



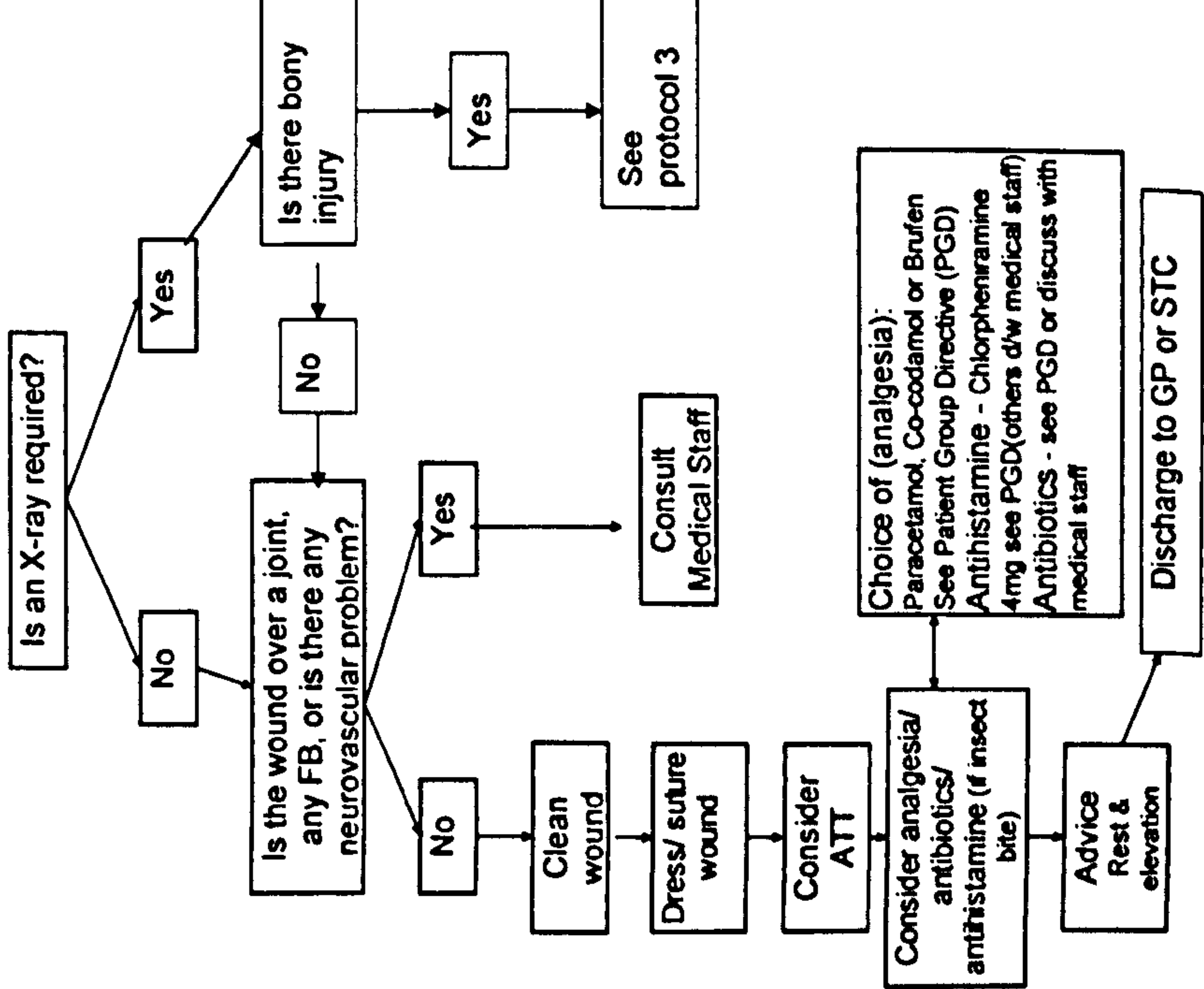
Protocol 7

The ENP can assess, treat and discharge patients with minor wounds and superficial puncture wounds (including insect bites).

In notes include:

- History
- Mechanism of injury
- Size and depth of wound
- Whether wound is over a joint
- Anatomical area
- Tetanus status
- Bony tenderness
- Swelling
- Pain
- Presence of any foreign body
- Any loss of: Function
- Movement
- Neurovascular deficit

Examination:



Protocol 8

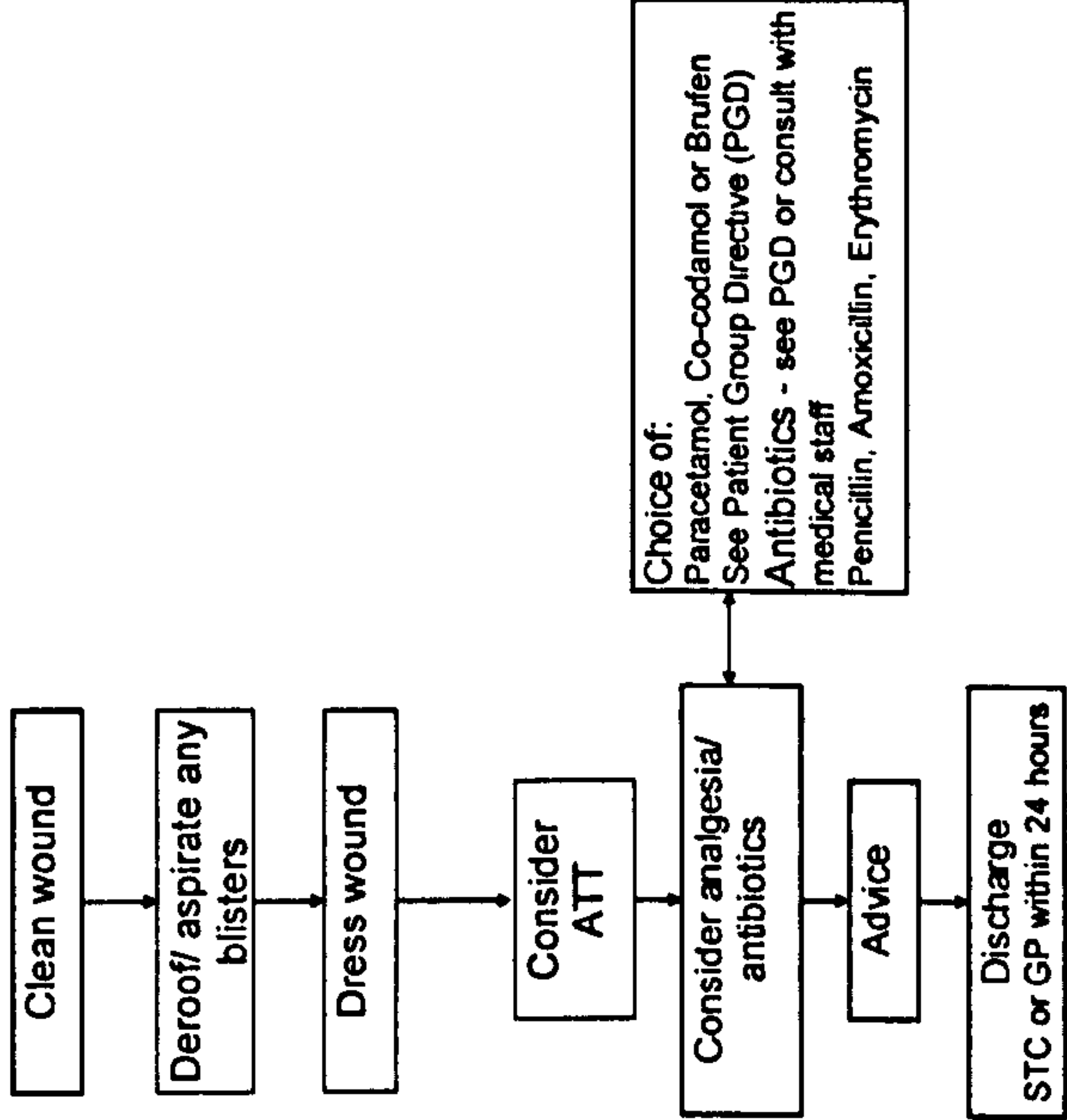
The ENP can assess, treat and discharge patients with superficial burns and scalds*.

*A minor burn is defined as covering less than 3% of body surface in an adult and does not involve genitalia or the face. The causative agent was wet heat e.g. steam or dry heat e.g. hot plate. Electrical, chemical or circumferential burns should be referred to medical staff.

In notes include:

- History
- Mechanism of injury
- Anatomical area
- Depth of burn
- Area of burn including skin loss and erythema
- Swelling
- Pain
- Causative agent
- Any loss of: Function
- Movement
- Neurovascular deficit

Examination:



Protocol 9

The ENP can assess, treat and discharge patients with minor injuries to their toes*.

*A minor injury is when there is no deformity, dislocation or crushing of the toe, minimal swelling and no neurovascular deficit.

In notes include:

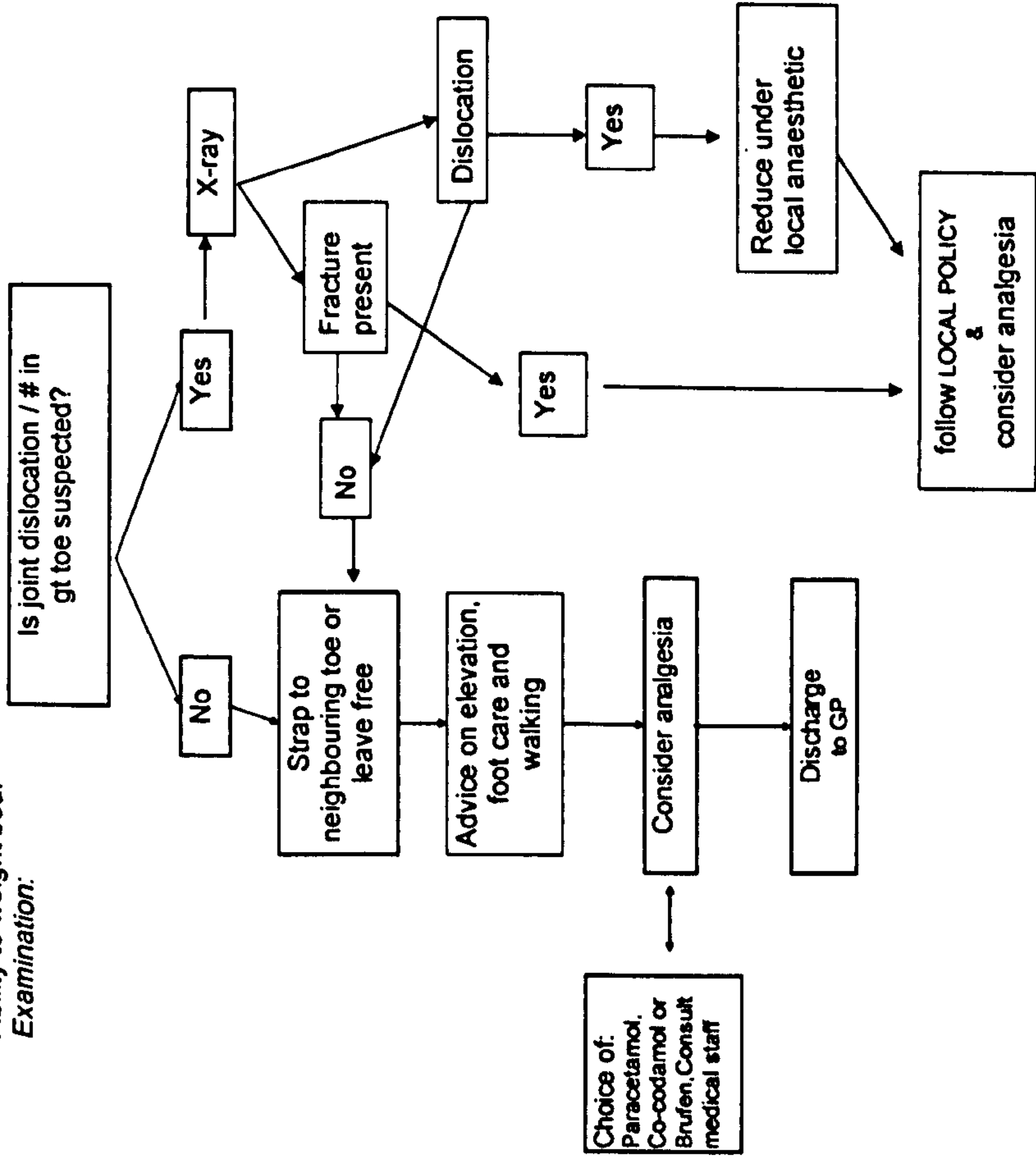
- History
- Mechanism of injury
- Anatomical area
- Swelling
- Pain

Any loss of: Function
 Movement

Neurovascular deficit

Ability to weight bear

Examination:



Protocol 10

The ENP can authorise the repair or replacement of plaster of paris cast where the plaster has been damaged by getting wet, cracked by over use, loose because underlying swelling has settled.

When the plaster has been replaced/repared the patient should be advised to keep their original follow up clinic appointment and given instructions for care of the plaster cast and affected limb. The ENP must not authorise the final removal of a plaster cast or remove any plaster if the patient has had a recent manipulation or orthopaedic/hand surgery.

Any patient who is complaining of pain under a particular area of plaster must be referred to a doctor, who may decide to cut a window in the plaster and inspect for plaster sores.

Any patient with a vascular or neurological complication arising from the position of the plaster must be referred to as doctor.

Protocol 11

The ENP can assess, treat and discharge patients who present with embedded earrings/butterflies in the ear lobes provided there are no significant signs of infection.

Notes must include:

History

Mechanism of injury

Note any: Swelling

 Pain

 Erythema

 Infection

Tetanus status

Examination

Position patient
under a clear bright
light

If child Use local anaesthetic cream and
see appropriate period of time for
anaesthetic to be effective

Infiltrate area
around FB with
local anaesthetic

Make small incision if required

Remove FB with mosquito
forceps

Dress wound

Consider ATT

Advice on wound
care

Consider if
antibiotics are
required

Antibiotics (choice of) -
see Patient Group Directives (PGDs)
or d/w medical staff
Penicillin, Amoxicillin, Erythromycin

Discharge to GP
or STC

Protocol 12

The ENP can administer ATT to patients requiring anti-tetanus only or combined with treatment for wounds when tetanus could be a consequence.

An injection of 0.5ml absorbed tetanus vaccine is given by intramuscular or deep subcutaneous injection. The following guidelines should be adhered to:

Immunisation of Infants and under ten years old

Under normal circumstances tetanus immunisation is given in conjunction with the triple vaccine to infants. This consists of injections at two, three and four months. This completes their primary immunisation against tetanus and gives cover until around five years.

A reinforcing dose is usually given at primary school age around five years and this gives cover for a further ten years.

Immunisation of adults and over ten years old

For primary immunisation (i.e. those who did not complete their primary immunisation course), the course consists of three doses of 0.5ml absorbed tetanus vaccine by the usual route, with intervals of one month between each dose.

A reinforcing dose ten years after the primary course and again ten years later maintains a satisfactory level of protection which should be continued life long. For immunised adults, booster doses at less than ten year intervals are not recommended since they have been shown to be unnecessary and can cause local reactions.

Tetanus Prophylaxis

Tetanus prone wound:

- Any wound or bum sustained more than six hours before surgical treatment of the wound or burn.
- Any wound or bum at any interval after injury that shows one or more of the following characteristics:
 - A significant degree of devitalised tissue
 - Puncture type wound
 - Contact with soil or manure likely to harbour tetanus organisms
 - Clinical evidence of sepsis

Clean wound:

Any wound less than six hours old, clean, incised or superficial.

Immunisation Status	Tetanus Prone Wound	Clean Wound
Complete ATT course or booster within the last 10 years	Nothing (a dose of HATI may be given if risk of infection considered especially high (e.g. contamination with stable manure)	Nothing
Complete ATT course or last booster over 10 years ago	ATT booster plus HATI	ATT booster
Never completed course or immunity unknown	A full course of ATT plus HATI	full ATT course

HATI 250iu in 1ml is given IM at a different site to the ATT

Adverse reactions

- Local reactions, such as pain, redness and swelling round the injection site may occur and persist for several days. General reactions, which are uncommon, include headache, lethargy, malaise, myalgia and pyrexia. Acute anaphylactic reactions and urticaria may occasionally occur and, rarely, peripheral neuropathy. Persistent nodules at the injection site may arise if the injection is not given deeply enough.

Contraindications

- Tetanus vaccine should not be given to an individual suffering from acute febrile illness except in the presence of a tetanus-prone wound. Minor infections without fever or systemic upset are not reasons to postpone immunisation.
- Immunisation should not proceed in individuals who have had an anaphylactic reaction to a previous dose. Research suggests that an adverse reaction to tetanus toxoid does not preclude future immunisation with the same material. Although if it is done it is best performed in a setting where there are facilities to deal with any allergic reactions.

Adapted from: DoH (1996) *Immunisation against infectious disease*. London: HMSO

Appendix VIII. Emergency nurse practitioner courses

a Glasgow Caledonian University / NHS Glasgow ENP course

b Anglia Polytechnic University / Southend Hospital ENP course

c Queen Margaret University College / Western General Hospital
Minor Injuries course

Glasgow Caledonian University

Module Descriptor

Title Emergency Nurse Practitioner

Host Department NMCH **Module Code** NCHX303

Host programme

Other Named Programmes

Level 3 Credit Points 20 Mode FT / PT

Pre-requisite Knowledge
Applicants eligible for undertaking the Course must have worked continuously for a period of 5 years in an Accident and Emergency (A&E) Department at Grade `E? or above. Evidence of advanced A&E background and knowledge either in local or national format which is recognised by the management of the hospital employing the staff e.g. ATLS, TNCC, ATNC, ALS, PALS. Professional Studies or extended practice; Venepuncture, X-ray, Triage, Defibrillation and suturing will be an advantage

Co-requisites

Semester : A /B Session: Max. No: 6 Est. No: 6

Module Structure	Learning Methods	Hours in Module
	Lectures	30
	Practicals	
	Seminars	
	Tutorials	6
	Directed Learning	
	Independent Learning	124
	Assessment	20
..	Private Study	
	Notional student effort	180

Module Leader

**Associate
Module Tutors**

Summary of Content

The aim of this course is to provide participating registered nurses with the necessary knowledge and skills to independently carry out assessment on patients who voluntarily present to an Accident and Emergency department. The Course also aims to enable the nurse build on their knowledge and skills to then practice autonomous patient care within defined protocols without reference to a doctor.

This course encompasses the basic protocols identified as being the minimum standard before a nurse can title himself or herself an Emergency Nurse Practitioner. It acts as a foundation on which later protocols can be developed and taught to further expand their role.

Learning Outcomes Including Transferable Skills

Demonstrate acceptance of the accountability associated with practising independent nursing assessment and associated treatment decisions.

Discuss the significance and implications of the term 'personal indemnity'?

Develop the expansion of the scope of professional practice in the Accident and Emergency Department within parameters agreed by the North Glasgow University Hospitals NHS Trust.

Utilise an in-depth knowledge of physiology to undertake assessment and treatment of specific injuries as defined in a protocol.

Demonstrate sensitivity in interpersonal communication during assessment process and treatment.

Evaluate professional ability in treating patients within a defined category without medical advice

Recognise the limitations of the Emergency Nurse Practitioner role by demonstrating the ability to refer patients when indicated

Teaching/Learning Strategy

A combination of modified lectures, groupwork, discussions and tutorials. Clinical practice involves negotiated triangulation between the student, the Course Team and the Emergency Nurse Practitioner who will supervise and assess the student's practice. A flexible period of supervision and assessment will be agreed and this will involve a period for reflection and feedback on clinical experiences.

Syllabus

Documentation and History taking

Professional and Legal Issues

Audit

Protocol Development

Assessment of wrist hand and forearm

Assessment of painful ankle and foot

Wound Assessment

Use of local anaesthesia techniques and wound closure techniques

Burns Assessment and management

Head Injuries - Assessment and Management

Pharmacology

Health promotion

Speciality referral

Radiology

Communication Skills

Indicative Reading

- Bates. B (1995) A guide to physical examination and history taking.
6th Edition. Lippincott Company
- Burgess. K. (1992) Emergency Nurse Practitioners
Nursing Standard; Emergency Nurse Supplement. March; p12-13
- Dunlop M, (1999) Health Promotion as an ENP: Is it possible?
Emergency Nurse Sept 7 (5) p24-7
- Department of Health (1992) The Patients Charter. Department of Health. HMSO, London.
- Edwards et al (1999) Nurse practitioners: Are we being true to the Spirit of Nursing.
Emergency Nurse June 7 (3) p26-31
- Guly. H.R. (1996) History taking, Examination and Record keeping in Emergency Medicine.
Oxford University Press.
- Malbrook J et al (1998) Can Nurse practitioners offer a quality service?
An evaluation of a year's work of a nurse led minor injuries unit
Journal of Accident and emergency Medicine 15,266-268.
- Sakr et al (1999) Care of minor injuries by Emergency Nurse Practitioners or Junior doctors: A
randomised control trial.
The Lancet Vol 354 Oct 16
- Savage, J (1991) Nurse Practitioners working for change in Primary Health Care Nursing.
Kings Fund Centre
- Senior K. (1999) ENP Scheme Highlighting the barriers.
Emergency Nurse 6, 9 p28-32
- UKCC (1992) Standards for the Administration of Medicines. UKCC. London
- UKCC (1992) The Scope of Professional Practice. UKCC. London.

Assessment Methods

1. Due dates for submission of Continuous Assessment / final Examination
dates:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

2. Format of Assessment: Portfolio of evidence to support achievement of each of the learning outcomes
and Objective Structured Clinical Examinations

MODULE REFERENCE SHEET ANGLIA POLYTECHNIC UNIVERSITY

1. Module title		Introduction to the Emergency Nurse Practitioner Role			
2. Anglia Credits	20	Level	H	Status V/C/A Categories	Module Code HEH2092
3. Set	Continuing Health Care Education			Set Co-ordinator	Danny Ally
4. Keywords	A&E, Emergency Nurse Practitioner				
5. Pre-requisites	Registered Nurse, ENB 199				
Co-requisites	None				
6. Learning Outcomes	On successful completion of this module students will be able to:-				
1. Demonstrate competence in the assessment, prioritising, and treatment of minor injuries and ailments.					
2. Critically apply knowledge of body function to make a diagnosis, and determine the appropriate action.					
3. Critically analyse the role and responsibilities of the Emergency Nurse Practitioner.					
4. Apply critically a range of professional strategies for promoting health in the context of the Emergency Nurse Practitioner.					
7. Catalogue Summary					
This module relates only to an Accredited programme in conjunction with Southend Hospital NHS Trust residential course.					
8. Delivery Method		Responsible Course/Scheme			
Residential work based/classroom					
9. Indicative Learning Activities	Hours	Comments		Outcomes	
Lectures plus assessed practicals	40	Takes place at Southend A&E		1-4	
Student managed learning	110	Work based action learning & log.		1-4	
Total Hours	150	3,000 words			
10. Indicative Assessment	Weight %	Pass Req.	Comments		Outcomes
Practice		Yes	Within residential phase at Southend A&E		1-4
Reflective Analysis of a critical incident/event related to patient care Maximum 3,000 words	100%	Yes 40%	Reflective Analysis of an event based on the reflective diary (journal) recorded over the 10 weeks at place of work.		1-4

11. Indicative Assessment Schedule

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|------------------------|---|
| 1. Practice | Within the residential phase at Southend A&E. |
| 2. Reflective Analysis | By end week 16 |

12. Indicative Outline Content

- Assessment and management skills for the diagnosis and treatment of minor injuries and ailments.
- Relevant anatomy and physiology, wound healing.
- Medico-legal aspects of the practitioner role.
- Clients' rights; patient advocacy.
- Detailed assessment of hand, wrist, elbow, arm, knee, ankle, foot, head, face injuries, ENT emergencies, Ophthalmic emergencies, Allergic reactions.
- Prescribing issues within the ENP role.
- Health promotion.

13. Indicative Learning Resources/Support (noting key texts and relevant non print media)

Cheng, H.		Emergency Ophthalmology – A Symptom Based Guide to Diagnosis and Early Management	
Currie, D.G.	1993	The Management of Head Injuries	Oxford University Press
Hawkesford, J. & Banks, J.G.	1994	Maxillofacial and Dental Emergencies	Oxford University Press
Khaw, P.T. & Elkington, A.R.	1994	ABC of Eyes, 2 nd Edition	BMJ
Orem, D.	1980	Concepts of Practice, 2 nd Ed.	McGraw-Hill
Rice, U.E.	1989	Community Nursing Practice – The Australian Experience	Williams & Wilkins
Reil, J.P.	1980	Conceptual Models for Nursing Practice	Appleton
Snell, R. & Smith, M.	1993	Clinical Anatomy for Emergency Medicine	Mosby

Full resources list available?	Yes	From:	Course Leader
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Queen Margaret University College
EDINBURGH

Module Descriptor 2001

Title Minor Injuries		Code (if known) MI
Level 3	Semester 1 and/or 2	Proposed credit rating 40
Module Co-ordinator Mrs Fiona Murdoch		
Module Team Mrs F Murdoch, Mr D Purcell, Mrs C Lawson, Ms A Butler-Nixon, Miss L Willis, Mrs L Stark, Mr S McGhee		
Pre-requisites Normally 2 years post registration experience within an accident and emergency setting or equivalent environment (GP setting).		
Co-requisites Nil		
Prohibited Combinations Nil		
Rationale		
Aim To enhance the existing knowledge base of practitioners with reference to mechanism of injury and trauma management. To develop the confidence and skills of the individual practitioner in history taking, treatment, appropriate referral and discharge. To develop competent practitioners who are able to function autonomously within a minor injuries setting.		
Learning Outcomes By the end of the module participants will be able to: <ol style="list-style-type: none"> 1 Demonstrate the necessary knowledge, skills and competence to function in an autonomous manner. 2 Accurately assess and formulate a clinical impression of the patient. 3 Select treatment protocols and implement an appropriate treatment regime. 4 Demonstrate professional accountability and responsibility in respect of professional judgement and clinical management of the patient within the minor injuries setting. 5 Analyse the developments in the role of the nurse practitioner within the context of changes in health care and its delivery. 		
Learning Approach 60 Hours contact time and estimated 140 hours study and work-based practice. Teaching methods include lectures, group discussions.		
Assessment Pattern Assessment for nurses who choose to claim credit will consist of two elements: <ul style="list-style-type: none"> • A portfolio of evidence gathered over 120 hours in practice. • Clinical assessment using mock clinical situations on completion of 120 hours in practice. 		
Content Scope of practice, legal issues, the role of the nurse practitioner in minor injuries, clinical protocol development, patient assessment and clinical history taking, patient documentation, wound assessment, management of burns, x-ray reporting and interpretation, physiotherapy, pharmacy issues relating to nurse dispensing. Injuries of: head, neck, face, ENT, shoulder, arm, wrist, eye, knee, foot, hand. Paediatric injuries and emergencies. Venepuncture (optional).		

Main Texts

Agur *Grant's Atlas of Anatomy* Williams & Wilkins
American Society for Surgery of the Hand *The Hand* Churchill Livingstone
Cyriax/Cyriax *Cyriax's Illustrated Manual of Orthopaedic Medicine* Butterworth Heinemann
Fuller *Neurological Examination Made Easy* Churchill Livingstone
Gross/Fetto/Rosen *Musculoskeletal Examination* Blackwell Science
Hawkesford/Banks *Maxillofacial and Dental Emergencies* Oxford University Press
Kapit Elso *The Anatomy Colouring Book* Harper Collins
McRae Kinninmonth *Orthopaedics and Trauma* Churchill Livingstone
Stone/Stone *Atlas of Skeletal Muscles* William C Brown
Swann/Yates *Management of Minor Head Injuries* Chapman & Hall Medical
Wilson/Nee/Watson *Emergency Management of Hand Injuries* Oxford University Press
Morton Phillips *Accidents and Emergencies in Children* Oxford University Press
Glasgow Graham *Management of Injuries in Children* British Medical Journal Publishing
Wardrope/Smith *The Management of Wounds and Burns* Oxford University Press
Peterson/Renstrom *Sports Injuries – their Prevention and Treatment* Dunitz
Raby/Berman/DeLacey *Accident and Emergency Radiology: A Survival Guide* W B Saunders
Gurly History Taking *Examination and Record Keeping in Emergency Medicine* Oxford University Press
Montague *Legal Problems in Emergency Medicine* Oxford University Press

Other relevant details**Signed****Date****Registry use only****Date received****Submitted to VCR**

Appendix IX. Peer reviewed published papers from thesis

a The extent and nature of Emergency Nurse Practitioner services in Scotland

b Emergency Nurse Practitioner's documentation:
development of an audit tool

c Minor injury care by nurse practitioners or junior doctors (Lancet Letter)

d Evaluating Emergency Nurse Practitioners services:
a randomized controlled trial