CORE CLINICAL COMPETENCIES FOR EXTENDED-SCOPE PHYSIOTHERAPISTS WORKING IN MUSCULOSKELETAL (MSK) INTERFACE CLINICS BASED IN PRIMARY CARE: A DELPHI CONSENSUS STUDY

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Table of Contents

Chapter 9 Opinion Change and Agreement between Professional Groups

Chapter 10 Discussion

Chapter 11 Conclusions

Appendices

List of Tables

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Glossary of Definitions and Abbreviations

ESP (Extended-Scope Physiotherapist)

An ESP is a physiotherapist who practises outside the recognized scope of physiotherapy practice in a job that demonstrates an aspect of role enhancement or role expansion related to therapeutics, diagnostics, and practice consultation. Some of this practice will involve performing tasks normally undertaken by doctors, for example, listing for surgery.

GPwSI (General Practitioner with a Special Interest)

A GPwSI is a general practitioner (GP) who has supplemented his or her core generalist skills in order to specialize in a particular field of medicine. GPswSI work principally in community settings; they may perform interventions not normally undertaken by their peers, for example, minor surgery.

MSK (Musculoskeletal)

The MSK system refers to the muscles, joints, and the axial and appendicular skeleton.

Secondary Care

This refers to services provided by medical specialists in hospital settings. These specialists usually see patients referred by a GP or another primary health care provider.

Primary Care

This refers to a patient's first contact with a health-care provider. This is usually a GP, but it may include dentists and other professionals allied to medicine.

Community Care

This refers to services provided by health-care professionals in their homes or in other community settings such as health centres. It generally excludes care delivered in GP surgeries and care delivered by social care services.

Interface Clinic

An interface clinic, often known as a ‘Tier 2’ clinic or ‘CATS’ (Clinical Assessment and Treatment Service), refers to a ‘one-stop shop’ for assessment, diagnosis, treatment, or referral to other specialists. The triage process determines which patients can be managed by local primary and community care services and which will need referring to hospital-based services (DH, 2006).

Abstract

Objectives

The primary aim of this UK-based study was to identify core clinical competencies (skills, knowledge, attitudes, and behaviours) for primary-care-based extended-scope physiotherapists (ESPs) working in the field of adult musculoskeletal (MSK) medicine. Although the musculoskeletal (MSK) ESP role in the UK has been in existence for over 10 years, there is no competency and curriculum framework supporting these posts. This study used a consensus-building methodology with a multidisciplinary panel of MSK experts to identify core clinical competencies for MSK ESP practice.

Methods

Purposive sampling was used to recruit MSK ESPs and MSK medical experts from six specialist fields within medicine: rheumatology, neurology, neurosurgery, general practice, orthopaedic surgery, and rehabilitation medicine. Seventy-two experts volunteered to take part in a three-round online Delphi survey and fifty-six experts completed all three rounds. Qualitative data from the first and second questionnaire rounds were analysed using content analysis, and descriptive statistics facilitated the presentation of quantitative data.

Principal findings

The expert Delphi panellists identified 104 core clinical competencies for primary-care-based MSK ESP practice and they reached a consensus view on 85 of these competency items.

Importance and Relevance

This is the first study to have identified core clinical competencies for primary-care-based MSK ESPs. Although further work is required to validate the results of this Delphi survey, they represent a contribution to knowledge in the field of MSK ESP practice and they should assist the professional body and the health care

regulator with their development of a nationally agreed competency and curriculum framework for MSK ESP practice.

Introduction

The Department of Health (DH) estimated that gross expenditure in England in 2009/2010 for disorders of the musculoskeletal (MSK) system reached £4.67 billion (DH, 2011a). The National Health Service (NHS) apportions over £4 billion per year to the management of MSK disorders, making it the fifth highest area of NHS spending (DH, 2011a). In 2009, The Arthritis and Musculoskeletal Alliance (ARMA) published results of an audit of the implementation of *The Musculoskeletal Services Framework* (DH, 2006a), which demonstrated deficiencies in the early identification and treatment of MSK disorders in the UK (ARMA, 2009). In the following year, ARMA exposed variable standards in the overall quality of NHS MSK services in England (ARMA, 2010). With general practitioners (GPs) now set to lead on the commissioning of health services in England (BMA, 2011), attention is shifting towards primary-care services. The health-care market is now more competitive than ever and allied health professionals (AHPs) will be working more closely with GP-led consortia in the near future. The recent White Paper, *Equity and Excellence: Liberating the NHS* (DH, 2010), stated that the commissioning of education and training for health-care professionals must begin to align itself locally and nationally with the commissioning of patient care. The majority of MSK extended-scope physiotherapists (ESPs) work in orthopaedic clinics in secondary care, but an increasing number of ESPs are now working in primary care due to the current shift in health-care policy. ARMA (2010) expressed concern about community-based MSK interface clinics, which filter GP referrals to secondary care; this concern focused on the fact that many of these MSK interface clinics are led by GPs with a special interest (GPwSI), or by ESPs with no specialist (secondary care) input. Indeed, it is unusual for community-based MSK services to have clinical-governance pathways in place that involve all stakeholders (ARMA 2011). The focus of this study is the ESP role in primary care, where ESPs are assessing, diagnosing, and managing GP MSK referrals to secondary-care services.

Chapters one through four set out the rationale for this current study. Chapter one outlines the research context by discussing the development of the MSK ESP role in the United Kingdom (UK), alongside other non-medical advanced practice roles. It introduces a range of practice issues that beset ESPs, particularly those relating to role definition, job titles, competency and curriculum frameworks, and the educational preparation required; it then discusses the aims of the study. Chapter two presents the literature surrounding MSK ESP practice and highlights the paucity of research concerning MSK ESPs in primary-care settings. Chapter three focuses on primary-care MSK medicine and MSK interface services, and chapter four presents some of the medico-legal aspects of extended practice. Chapter five introduces the Delphi method, and chapters six through eight present the application and results of the Delphi survey process. Each Delphi questionnaire round follows on from the previous one, and the results and analyses will be presented in the order in which they were conducted. Thus, chapters six and seven present the method, results, and summary in self-contained sections. Chapter nine presents data relating to opinion change across rounds and levels of agreement among expert groups. Chapters ten and eleven present the discussion and conclusions.

Chapter 1
The Research Context

1.1 Introduction

This chapter contextualizes the research aims by discussing the development of the MSK ESP role in the UK and a number of practice issues, such as the lack of standardization across roles and the absence of a competency and curriculum framework for MSK ESPs. It also describes the purpose of the study, which was to obtain MSK medical experts' opinions regarding the core clinical competencies required of ESPs working in MSK interface clinics in primary care. *Fowler's Modern English Usage* (Burchfield, 2004) refers to consensus as 'general agreement' and approves attributive uses, for example, 'consensus view'. The research literature presents other terms; for example, 'consensus guidelines' (Lakos et al., 2012), 'consensus statements' (Cuzick et al., 2009; O'Donovan et al., 2010), 'consensus algorithm' (Nathan et al., 2009), and 'consensus definition' (Rumbak & Solomon, 2009). A consensus study produces results based on expert opinion and, because of this, it has been suggested that 'evidence-based' and 'consensus' should not be used in the same context (Bousquet et al., 2008). Nevertheless, researchers have referred to 'evidence-based consensus' (Ramirez et al., 2006; Zhang et al., 2008; Rahier et al., 2009).

1.2 Definition of ESP Roles in MSK Medicine

ESPs are physiotherapists who perform aspects of care previously performed by a doctor, which may involve assessing, diagnosing, treating and discharging patients, or referring to other health-care professionals. The clinical interest group for ESPs in the UK has between 450 and 500 members (the majority of whom are MSK ESPs) and describes ESPs as 'highly expert physiotherapists whose practice incorporates skills in a specialised clinical area' (ESP-Physio., 2010a). The Chartered Society of Physiotherapy (CSP) does not provide a definition of an ESP, but states that extended practice requires additional training beyond immediate postgraduate level and that doctors typically provide ESPs with the necessary mentorship, training, and supervision (CSP, 2008). This 2008 paper also stated that it was inappropriate to list activities as 'in' or 'out' of scope because of the blurring of professional boundaries within modern health care; interestingly, an earlier CSP information paper (now withdrawn) defined an ESP as a clinical physiotherapy specialist in any recognised specialty with an extended scope of practice (CSP, 2000). There remains a lack of consensus in the literature surrounding the definition of an ESP (Stanhope et al., 2012b). Kersten et al. (2007) commented that attempting to define an ESP is complicated because so many different titles and examples of the role exist. This is not unique to physiotherapy; there is also a lack of consistency surrounding titles and scope of practice within advanced-practice nursing (Lowe et al., 2012).

1.3 Development of the ESP and Other Non-medical Advanced Practice Roles in the UK

The development of extended practice in health care was central to the delivery of *The NHS Plan* (DH, 2000a) and was reinforced by other government policies supporting the role of AHPs (DH, 2000b, 2002, 2003a). The need to address workforce shortages and achieve the 48-hour week for junior doctors, laid out in the European Working Time Directive (EWTD), were the main drivers for role expansion in nursing and the professions allied to medicine (NHS Employers, 2011; Pickersgill, 2001). Finding innovative ways of delivering cost-effective, high-quality services through expanding health-care professionals' roles and challenging existing professional boundaries remains high on the health-care agenda today, as non-medical prescribing exemplifies (Fittock, 2010). However, the EWTD (operational in the NHS since August 2009) does not seem to have been the promised panacea for workforce issues. Rather than improving junior doctors' work-life balance it actually seems to be leading to a rising attrition rate among junior doctors (Goddard, 2010), perhaps due to their having to sacrifice training time in order to cover their clinical or administrative duties (Rose, 2010). This, in turn, may be putting more pressure on non-medical practitioners in extended roles. Furthermore, NHS waiting times appear to be suffering as hospitals struggle to accommodate the new working week (Savill, 2010), and this might have prompted Goddard (2011, p.420) to refer to the EWTD as 'one of the main culprits in the disintegration of clinical medicine in UK hospitals'. The EWTD was an important driver for extending non-medical health-care practitioners' roles, but its impact in the longer term is unknown.

Long waiting times in orthopaedic outpatient clinics in the late 1980s were the catalyst for the inception of MSK ESP posts in the UK. Roland et al. (1991) compared the views of GPs, orthopaedic surgeons, and patients on the appropriateness of GP referrals to hospital-based orthopaedic services. The orthopaedic consultants rated 43% of GP referrals as possibly, or definitely, inappropriate. Ten possible solutions were presented, which included GP education in MSK medicine, managing patients' expectations, and improved communication links between GPs and hospital-based specialists. Long waiting times for orthopaedic surgery was a UK-wide problem in the early 1990s, which led to service redesign measures being implemented across the UK as a way of managing pressure on orthopaedic departments. This required a different way of utilizing the skills and experience of existing staff; extending the role of physiotherapists seemed to be the simplest and quickest solution, paving the way for the first MSK ESP posts. Advancing technology and new treatment options, increasing patient demand and expectations, an ageing population, and ongoing medical workforce shortages are all factors that continue to promote the development of these roles (Laurant et al., 2010). However, with the NHS currently facing efficiency savings of £20bn, this is no time for complacency for ESPs or AHP managers. Furthermore, with little strong evidence to support their clinical effectiveness and economic value, the future of these roles is by no means certain. The majority of MSK ESPs continue to work alongside orthopaedic surgeons in secondary care, but it is now *de rigueur* for ESPs to be working in primary-care-based specialist MSK interface clinics. MSK ESPs have also moved into other fields of MSK medicine such as rheumatology, emergency care, and pain management. ESP posts have developed in an *ad hoc* fashion over the years because of local service demand, and this has resulted in a general lack of standardization of ESP roles across the UK (Kersten et al., 2007).

1.4 Existing Competency frameworks for Other Non-medical Advanced Practice Roles in the UK

The success of the physician assistant (PA) role, developed in the United States (US) in response to a shortage of primary-care physicians (Larson et al., 2011), might have influenced the medical profession's support of non-medical extended-practice roles in the UK (Cawley & Hooker, 2003). After the Vietnam War (1954-1975), non-medical servicemen who had administered medical care during their service were among the first to train as PAs. The supervisory role of the physician is critically important to the success of these roles. Hutchinson, Marks & Pittilo (2001), commented that PAs practise at the level of junior doctors in the US but questioned whether this US model would transfer to the NHS in the UK. They commented that physicians might object to non-physicians providing medical care, and that other health-care professionals might be concerned about their roles being duplicated or undermined. Stewart & Catanzaro (2005) did see a place for PAs in the NHS but urged caution because of a possible destabilizing effect on other health-care professionals' extended-practice roles. However, skill-mix is here to stay, despite any 'resistance from those preferring to hide in their professional silos' (Alberti, 2003, p.113). PAs have been working in the UK since 2005 (UKAPA Ltd., 2011) and a PA-specific competency and curriculum framework was developed in 2006 by the Royal College of Physicians, higher education institutions (HEIs), and the Royal College of General Practitioners (DH, 2006b). MSK medicine makes up only a small part of this framework. PAs have little formal postgraduate training in orthopaedic medicine (Larson et al., 2011); their role focuses on general medicine rather than on specialty care (NHS Careers, n.d.).

There are other non-medical practitioners in the UK working as part of an extended medical team: surgical care practitioners, medical care practitioners, anaesthesia practitioners, emergency care practitioners, and perioperative specialist practitioners (DH, 2005a, 2005b; Mason et al., 2006; DH, 2006c; DH, 2007b). These newer roles were set up to recruit preferentially from science graduates and ex-forces personnel because targeting experienced clinicians from nursing and allied health professions was considered unsustainable, and likely to have a negative effect on those professions (Armitage & Shepherd, 2005). This approach to recruitment, using positive discrimination, may not be working because it appears that some physiotherapists have already moved into these new roles (Kneebone et al., 2006). Armitage (2006) referred to a number of concerns about new roles, including the impact on junior doctors' training, a perceived 'dumbing-down' of medicine, existing professions viewing these new practitioners as a threat, and problems arising from differential diagnoses being made by non-medical practitioners. Despite these concerns, the trend for development of the non-medical practitioner shows no sign of abating; furthermore, the medical Royal Colleges have been involved in setting their education and training standards, and nationally agreed competency and curriculum frameworks underpin all these roles.

In 2005, Greater Manchester Strategic Health Authority (SHA) introduced an advanced-practitioner role across Manchester. Students completed a part-time master of science degree in advanced practice and were recruited from a variety of health-care professions, including physiotherapy. The project required collaboration between the SHA, two local universities, the deanery, and local employer organizations. The universities were commissioned primarily to deliver a generic programme of study, although the original vision had been to produce advanced roles in specialist fields. A report evaluating the local impact of this role was published in 2009. A number of advanced practitioners interviewed during this evaluation felt that attaining clarity about the role and its professional status remained a challenge, and that further work was needed if these posts were to be successful (Acton Shapiro, 2009). MSK ESPs share many of the same problems relating to professional status and role clarity with this generic advanced practitioner role.

Skills for Health (SfH), the Sector Skills Council for Health in the UK, is developing nationally transferrable role (NTR) templates and national occupational standards (NOS) for practitioners in advanced-practice and extended-practice roles (Skills for Health, 2010a). During the initial project phase, relevant stakeholders, practitioners, and experts submit comments electronically via the SfH website. A working group collates this information at the end of the consultation period and then each NOS and NTR is reviewed and revised. The SfH vision is that all health-care workers ought to comply with nationally agreed standards detailing the knowledge and skills required to perform specific tasks. There is currently only one MSK-specific NOS, concerning the required knowledge and performance criteria associated with undertaking joint and soft tissue injections. Yet, a number of accredited training programmes already exist for physiotherapists (and doctors) wanting to practise injection therapy, for example, SOM (n.d.). That said, this NOS is useful for ESPs who are undergoing in-house training under the direct supervision of a colleague, and who require a standard against which to compare their competence in the field; it could also be used as a self-assessment tool by more experienced ESPs. Furthermore, the majority of NTRs present broad-based skills linked to the dimensions and levels of the *NHS Knowledge and Skills Framework* (DH, 2004), such as personal and people development, equality and diversity, and health intervention. The design of these NTRs is generic, which makes them suitable for a range of professions and occupational groups but not particularly useful for the MSK ESP role. The NTR with the most relevance to the ESP MSK template is the 'Advanced Practitioner Orthopaedic Physiotherapy Musculoskeletal' role (Skills for Health, 2011). One other template, the 'Advanced Practitioner Arthroplasty' (Skills for Health, 2010b), focuses solely on the care of patients undergoing hip and knee joint replacement surgery; neither template is appropriate for the MSK ESP role in primary care.

Doctors' postgraduate career development is well defined, as evidenced by the number of published medical specialty training curricula (GMC, 2010). A new system of medical training was introduced in the form of a foundation programme in 2005, and specialty training was introduced in 2007 (Gompels et al., 2011). The introduction of the Modernising Medical Careers programme in 2007 (MMC, 2009) produced a shift towards a competency-based system for training and assessment in postgraduate medical education in the UK. In the nursing profession, there is a nationally agreed competency framework for advanced practitioners (RCN, 2010) and a framework for establishing advanced nursing roles in nursing and midwifery (NCNM, 2004). In addition, Fullerton, Thompson & Severino (2011) conducted a Delphi study alongside a survey research method to update midwifery practice competencies produced for the International Confederation of Midwives (Fullerton et al., 2003). The physiotherapy professional body has not yet developed competencies for ESPs. However, in 2009, the UK Extended-Scope Physiotherapy Interest Group (ESP OCIG) published a competency resource manual and toolkit for MSK ESPs (Syme, 2009a). It is not a competency and curriculum framework, but it provides guidelines for developing the necessary infrastructure to support ESP posts and it outlines suggested competencies for MSK ESPs. This comprehensive document used the European Competencies for Sports Physiotherapists (Bulley et al., 2005) as a part of its core framework. The sole author was a physiotherapist; there was limited input from the Professional Affairs Officer at the CSP and no input from medical professionals. Interestingly, the author commented that a Delphi study would have been the ideal approach to define ESP competencies (Syme, 2009b), which was also recommended by The Centre for Allied Health Evidence in Australia as part of their systematic review of extended physiotherapy practice (Lowe & Prior, 2008).

Thus, at the time of writing, physiotherapists have no postgraduate career development programme preparing them for extended practice roles. Moreover, unlike doctors, nurses, and other non-medical practitioners, ESPs have no nationally recognized competency and curriculum framework. Thinking about a job vacancy and interview scenario for a doctor and then for an ESP might help to illustrate the difficulties that this presents in practice. To the interviewers, it would be clear from the doctor’s training and qualifications if he or she had reached the required standard for, say, a specialist registrar’s position; however, there is no such benchmark against which to determine whether or not a physiotherapist has the required skills for an ESP position.

1.5 MSK ESP Practice Issues

1.5.1 Lack of Standardization across Roles and Titles

The establishment of ESP posts has often been an *ad hoc* arrangement in response to local service demand (McPherson et al., 2006) and this remains the case today. A wide variety of post outlines, roles, and titles exist across the UK. This results in poor transferability of skills and difficulties for employers when recruiting to these posts (Miller, Price & Vesper, 2011); it also renders ESP practice a difficult area to regulate and research. If the ESP role is to survive in the current competitive health-care market, it is important to address the paucity of high-quality research in the field, and this requires a more unified definition of the nature and scope of ESP practice. There should be a move away from the unhelpful debate about titles and the ‘lack of a common language to describe extended practice’ (NCCSDO, 2006, p.1). Furthermore, engagement with the medical Royal Colleges is required in order to develop a comprehensive curriculum and competency framework for MSK ESPs.

The bewildering array of job titles relating to non-medical extended-practice and advanced-practice roles in the allied health professions is confusing in itself (Read, 2001; Hardy & Snaith, 2006); for example, extended-scope physiotherapist, advanced practitioner, advanced musculoskeletal practitioner, consultant physiotherapist, clinical specialist, orthopaedic physiotherapy specialist, and orthopaedic physiotherapy practitioner. The situation is similar in nursing (NMC, 2010a) and radiography, and Eddy (2008) argued that it is important to be consistent with the use of job titles. The term ‘advanced’ appears to be synonymous with ‘extended’, but the general issue of titles within physiotherapy became so cumbersome that it led to some academic debate in the late 1990s concerning the difference between ‘advanced practice in physiotherapy’ and ‘advanced physiotherapy practice’ (Stewart, 1998). Even now, the distinction between advanced physiotherapy (at the margins of scope) and extended practice is unclear (Stanhope et al., 2012b). However, Gilmore et al. (2012) commented that an advanced role describes the depth of practice whereas an extended role describes the breadth of practice.

Gardiner & Wagstaff (2001) discussed the titles used by ESPs and questioned whether incorporating the word ‘physiotherapist’ would affect their standing in an orthopaedic outpatient clinic setting, and their sense of professional identity. It would be interesting to poll how many ESPs wear their physiotherapy uniforms, because an ESP not wearing a uniform might command a different level of authority - one more commensurate with the added responsibility of the role.

Sparrow (1991), for example, found that when nurses on an acute medical ward wore their own clothes for two months, rather than their nursing uniforms, it changed the way patients and nurses behaved. Some patients were less likely to ask for assistance and became more independent around nurses not wearing a uniform; some nurses felt more confident without their uniforms (particularly around senior doctors) and other nurses said they preferred wearing a uniform because it identified them as someone with knowledge, conferring on them more self-esteem and confidence. Removing nurses' uniforms stripped them of their identity and meant that they interacted differently with patients; for example, they were more likely to explain procedures and introduce themselves to patients. These kinds of experiments, and the debates that follow, are interesting; however, regardless of title and dress code, ESPs should be informing patients of their professional background and role, and gaining a patient's consent to be seen by an ESP.

1.5.2 The Competency Movement

It is difficult to know quite why, and when, the competency movement became so omnipresent in health care; its association with accountability in the professions might have been the reason (Dunn, Hamilton, & Harden, 1985). Eraut (1994) proposed a political motive - a ploy by the medical profession to protect its knowledge base. Competence is not, as Eraut (1994 p.159) pointed out, 'value neutral'. The ubiquitous acceptance of competency-based learning in health care belies the more obvious limitations that this model imposes, some of which are discussed later in this section. Chehade, Burgess & Bentley (2011) recommended a broader vision of competence for medicine, a vision that transcends a set of rote-learned procedural skills. Talbot (2004) criticized what he saw as the current dominance of an academic-based competency model in medical education, a model that he accused of reducing the complexities of clinical practice to a list of discrete non-contextualised tasks. This is not to say that there should be a return to a Halstedian system of teaching (Barnes, Long, & Whiteside, 1989; Dutta & Krummel, 2006; Moller et al., 2008), where training relies almost entirely on a 'see one, do one and teach one' learning style (Wadey et al., 2009). Instead, there should be a variety of different learning models in use, as advocated by Talbot

(2004). He referred to Barnett (1994) and Squires (2005) who both acknowledged the complexities and vagaries of professional practice, and the importance of learning from more experienced and knowledgeable individuals. However, despite their limitations, competency frameworks are important for clinicians' lifelong-learning, and for their continuing professional development. They provide reassurance to patients and employing health-care organizations by establishing practice standards, and by facilitating the proper delineation of roles. They inform education providers about the exact nature of training required and employers can use them to monitor the performance of individuals. According to Markus, Cooper-Thomas & Allpress (2005) and Watson et al. (2002) the competency movement stems from the education literature of North America, where the acquisition of a defined set of skills was seen as an alternative to the more traditional aptitude tests for predicting performance or success in an occupational setting (McClelland, 1973), particularly for non-professional jobs. Interestingly, although its origins lay outside the health-care professions, the competency movement is now firmly rooted within them. It is seen as a way of standardizing professional practice and guiding continuing professional development. The National Prescribing Centre's competency frameworks for non-medical prescribers are an example of this (Picton, 2011).

Watson et al. (2002) called competence a 'nebulous' concept; it has also been called a 'popular but often misused' concept (Markus et al., 2005, p.125). It is certainly difficult to find agreement in the health-care literature regarding the definition of competence or competency; its association with related concepts such as performance, expertise, and capability muddies the waters even further. Competencies have been called 'the performance criteria, knowledge and understanding required carrying out a work activity effectively' (Oliver, 2006, p.182). The Oxford English Dictionary (Stevenson, 2010) treats 'competence' and 'competency' as synonyms but some authors view them as discrete terms (Manley & Garbett, 2000). The CSP defined competence as a synthesis of knowledge, skills, values and behaviours, and attributes (CSP, 2007). It distinguished clearly between the concepts of competency and competence, and capability (potential competence) and performance (competence in action). Talbot (2004) made a similar distinction in medical education; he argued that competency was not synonymous with competence, and that ‘signing off’ a list of competency-based standards does not necessarily equate to the more traditional and experiential ‘bedside’ approach to skill and knowledge acquisition. It is the assumption that adopting the competency model somehow guarantees performance that invites criticism of the competency movement – but even this criticism has not been sufficient to challenge the stronghold of the competency movement in medical education. Rethans et al. (2002, p.902) urged us to remember that competency-based assessments measure what clinicians do in ‘controlled representations of professional practice’, whereas performance-based assessments represent a more accurate measurement of performance in clinical practice because they embrace ‘perception and situational understanding’ (Talbot, 2004, p.588). A discrete set of tasks assessed in a non-contextualized setting is most unlikely to reflect the messy, uncertain, unpredictable, and often complex world of real-life clinical practice. These sentiments were echoed by Nachev (2010, p.338) who questioned whether competence has much bearing on performance by commenting that ‘something misconceived as a test of competence is likely to be a very poor test of ability’. The assessment of competence is almost as complex as the definition of competence itself. Indeed, Wass et al. (2001, p.945) said that knowledge, skills, and attitudes ‘cannot be properly assessed by a single test format’.

Referring to a health-care professional’s practice as ‘competent’ implies the ability to complete a task successfully, but the word often fails to impress. Titles such as ‘consultant’ or ‘specialist’ have more standing but, again, do not necessarily guarantee competence. Moreover, it is not always clear where ‘being competent’ sits on the continuum between inexperienced novice and practised expert (Benner, 1984). Competencies tend to be dynamic and in a constant state of flux; they deteriorate when neglected and improve with practice. Competence can mean the transient state of basic proficiency that all health-care professionals must pass through on the way to becoming experts, or it can represent a level of expertise; for example, if professionals perform certain tasks on an infrequent basis then it will preclude their achievement of either competence or expertise.

There may be times when expertise always trumps competence, in terms of what is required of a practising clinician; for example, some surgical procedures are technically so difficult that only someone with considerable expertise should perform them. For example, many orthopaedic surgeons would argue that if a surgeon is not doing a set number of knee ligament reconstructions every year, then they should not be doing them at all; being 'competent' is simply not good enough. This presents somewhat of a quandary, because to be expert at performing a surgical technique one needs the opportunity to practise it. However, it would be erroneous always to equate experience with expertise, and this is why competency and curriculum frameworks are important for ESPs; it is not acceptable to expect ESPs to gain expertise simply by doing their job.

Competency frameworks usually refer to classic works in the field; for example, Benner's novice to expert model (Benner, 1984; Benner, 2004), the five levels of practice described by Dreyfus & Dreyfus (1980), and Miller's pyramid of competencies (Miller, 1990). The majority of competency frameworks in health care seem to use these three seminal works as their foundation. Miller's pyramid model described four elements of clinical competence: 'knows' (basic facts and recall of knowledge), which is the lowest level; 'knows how' (contextualised application of clinical knowledge); 'shows how' (*in vitro* assessment of skills); and 'does' (actual performance in an *in vivo,* or real-life, setting), which is the highest level (Wass et al., 2001). Pitts et al. (2010) described a similar model in their training curriculum for trauma and orthopaedics. Their scale relating to knowledge assessment consisted of the following four levels: 'knows of', 'knows basic concepts', 'knows generally', and 'knows specifically and broadly'. A second scale relating to skills and procedures comprised a different set of four levels: 'has observed or knows of', 'can manage with assistance', 'can manage whole but may need assistance', and 'competent to manage without assistance including complications'. These examples are more concerned with measuring competence than with their identification. All competency models tend to contain the same elements: practical skill, underpinning knowledge, and important attributes (attitudes or behaviours); such a 'pyramid of competencies' (incorporating knowledge, skills, and attitudes or behaviours) has already been described (Lucia

& Lepsinger, 1999 cited in Nicolini et al., 2006). Their work concurred with that of Jarvis (1983), an education expert, whose definition of professional competency comprised three core elements; namely, knowledge and understanding, skills (the ability to perform certain tasks), and professional attitudes. Similarly, Gonczi (1994) described competence as a composite of attributes comprising skills, knowledge, and attitudes. Penciner et al. (2011, p.333) also spoke of a core competency being 'the essential knowledge, skill, or attitude needed to succeed in a given field'. Fullerton et al. (2011, p.401) referred to the importance of professional attitudes and behaviours within competence. Their definition of attitude incorporated values and beliefs, and they described behaviour as 'a person's way of relating or responding to the actions of others or to an environmental stimulus'. They also considered competence implied more than mere task performance or skill, defining it as 'the combination of knowledge, psychomotor, communication and decision-making skills that enable an individual to perform a specific task to a defined level of proficiency' (*Ibid,* p.401).

Professions tend to have the monopoly over their expert knowledge base (Yielder, 2006) and to exercise control over specific areas of expertise (Sullivan, 2000). One has to question whether or not MSK ESP practice has its own distinct body of knowledge and if it does, if it has more similarities with medicine than with physiotherapy. Extended practice challenges professional boundaries (Wilson, Pearson, & Hassey, 2002; Sibbald, Laurant, & Reeves, 2006). One would hope that ESPs recognize the deficits in their training, and practise within the 'conscious incompetence' part of the five-stage 'conscious competence' model (Howell, 1982 cited in Jackson, Ignatavicius & Case, 2005, p.235). The danger for many ESPs as they perform tasks more usually carried out by a doctor is that either they may not know what they do not know or they may be practising without proven skills.

Within extended physiotherapy practice, issues can arise when we consider skills traditionally performed by a doctor or another health-care professional; for example, performing an abdominal examination, using an ophthalmoscope, or auscultating for heart sounds. The CSP supports ESPs performing such 'medical' tasks if they have been trained appropriately and if they have proven competencies (CSP, 2008). Thus, an ESP could learn to auscultate for heart sounds and become as proficient at it as a doctor. However, this does not necessarily mean that the physiotherapist and doctor share the same level of underpinning knowledge and ability to interpret the findings. Furthermore, a clinician must examine hundreds of patients before he or she is able to recognize normal and abnormal heart sounds. Thus, unless ESPs practise these 'medical' skills on a regular basis and in real-life clinical settings, one has to question whether they should be practising them at all. This is not to say that ESPs should not be performing these skills or that an ESP cannot correctly interpret the findings of such 'medical' examinations; it is merely pointing out that it is not within an ESP's remit to diagnose medical conditions. Currently, MSK ESP practice is not regulated and the absence of a competency and curriculum framework increases the possibility of overconfident ESPs putting patients at risk and facing litigation.

The scope of extended practice will vary for individuals but, by definition, there will always be boundaries. Take as an example ESPs requesting diagnostic tests such as X-rays. The majority of MSK ESPs request X-rays but unless they have completed an accredited course on image reporting, they are not legally able to interpret them. Thus, a MSK ESP would be unwise to request an X-ray and then act on the findings without showing that X-ray to a doctor or requesting a formal report from a radiologist/reporting radiographer. This is frustrating for many ESPs but perhaps not all of them are as mindful as they should be of the clinical-governance issues surrounding the privileges extended to them in their roles. With appropriate training and proven competence, ESPs should not routinely need to turn to a doctor to 'check' their X-rays. However, ESPs should be cognizant of their practice boundaries and understand that they must not undertake any tasks delegated to them, which they are neither trained nor competent to carry out (CSP, 2008). Doctors and other professionals may not know what these boundaries are, and so ESPs are responsible for making co-workers aware of the limitations of their practice; they should also make their employers aware of their current scope of practice, because of the vicarious liability issues involved. In many NHS hospitals, extended-practice roles undergo approval by a risk management committee, and these practitioners have details of their extended practice written into their job descriptions. An appreciation of the medico-legal implications of ESP practice is critically important. ESPs can often demonstrate tremendous confidence and self-assurance, but there is no room here for misplaced hubris. The medico-legal issues surrounding extended practice will be discussed in more detail in chapter four.

1.6 Theoretical Framework

This study used a theoretical framework that arose from a number of issues occurring both before and during the research process. Initially, a review of the literature concerning ESP practice led to a number of considerations: the research question, including the nature of competencies and competency frameworks; the experience of the principal investigator (PI), observations from clinical practice, and personal assumptions and beliefs; and the best methodological approach to use to address the research problem. It was the latter, the methodological considerations, which then drew in theories and concepts from both the consensus approach of Delphi methodology and the content analysis used to analyse the qualitative data. The approach to this study was exploratory, in order to generate theory from data derived from direct interaction with a range of different health-care practitioners in full-time clinical practice.

An interpretive outlook was adopted throughout the study design (Giacomini & Cook, 2000; Pope, Ziebland, & Mays, 2000; Pope & Mays, 2006). This seemed to be the most appropriate concept on which to base the study, and there were a number of reasons for this. It allowed a freedom of thought and practice that complemented the aims of the study. The interpretive approach encompassed a number of key stages within the research process; for example, the iterative nature of the questionnaire rounds in the Delphi survey and the open-ended structure of its first questionnaire, and the emergence of theory from the data as evidenced by the qualitative content analysis. The theoretical framework recognized the relativity and context-dependency of knowledge, and that one has to view the wider picture to fully comprehend and focus on a research problem of this kind. It also acknowledged the fact that the answers to the research question were unlikely to be entirely value-free or objective. The PI, and the experts taking part in the study, could not adopt an entirely neutral position because of their professional backgrounds and experiences, and this undoubtedly influenced and shaped this research from the outset. Being dually qualified and involved in teaching at postgraduate level, and working in full-time clinical practice in an extended role influenced the PI's approach. The importance of beliefs, values, and subjectivity permeated through the entire study. Indeed, professional judgement was the fundamental premise of the study, because professionals' own judgement and knowledge ultimately dictates professional practice. Professional judgement consists of four areas of knowledge: propositional knowledge, or the theoretical basis of practice; process knowledge, the way in which professionals engage in practice; personal knowledge; and value-based knowledge, which concerns the moral and ethical values, and beliefs (Fox, Martin, & Green, 2007).

There was never any expectation that this study was going to find the 'right answer', but there was a strong desire to find out what experienced practising clinicians thought about MSK ESP practice competencies. By using a consensus-building methodology that allowed all experts an equal voice, it was hoped that the study would produce an outcome that was as close to 'right' as it was possible to be. It also addressed the need to tap into the tacit clinical and professional knowledge, which is so difficult to access - knowledge rooted in experience and judgement. The weaknesses of competency-based education and training have been acknowledged (Nachev, 2010), but competency frameworks exist nonetheless and we must work with them. The typical criticism directed at competency frameworks, as already discussed, is that they are without context and task-specific and therefore have little to do with actual clinical practice. Allowing practising clinical experts to become directly involved in developing competencies and competency frameworks can help to address these criticisms.

1.7 Conceptual Framework

Leshem & Trafford (2007) referred to a conceptual framework as a map of the territory one has chosen to study, analogous to that of a journey; it is a research journey highlighting concepts, theories, beliefs, expectations, and assumptions about the nature of data collected along the way. The conceptual framework guiding this work reflects the current issues surrounding MSK ESP practice (Table

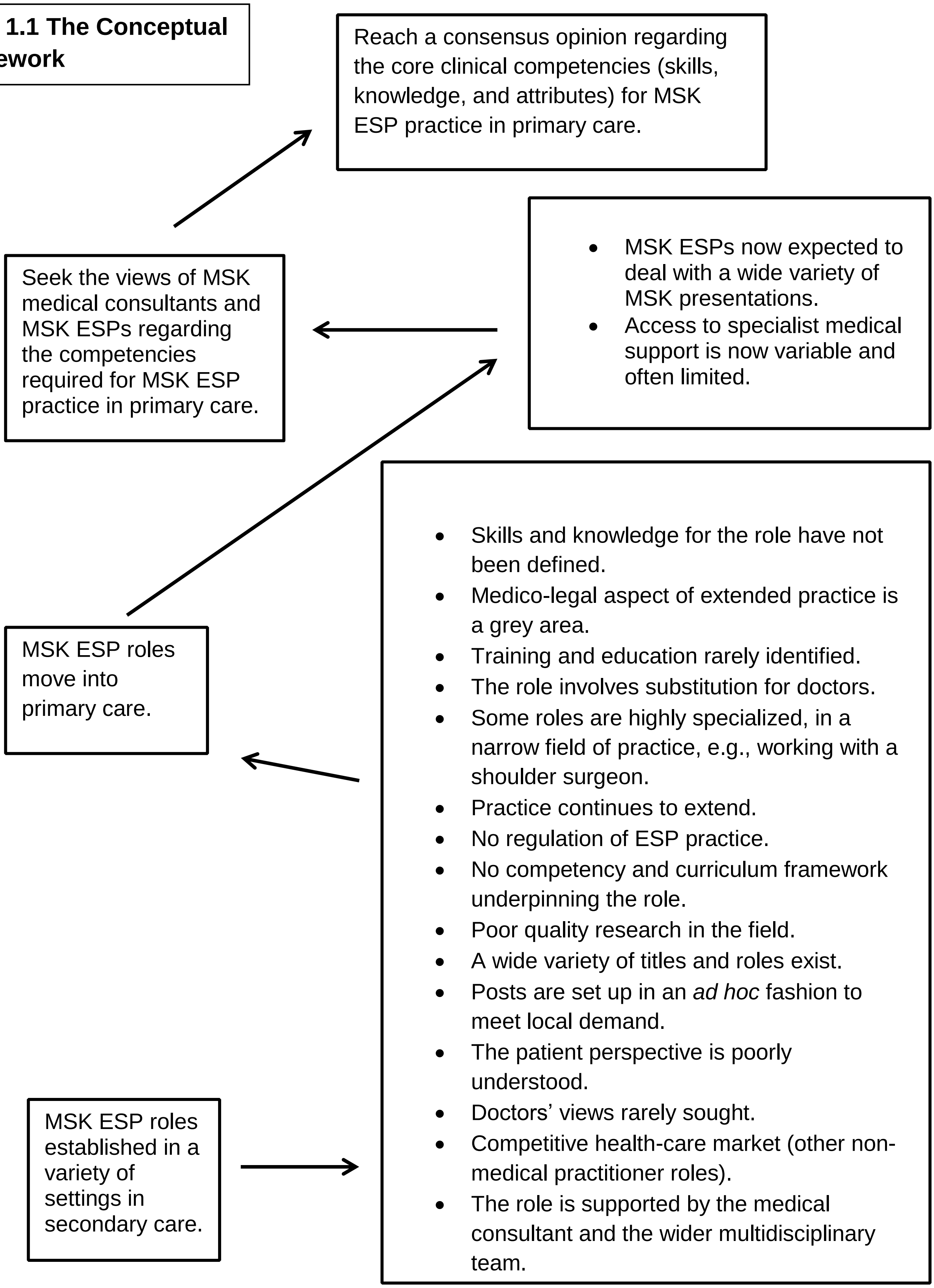
1.1). The MSK ESP role is well established in the UK and involves an element of role substitution for doctors. Despite its success and popularity, there is still no competency and curriculum framework supporting the MSK ESP role, and no regulation of MSK ESP practice. Historically, MSK ESPs have worked in orthopaedic clinics in secondary care with the support of the wider medical team. A more recent development is the MSK ESP role in primary care, where ESPs may be working without multidisciplinary team support (Roberts et al., 2003; Bernstein, 2009). It is critically important to develop a competency and curriculum framework for MSK ESP practice, particularly when one considers that MSK ESPs' work involves performing tasks more usually associated with doctors. The premise of this thesis is that because the MSK ESP role requires the acquisition of medical skills and knowledge, it is essential to engage the support of the medical Royal Colleges in developing such a competency and curriculum framework. The first step in this process is to ask a range of medical MSK experts what the core clinical competencies for MSK ESP practice should be, and to determine whether a consensus can be reached.

1.8 Search strategy

This section provides an overview of the strategy used to search for literature relating to MSK ESP practice, both in the UK and abroad. The purpose of the literature review was to look for evidence relating to the following:

1. the exact nature of ESP roles in MSK medicine
2. the clinical effectiveness and cost-effectiveness of ESP roles
3. training, education, and competency frameworks for ESPs
4. the use of Delphi methodology in defining competencies or competency frameworks in health care
5. online Delphi surveys

Table 1.1 The Conceptual Framework



A librarian specializing in health sciences was consulted to ensure that the literature search was thorough and that terms were adequately defined. The terms, truncation, and wildcards used in the search are detailed in Table 1.2. Boolean operators ‘AND’, ‘OR’ and ‘ADJ’ were used and the resources accessed can be found in Table 1.3. The search included ‘grey’ literature as well as published evidence, and included health-care systems other than the NHS. Monthly alerts were set up for AMED, CINAHL, Ovid MEDLINE and Google Giga, and a final search was conducted for work published in 2011/12. There were no limits on the type of study design or the year of publication. Studies relating to paediatric medicine were included if they concerned MSK extended-practice physiotherapy. The search was limited to the English language. Literature relating to advanced-practice roles in other professions was not included, but its inclusion was allowed where it also discussed extended-scope physiotherapy roles. Literature relating to routine physiotherapy was sometimes included, but only where the exact nature and scope of the role was uncertain.

Results were screened using the title and abstract and all full-text articles were retrieved electronically or via inter-library loans; in some instances, the authors were contacted directly. The reference lists in full-text articles were checked manually for additional papers. Studies representing levels I, II and III evidence (CEBM, 2010) were appraised for quality using worksheets from the Critical Appraisal Skills Programme and BestBETs websites, which also provided guidelines for appraising qualitative research (BestBETs, 2010; CASP, 2010). Studies with inadequate qualitative or quantitative data and studies representing levels IV and V evidence were excluded from this formal appraisal process, but they were included for their descriptive content.

Papers relating to extended-practice or advanced-practice roles in physiotherapy totalled over 235, of which only three were randomized controlled trials (Daker-White et al., 1999; Richardson et al., 2005; Jesudason et al., 2011). A fourth publication, an unpublished PhD thesis (McClellan, 2009) described a randomized controlled trial, and this led to the subsequant publication of an abstract in a peer-reviewed journal (McClellan et al., 2009). One systematic review was found relating specifically to MSK ESP roles (Kersten et al., 2007) and one review focused on the ESP role in emergency care (Kilner, 2011). A further three systematic reviews incorporated MSK ESPs as part of a review of nursing and other AHP extended-practice or advanced practice roles: McPherson et al. (2006), Lowe & Prior (2008), and Laurant et al. (2010). The review by Lowe & Prior (2008) was later updated (Stanhope et al., 2012a; 2012b); a fourth review was identified but it focused solely on consultant-practitioner roles (Humphreys et al., 2001). Out of 415 hits, 196 papers where a Delphi study had been used to establish either clinical competencies or education curricula in health care were evaluated; only one of these, an observational study (Ellis, Kersten, & Sibley, 2005), concerned MSK ESP (physiotherapists and occupational therapists) competencies in hand therapy.

Table 1.2 Search Terms

Concept 1	**Concept 2**	**Concept 3**	**Concept 4**
physiotherap$ allied health professional$	extended scope extended practice extended role advanced scope advanced practice advanced role enhanced scope enhanced practice enhanced role practitioner$	MSK musculoskeletal orthop?edics orthop?edic rheumatology	competenc$ skills
Concept 5	**Concept 6**		
email internet online web based web-based	Delphi technique Delphi survey$ questionnaire$		

Table 1.3 Resources

Electronic databases	
	CINAHL (Allied Health and Nursing), 1982-02/2011
	PEDro (Physiotherapy Evidence)
	MEDLINE (1950-02/2011)
	AMED, Allied and Complementary Medicine (1985-02/2011)
	EMBASE (1980-02/2011)
Grey literature	

	OpenSIGLE
	Fade library
Others	
	ProQuest Dissertations & Theses database
	The National Research Register Archive
	The British Library EThOS online theses
	The British Library Integrated Catalogue
	The British Library Conference Collections
	Google scholar/Google Giga alerts/advanced Google search
	The CSP website/ interactive CSP website/ extended-scope physiotherapy website
	DH website
	National Institute for Health Research Service Delivery and Organization Programme

1.9 Summary

In the UK, the MSK ESP role is well established and the role remains widely accepted by doctors, patients, and other professions allied to medicine. However, there is no competency and curriculum framework for MSK ESP practice, despite the fact that newer non-medical health-care practitioner roles working alongside ESPs already have competency and curriculum frameworks, produced with help from the medical Royal Colleges. SfH has produced the Advanced Practitioner Orthopaedic Physiotherapy Musculoskeletal NTR template, which brings together generic competencies designed to be replicable across different locations but it does not focus on clinical competencies or the MSK ESP role in primary care. The focus of this current study is the ESP role in community-based MSK interface clinics, which is becoming more prevalent as a result of government reforms proposing the transfer of services from hospital-based services to services based in the community settings (DH, 2006a; DH 2006d; DH, 2007a), and this will be discussed in more detail in chapter three. The next chapter reviews the literature surrounding MSK ESP roles in the UK and abroad, but similarly fails to uncover an existing competency framework for MSK ESPs.

Chapter 2

MSK Extended-Scope Physiotherapy Practice in the UK and Abroad

2.1 Introduction

This chapter explores the literature surrounding the clinical effectiveness and economic value of the MSK ESP role, together with the educational preparedness and competencies required.

2.2 Orthopaedics: Early Seminal Papers

Byles & Ling (1989) were possibly the first authors to describe the MSK ESP role in orthopaedic outpatient clinics in the UK, but they referred to an ‘orthopaedic assistant’ rather than an ESP. This descriptive audit examined the role of a physiotherapist in helping to reduce orthopaedic outpatient waiting times. The physiotherapist involved in the study had been qualified for over 30 years but the authors did not provide details about the type of training undertaken in preparation for this innovative role. However, the physiotherapist was able to request limited investigations (blood tests and plain X-rays) and access to orthopaedic and radiology consultant medical support was provided. The consultant orthopaedic surgeon selected patients whom he considered suitable for the ESP’s list (patients without complex pathology and unlikely to require surgery). Patients completed a self-administered questionnaire before their initial appointment, which ‘screened’ them for serious pathology. During the 18-month study, the physiotherapist saw 619 new patients and saw six patients per half-day session. By contrast, the consultant (and members of his team) saw 30 patients per session, although the consultant team reportedly saw only 834 new patients throughout the duration of the study. The physiotherapist managed 34% of referrals independently and referred 33% of patients to the consultant’s team. Patient and GP satisfaction levels were generally good with only 10% of patients expressing dissatisfaction with the service, which the authors attributed to the recurrence of chronic symptoms. Two of the GPs surveyed expressed concerns relating to medico-legal or political issues but did not state what these were exactly. The authors did not present raw data but commented that having a physiotherapist in the clinic had enabled the consultant to substitute one operating list for an outpatient clinic each month. They also remarked that the consultant was ‘responsible’ for the physiotherapist. This raises an interesting point about extended practice and how it is perceived; the inference that ESPs are not responsible for their own actions is erroneous (Dimond, 2009). However, the physiotherapist in this study was working as a clinical assistant and the parameters of the role are not known; perhaps there was little that was autonomous about her role and the consultant may well have retained responsibility for her actions. Times have changed and ESP practice has changed, and this will become apparent later in this chapter. ESP practice is a phenomenon that is unlikely to remain stationary. It has progressed over time (albeit with a lack of regulation) and, because it is now embedded within the NHS workforce, it is likely to continue to do so.

Hourigan & Weatherley (1994) presented the findings of a descriptive audit in which an ESP triaged low back pain referrals to an orthopaedic clinic. The authors reported that out of 78 referrals seen by the ESP, only 14 patients at their initial appointment and 10 patients at their follow-up appointment (four months later), needed to see the consultant orthopaedic spinal surgeon. The ESP received training and supervision from the spinal surgeon but it appeared that the ESP discussed every patient with the spinal surgeon, and so one has to question whether the ESP really did manage any of the patients independently. This paper generated some interest and in response to the queries received about their spinal orthopaedic service, the same authors conducted a national postal questionnaire survey of ESP spinal services in the UK (Weatherley & Hourigan, 1998). In this second study, the authors contacted 43 UK centres using ESPs to triage back pain referrals, by accessing ESPs through the UK ESP special interest group; 39/43 (91%) of centres responded. The authors might have missed some services and thereby introduced recruitment bias, because ESPs are not required to register with this special interest group. Details of the questionnaire used to survey these other centres were not provided, but it seemed to be a fact-finding exercise. Their results were informative but purely descriptive in nature. For example, ESP practice varied considerably across the UK and 23% of ESPs were concerned that their lack of medical knowledge would lead to missed diagnoses; almost three-quarters of ESPs found their role stressful. The relationship between the ESP and the spinal surgeon was clearly important, but two issues in particular caused concern when reviewing this paper. First, a 'high number' of ESPs were seeing complex spinal cases, when the reason for having an ESP in the first place was to allow the surgeon to see these patients. Second, 41% of ESPs who requested their own X-rays did not show them to the spinal surgeon or request a report from the radiology department. At the time of the study, it is most unlikely that ESPs would have been reporting their own X-rays because reporting radiology courses, such as those now offered at Cardiff University (2011) and the University of Salford (n.d.), have only been available to physiotherapists in recent years. Today, radiographic reporting is more usually associated with extended-practice roles in radiography (Brearley et al., 2005; Piper, Paterson, & Godfrey, 2005; Donovan & Manning, 2006). Few ESPs will complete such a demanding course and so from a clinical governance point of view, they should be requesting reports or discussing images with the consultant. There can often be a certain naivety attached to ESP practice, fuelled by medical staff perhaps not being aware of what ESPs can or cannot do in terms of their scope of practice; it is up to ESPs to recognize their limitations and ensure that they are practising lawfully (CSP, 2008). It was reassuring to find that following their study the authors made certain recommendations, which included holding regular case reviews between the ESP and spinal surgeon, formal reporting of all ESP-requested imaging, and selecting less complex cases for the ESP to see. The 1998 paper received criticism from one of the centres studied (Heyes-Moore, 1998), whose clinicians accused the authors of glossing over GP and patient dissatisfaction with ESP services, which they claimed had led to an increase in their own GP re-referral rates within one year. In fact, their re-referral rate was relatively low (5%) and they did not present any data to support their argument.

Weale & Bannister (1995) compared a physiotherapist's management of GP referrals to orthopaedic clinics with one of two subconsultant-grade orthopaedic surgeons. Outcomes measured included investigations requested, treatment plans, and patient satisfaction data (collected at six and 12 months). Patients were not randomized, and the physiotherapist group (n=221) comprised significantly more cases of anterior knee pain ($p<0.001$) than the doctor group (n=95). The physiotherapist had been qualified for six years, and the two doctors had been awarded their FRCS (Fellowship of the Royal College of Surgeons) status 10 to 15 years earlier. Patient satisfaction and treatment outcomes were similar in both groups, but the physiotherapist requested significantly more X-rays ($p=<0.001$); 53% of patients in the physiotherapist group received X-ray imaging compared with 25% in the doctor group. The authors concluded that an appropriately trained physiotherapist and a subconsultant-grade surgeon were equally capable of managing orthopaedic outpatient referrals that are unlikely to benefit from surgical intervention. However, the authors did not appear to consider the significance of the between-group differences in the number of X-rays requested, when this might have highlighted the need to instigate training for ESPs in radiographic imaging, particularly relating to IRMER regulations and guidance (CQC, 2010).

These early studies paved the way for other ESPs to undertake roles in orthopaedic outpatient clinics. The next section will look at some of these papers in more detail. A small number of them concern occupational therapists (OTs), but they are included because of the similarity of the role to that of the ESP.

2.3 Overview of ESP Roles in Different MSK Practice Settings

2.3.1 MSK ESPs in Orthopaedics

ESP practice in orthopaedic clinics is variable, with some ESPs working in general orthopaedics and others working in a narrow field, such as hand surgery. For example, Peck et al. (2004) published details of an audit of an ESP-led hand service, which was introduced to deal with overcrowding in hand surgeons' clinics. They investigated the effectiveness of the ESP clinic by examining the reduction in re-rupture rates following three types of primary tendon repairs in the hand. All patients who underwent these procedures attended the ESP clinic within 72 hours of surgery, at which point post-operative care and rehabilitation commenced. Comparison with historical audit data revealed a fall in re-rupture rates of between 5% and 13% following the introduction of the ESP clinic, although it is not clear if the same surgeon was involved throughout the study. Re-rupture rates might have fallen because the ESP clinic provided a rehabilitation service that had not been available previously, and one could argue that what this study described was a specialist physiotherapy role rather than an ESP role. An earlier study by the same lead author (Peck, Kennedy, & McKirdy, 2001) reported on a three-month audit of a practitioner-led (physiotherapist, occupational therapist, and nurse) hand clinic. They worked on the premise (based on results from a previous audit) that 50% of patients attending the hand clinic did not need to see the consultant. Practitioners worked with local protocols and guidelines for a range of hand conditions, and this enabled them to deal with 649 patient consultations during the study period. It is not known if this figure represented the total number of new patients seen or the total number of consultations. However, only six patients needed consultant input during this time. Waiting times reduced and the new venture became so successful that junior doctors started attending the ESP-led clinic as part of their training.

In an attempt to reduce waiting times for consultant-led hand clinics, Storey et al. (2008) audited the activity of a therapist-led carpal tunnel syndrome (CTS) clinic based in the community, which was set up to deflect referrals from secondary care. In fact, the therapist involved was not a physiotherapist, but an OT, trained by the hand surgeon. The aims of the study were to monitor the effect of this community clinic on waiting times, ‘did not attend’ rates, the quality of the service offered, and its effectiveness by examining the number of inappropriate referrals to the consultant-led clinic in secondary care. The service successfully managed 45% of GP-referred CTS patients in the community, and only one of these patients required further treatment for CTS two years later. Given that the study was an audit, it could not fully evaluate the quality or effectiveness of the therapist-led service. Nonetheless, the authors claimed to have cut costs, even though consultation times were twice as long in the therapist-led clinic; this was because a first appointment in the therapist-led clinic cost £48.25 compared with £148.00 for the consultant-led clinic. These findings were similar to those published by Taylor, Ball & Davis (2012), who stated that a clinical appointment with a consultant orthopaedic surgeon cost twice as much as an appointment with an ESP; indeed, they estimated that over a two-month period the Primary Care Trust (PCT) saved £6860 by introducing ESP clinics to review new foot and ankle referrals.

Another study reported on a secondary-care based, therapist-led hand clinic which operated with the support of a hand surgeon (Warwick & Belward, 2004), but the authors did not apprise the reader of the professional background of the therapist. However, they stated that the therapist received training from the surgeon over a three-month period; this resulted in the therapist being able to see patients independently, seeking advice from the consultant only when appropriate. The therapist referred 137/780 (18%) patients to the consultant, of whom 69/137 (50%) were listed for carpal tunnel surgery. The consultant discharged a further 28/137 (20%) patients, and 17/137 (12%) were treated for another condition. They estimated that the therapist-led clinic created four to five extra appointment slots each week in the consultant's clinic. Unfortunately, the introduction of these clinics led to an increase in surgical waiting times because the system could not meet the increased demand for surgery, which meant that the activity of the therapist-led clinic had to be restricted. This provides an example of the possible unintended consequences of extended-practice roles, and demonstrates that relieving pressure in one area of a closed system often creates pressure elsewhere. In addition, an ESP-led clinic that removes the less complex 'bread-and-butter cases' from orthopaedic outpatient clinics may have a deleterious effect on junior doctors' training. Thus, other health-care professionals may not always view the ESP role in a positive light.

Rose & Probert (2009) audited the effect of introducing a hand clinic run by two extended-scope practitioners who were OTs. Competencies were identified by the OTs themselves; training was in-house and involved spending time with orthopaedic and radiology consultant colleagues. They compared consultant and OT diagnoses and management plans for 100 patients (selected for their suitability by the consultant). Rather than doing this by auditing medical notes, patients saw both the OT and the consultant at their initial and follow-up appointment, thus facilitating a direct comparison between the two groups. All clinicians used standard validated outcome measures and the same assessment form to record their diagnosis and management plan. The authors provided limited results, and so we do not know how well the OTs performed against the benchmark of their consultant medical colleagues. However, one can assume that the outcomes were favourable because they commented that following the study OTs obtained limited listing rights.

Branstiter & Sandford (2010) published an early report of their small study (n=25) involving an ESP-led hand clinic. The aim of this clinic was to prevent delayed presentation of wrist instability in orthopaedic clinics by the earlier detection of ligament damage following trauma to the wrist. Patients were referred to the therapist-led clinic by the accident and emergency department 10 days post-injury. The ESP could request X-rays, magnetic resonance imaging (MRI) and ultrasound (US) scans, and nerve conduction studies. The authors reported that early intervention by the ESP clinic had resulted in improved outcomes for patients because of the earlier detection of serious injury, such as missed scaphoid fractures.

Shoulder surgery is an area where ESP practice is commonplace and this may be because physiotherapy is the mainstay of treatment for many shoulder disorders, and because specific rehabilitation is essential both before and after shoulder surgery. Connor, Coates & Kulkarni (2009), in a presentation to the British Elbow and Shoulder Society, described the mentoring effect of an ESP-led ‘problem shoulder clinic’, which could be accessed by physiotherapists. The ESP managed 256 patients over the three-year study period and saw 69 of these patients in face-to-face consultations. Forty-five patients were referred to the shoulder surgeon and the surgical conversion rate for these cases was 53%; a further 20% were waiting for the results of investigations at the time of publication and 22% received injections to manage their pain. Again, this suggests a local training need for ESPs – in this case, injection therapy. This was possibly the only study that used an ESP clinic to support physiotherapy practice directly. This is an important concept, because it incorporates the notion of succession planning for ESP roles and offers some reassurance that ESPs are not abandoning their physiotherapy roots.

Moving on to general orthopaedics, Pearse, Maclean & Ricketts (2006) audited one ESP’s activity in an orthopaedic outpatient clinic by conducting a retrospective review of patients' notes (n=150). They found that the ESP had independently managed 82/150 (55%) referrals triaged to the ESP clinic, which was a lower figure than they had anticipated and less than the figure generally quoted in the literature. They also found that 97/126 (77%) of patients were satisfied with the service, but measurements were taken 12 months after the initial appointment when patient recall could have been an issue. The patient groups that required consultant input were the shoulder (81%), knee (34%), and low back (11%) disorders. Half of the patients with shoulder disorders had an injection in the consultant-led clinic, which again indicated a need for the ESP to undergo injection-therapy training. When triaging GP referrals the ESP used a specific protocol to select patients who were suitable for the ESP-led clinic, and the consultant checked this selection. One wonders if poor quality GP referrals were behind the high ESP-to-consultant referral rate. It is not known what training these ESPs undertook, or their level of competence and experience; however, the authors concluded that ESPs were unlikely to be able to work independently without consultant medical support. These findings were supported by Harrison et al. (2001), whose descriptive observational study of an ESP-led shoulder clinic revealed that 60/130 (46%) patients needed the consultant's input. In this study, the ESP had close links with the orthopaedic consultant and observed in the consultant clinics on a regular basis. Furthermore, the ESP clinic had a minimal effect on waiting times (the waiting list reduced by only 50 patients), but this might have been because of extraneous factors. Again, the consultant selected patients for the ESP to see; given that the study ran over a 12-month period, the number of patients managed by the ESP during this time seems small.

More recently, a descriptive study by Curley et al. (2004) reported on the outcomes of a hospital-based back-pain screening service in Ireland, staffed by an orthopaedic spinal registrar and two physiotherapists. They found that a physiotherapist could manage 85% of GP referrals to a spinal orthopaedic consultant clinic. However, it is unclear if these physiotherapists were ESPs, because the orthopaedic spinal registrar seemed to be the only clinician requesting MRI scans. Unfortunately, the methodology and information within the paper do not elucidate this matter further. A couple of years earlier another study, also based in Ireland, described a retrospective audit (n=1000) of patients referred by GPs to spinal clinics who were then managed by a specialist physiotherapist. During the audit period (June 1997 to June 1998), the waiting time for an orthopaedic opinion fell from 29 to 20 weeks (Bartley, 2002).

Hockin & Bannister (1994) published an audit of an ESP's management of GP referrals to an orthopaedic clinic. They found that a specially trained physiotherapist working closely with an orthopaedic surgeon could manage 85% of selected general orthopaedic referrals. The physiotherapist in this study had attended an orthopaedic postgraduate training course and had received additional training relating to orthotic prescription and steroid injections. The reason why the physiotherapist in this study was able to manage a high number of referrals independently was probably that he or she was seeing patients specifically selected for the ESP clinic by the surgeon. Some ESPs may work like this today, whereas others are very much a part of the orthopaedic team and do not have a separate list of patients selected specifically for them to see.

A more recent development for the ESP role has been in the management of follow-up fracture clinics. Moloney et al. (2009) published an observational study describing a six-month pilot of an innovative ESP role in Ireland. The purpose of the study was to assess the impact on subconsultant surgeons' working hours of an ESP-led follow-up fracture clinic. The ESP used protocols detailing indications for X-rays and management plans, and completed a 26-week training programme. Her training included observation in consultants' clinics and an X-ray interpretation course. Outcomes included subconsultant doctors' weekly working hours before and after implementation of the new service, waiting times in clinic, and satisfaction levels of patients, clinical and clerical staff. The ESP managed 403 patients over a four-month period and of these, only six patients required a review by the consultant.

The CSP published its first clinical guideline for the use of injection therapy in 1999 (CSP, 1999) and physiotherapists must prove their competence to practise by obtaining a qualification in injection therapy from a recognized postgraduate institution. The following article is included because it exemplifies the use of an ESP to address a specific service development, in this case injection therapy. Birchall, Ismail & Peat (2008) used a prospective case-series design to track the outcomes of 100 patients who had received a single course of intra-articular hyaluronic injections in an ESP-led injection clinic. The consultant orthopaedic surgeon reviewed patients at 13 and 26 weeks, and a final follow-up review took place at 52 weeks. They found that although scores varied among individuals, 56 patients had maintained their improvement in scores at the 12-month point. Although there was no control group in this study and the authors acknowledged its limitations, they concluded that ESP-led injection clinics were 'feasible'. More recently, Smith (2011) published an audit of a single ESP's practice relating to steroid injections for common MSK problems – although the primary aim of this study was to determine if using a steroid solution on its own, without a local anaesthetic, would produce an overall change in post-injection pain scores.

Belthur, Clegg & Strange (2003) examined the effectiveness of a specialist physiotherapist in paediatric orthopaedic clinics in the UK. Ninety-three per cent of the patients seen in the physiotherapy clinic were managed without onward referral to the consultant. The waiting list reduced from 72 to five weeks over three years for non-urgent cases and from 17 to seven-and-a-half weeks for urgent cases over one year.

2.3.2 Orthopaedics: MSK ESPs Compared with Doctors

The following studies have attempted to compare orthopaedic doctors with ESPs. Studies from the UK will be discussed first, followed by those from Canada, the US, and Australia. Again, the majority of these studies describe ESPs working in hospital-based orthopaedic clinics, where they work alongside a team of orthopaedic doctors. In the majority of papers, the training and experience of the ESPs are not documented, and the results are not necessarily generalizable to other settings.

In a presentation at the British Association for Surgery of the Knee, Kotecha et al. (2010) described a prospective study designed to determine if it would be feasible to allow an ESP to list patients for arthroscopic knee surgery. They compared the outpatient clinical diagnoses of an ESP, an orthopaedic registrar, and a consultant orthopaedic surgeon with the findings at arthroscopy. Patients in all three groups were similar, in terms of presenting complaint and demographics, although randomization did not take place. The exact number of clinicians involved in the study is unknown. The same consultant orthopaedic surgeon performed all arthroscopies, but it is not known if this surgeon had been involved in making the initial clinical diagnoses. It is likely that these ESPs were highly skilled in knee examination but information relating to training and competence was missing. No statistical differences were found between the diagnostic abilities of ESPs and registrars. Raw data tables were not presented and there were no details relating to the patients seen in the consultant group. Of the 300 patients listed for an arthroscopy, only nine were deemed to have been listed inappropriately for surgery; none of these patients had been managed by the ESP group. The authors were justified in claiming that the ESP performed as well as orthopaedic registrars and was capable of listing patients directly for knee arthroscopic surgery; however, the results are not necessarily generalizable to ESPs in other settings.

A non-randomized study by Trompeter et al. (2010) also found no statistically significant differences between the abilities of surgeons and ESPs to list patients for knee surgery. They used a retrospective review of case notes of patients (n=100) undergoing arthroscopic surgery in an attempt to assess the diagnostic accuracy of orthopaedic surgeons and ESPs. The clinical diagnosis made in the outpatient setting was compared with the arthroscopic findings; agreement occurred between the two in 41/50 (82%) of patients seen by doctors and in 33/50 (66%) of patients seen by physiotherapists (p=0.07).

Daker-White et al. (1999) conducted a randomized controlled trial at two hospitals in Bristol, comparing ESPs' assessment and management of GP referrals to orthopaedic outpatient clinics with that of subconsultant orthopaedic surgeons. The aim of the study was to evaluate the clinical effectiveness and economic value of ESPs' initial assessment and management of orthopaedic referrals. Patients (n=481) were randomized to an ESP group (n=237) or a subconsultant grade surgeon group (n=244). The researchers recorded clinicians' documentation of provisional diagnoses, tests ordered, and treatment options proffered. They also measured a number of clinical outcomes: self-completed validated questionnaires, pain (visual analogue scale), functional disability (using three different validated measures for the spine, upper and lower extremity), perceived handicap (Disease Repercussions Profile), self-efficacy and health-related quality of life (EuroQol EQ-5D), and psychological status (Hospital Anxiety and Depression Scale). Patients' expectations of treatment and their demographic data were recorded before treatment, and patient and GP satisfaction scores were measured at follow up (the mean follow-up time was 5.6 months post-randomization). The EuroQol EQ-5D was used for its economic analysis elements, and a number of other factors relating to cost were recorded: number of visits, drugs and devices, and tests ordered. In terms of a comparison of investigations requested and management options selected by doctors and ESPs, the results showed that ESPs were significantly more likely not to request X-rays ($p=0.000001$) and significantly more likely to request no investigations at all ($p=0.000001$). Furthermore, ESPs were less likely to refer for an orthopaedic surgical opinion ($p=0.005$) and significantly more likely to offer advice and reassurance to patients ($p=0.000001$). A subscale of the patient satisfaction outcome (relating to perceived treatment quality) seemed to favour the ESP group ($p=0.001$). The mean cost per patient for the ESP and doctor group was £256 and £498 respectively; the difference in cost between the two groups was presumably related to the greater number of X-rays and referrals for surgery in the subconsultant group, or perhaps the different salaries. Unfortunately, these researchers did not collect data relating to consultation times, but it would have been interesting to see a further analysis of this and its possible impact on overall cost differences and patient satisfaction scores. There were a number of limitations to the study design. Recruitment at the two sites was not identical because patients who were likely to require surgery were included at one site but excluded at the other. Furthermore, the trial was not blinded, the number of clinicians involved was unknown, and its power calculation was inadequate. The authors concluded that ESPs and subconsultant-grade surgeons were equally effective at triaging GP orthopaedic referrals to secondary care. However, as well as the aforementioned limitations, there are a number of other issues challenging the authors' conclusions. The ESPs might have been more cost-effective because they requested fewer investigations and referred fewer patients for a surgical opinion, but this practice was not necessarily clinically effective, or even safe; perhaps the ESPs should have been requesting more X-rays, for example. A longer follow-up assessment and a review of re-referral rates would have clarified this. There was no gold standard against which the clinical decision-making skills of ESPs and subconsultant surgeons were measured. The follow-up time was short, and the 38 patients who were lost to follow up (split almost equally between the two groups) were not included in the analysis. Based on these results, a question mark has to remain over the clinical effectiveness of ESPs, at least in this study. In fact, the difference in referral rates for investigations and surgical opinion between the two groups is quite a concern, and it overshadows the authors' already doubtful claims.

Other UK studies have looked at ESPs' use of medical imaging. Rabey, Morgans & Barrett (2002) investigated the appropriateness of ESPs' surgical and radiological referrals for knee and lumbar spine conditions in an orthopaedic clinic. This descriptive study collected audit data over a 31-month period relating to 1,670 new patients. The ESPs selected patients for their ESP-led service, and patients for whom a surgical opinion was clearly indicated in the GP referral letter were redirected to the consultant clinic (which possibly accounted for the low ESP referral rate to orthopaedic surgery). Data were collected (we do not know by whom) regarding the presenting complaint, investigations ordered, and onward referral; the appropriateness of onward referral was assessed by reviewing the consultants' clinic letters. Over the three years, 79% of GP referrals were managed independently by the ESP service and 25% of all patients were referred for investigations (X-ray or MRI scans). An average of nine per cent of patients were referred for an orthopaedic surgical opinion and of these, only 11% were deemed inappropriate by the consultant, because their management could have taken place in primary care. These results are impressive but it would have been interesting to see the outcomes of the diagnostic tests requested. We do not know the number of ESPs taking part in the study, and their level of experience and training was not documented. Furthermore, we do not know if the ESPs' high deflection rate represented clinical effectiveness, because there was no follow up of the 79% of patients who were managed independently by ESPs.

Dickens et al. (2003) used a prospective study design (n=50) to compare the diagnostic accuracy between a consultant orthopaedic knee surgeon and two ESPs using a cohort of patients with soft tissue injuries of the knee. The three clinicians examined patients in random order over a 10-week period and documented their clinical diagnoses; 33 patients proceeded to arthroscopy (performed or supervised by the same surgeon) and 17 patients were managed conservatively. The initial clinical diagnoses of the 33 patients who proceeded to surgery were compared with the subsequent operative findings. Clinicians' diagnostic sensitivity, specificity, and accuracy relating to the four most common diagnoses were calculated and presented in a table form, which incorporated data from the 17 patients who were managed conservatively. The overall results showed an accuracy measurement of 92% for the surgeon, and 84% and 80% respectively for the two ESPs. All the patients managed conservatively had improved at the 6-week follow up and the three clinicians' initial diagnoses concurred in 13 cases. The authors stressed the importance of a strong working relationship between the ESP and orthopaedic team, and the need for relevant training and support; however, they provided no actual details about the ESPs' training.

Also looking at knee injuries, Gardiner & Turner (2002) conducted a retrospective audit of patients' medical notes (n=128) in an attempt to compare the accuracy of one ESP's clinical diagnoses of acute knee injuries with that of one consultant orthopaedic surgeon and three different grades of subconsultant surgeons. The number of patients seen by the ESP and doctors was unequal (consultant n=64, specialist registrar n=27, senior house officer n=1, staff grade doctor n=3, and ESP n=23). Simple descriptive statistics detailed the correlation between the clinical diagnosis found in the medical notes and subsequent findings at arthroscopic surgery. Diagnostic agreement with arthroscopic findings reached 12/23 (52%) and 39/105 (37%) for the ESPs and doctors (as a group) respectively. The doctors' results were not differentiated into the four different grades, which was a fundamental flaw in the study. It makes little sense to combine the results from different grades of doctors and then to compare these with the results from one ESP, given the huge variation in experience and skill involved. It would have been more interesting if the authors had compared the results of different grades of doctors alongside that of an ESP, and it might have been useful in identifying specific training needs within the orthopaedic team. One person collected the data and analysed it, which could have introduced bias. In addition, a number of different orthopaedic surgeons were performing the arthroscopic surgeries, which rendered the gold standard benchmark of the arthroscopic findings somewhat flawed; it would also have been helpful to see the outcomes of patients who were not listed for arthroscopic surgery. Problems must have been encountered with data collection because the authors stated that they implemented a standard for medical record-keeping following the audit. The overall percentage agreement between clinical and arthroscopic diagnoses for the orthopaedic team (ESP and all grades of doctor) was 83%, which fell short of the standard set by the authors.

A published abstract by Dahabreh, Gonsalves & Calder (2007) reported on the outcomes of a six-month audit of a new physiotherapist-led acute knee trauma clinic, which reviewed patients 10 days after an injury. Out of 191 patients seen, 25 were referred for further investigations (MRI scan, n=13 and arthroscopy, n=10, or both, n=2) and 52 were referred for a specialist opinion, to either a rheumatologist (n=6) or an orthopaedic surgeon (n=46). The physiotherapist's diagnosis correlated positively with that of the specialist in 26 out of 32 cases that completed their treatment, and the diagnosis made by the physiotherapist correlated with the MRI scan or arthroscopy findings in 89.5% of cases compared with 94.7% of cases in the specialists' groups.

Another small study using a retrospective audit of medical notes (n=26) was performed by Oakes (2009), who extracted data relating to patients with shoulder pain referred by an ESP to a consultant orthopaedic surgeon's clinic. Only one individual (the author) examined these notes, which could have introduced bias.

The diagnoses of the ESP and the consultant orthopaedic surgeon were compared and they concurred partially in 31% of cases and fully in 65% of cases; the ESP accurately predicted a surgical outcome in 86% of cases. It is difficult to extrapolate beyond this study, because the training and experience of the ESPs were unknown. One can question if a 65% diagnostic agreement is acceptable when ESPs are seeing patients who would otherwise see the consultant or a member of the consultant’s team. However, the ESPs’ performance relating to accuracy in surgical prediction (86%) was more than acceptable given that the ESPs’ role was to determine which patients would benefit from a surgeon’s opinion. In fact, the diagnostic accuracy in both groups was not confirmed in this study by test results or operative findings; it merely compared ESPs’ diagnoses with the expert surgeon’s opinion. This study lends support to the notion that ESPs can be effective at triaging referrals to orthopaedic clinics; in other words, they can differentiate between patients who can be managed conservatively and those who need a surgical opinion.

Pope (2010) published a presentation of a one-year study of an ESP managing the post-operative care of patients who had undergone knee joint replacement surgery, where patients were reviewed at one, three, five, or seven years following surgery. The ESP had undertaken specific training in image interpretation prior to the start of the study, and saw 508 joints (438 patients) over the study period. Consultant input was required in 7% of cases and a further 6.7% of cases were discussed with the consultant but did not need a face-to-face medical review. The authors commented that the ESP was perhaps overcautious with X-ray interpretation, but concluded that an ESP could manage the care of these patients in the post-operative phase; the caveat they added was that the ESP should be working in secondary care as a member of the orthopaedic team. No mention is made of the possible effect of ESPs seeing these patients on specialist registrars’ training or on the need for surgeons themselves to follow up on their work for self-audit purposes. Health-care commissioners may wish to see more outpatient activity in community settings but a study published by Harle et al. (2009) identified a number of reasons why post-operative follow-up care should take place in hospital, by members of the orthopaedic team. Their cross-sectional questionnaire survey was designed to find out what orthopaedic post-operative patients (n=73), orthopaedic trainee doctors (n=30), and GPs (n=239) thought about follow-up care of patients who have undergone joint replacement surgery being transferred to GPs and nurse specialists in the community. They did not include community-based specialist nurses and MSK ESPs in their questionnaire survey, nor did they include orthopaedic surgeons. They found that 77% of patients wanted their care to take place in hospital and that only 5% of GPs felt confident to manage the post-operative care of these patients. All specialist registrars felt it was essential for their training to see patients post-operatively. On the surface of it, it looks as if these clinicians were being protective of their professional boundaries, but there are valid reasons why post-arthroscopy patients should be seen in a hospital-based orthopaedic clinic. Specialist care and easier access to an on-site radiology department are the first thoughts that spring to mind; all patients receiving joint replacements are entered into the National Joint Registry; they must be monitored for life because complications such as loosening of the prosthesis can occur at any time post-operatively.

Walton et al. (2008) described an eight-month prospective audit of 933 joint replacements (n=865 patients) in a UK ESP-led clinic for patients who had undergone total knee and hip joint replacement surgery. The study excluded revision surgery and complex cases, and took place in an orthopaedic outpatient setting. Their time-benefit analysis suggested that the ESP clinic would realize an additional 632 new patients slots per year. This was seen as a positive outcome although this number of additional new patients in the system could cause problems in terms of theatre availability and anaesthetists' time. Their cost-benefit analysis made a number of assumptions related to salaries and the capacity of each clinic (the ESP saw fewer patients). They estimated a very low (1%) cost-saving based on outpatient appointment fees of £4.97 and £5.04 for an ESP and orthopaedic doctor assessment respectively.

Newsome et al. (2009), in a conference report of a prospective study of patients referred to an ESP-led spinal clinic (n=318), compared two ESPs' diagnoses of spinal pathology with subsequent MRI scan reports (n=76). They found a correlation between a clinical suspicion of pathology and MRI findings in 54/76 (71%) of cases - the greater the index of suspicion, the higher the correlation. In a similar study, Inman et al. (2009) conducted a retrospective review of 130 lumbar spine MRI scans requested by ESPs and compared them with 145 lumbar MRI scans requested by orthopaedic surgeons. Outcome measures included patients' signs and symptoms on presentation, abnormalities on MRI scan, and the subsequent management of patients. The abnormal scan rate was similar in the two groups: 91% for the ESPs and 92% for the surgeons. The surgeons' performance was the gold standard against which the ESPs' performance was judged, although the orthopaedic surgeons did not appear to have been spinal specialists and they were located at a separate hospital site, which did not have a dedicated spinal service.

Ellis & Kersten (2001) used a postal questionnaire to survey 35 ESPs in hand therapy (physiotherapists, n=20 and OTs, n=12) about their training and scope of practice. The response rate was high (91%) and content analysis uncovered a variety of roles in different settings: rheumatology, pre-operative and post-operative clinics, and routine (therapy) clinics. There were numerous different job titles, and training appeared to be largely informal and experiential in nature, comprising mainly observation and clinical supervision. In a follow-up study, Ellis & Kersten (2002) used a similar process with the 31 consultant orthopaedic surgeons (based at 28 different sites) who worked with these same ESPs in hand therapy; the postal survey achieved a 54% response rate. Consultants' views on the ESP role and the required qualifications and training were sought, and content analysis was used again to analyse the responses to open questions. The majority of consultants saw experiential learning as the main component of training; however, three surgeons favoured specific training methods, such as courses in advanced surgery. Some surgeons had concerns about the ESP role extending too far, whereas others saw no problem with ESPs continuing to extend their practice, for example, as surgical assistants in theatre. Concerns about professional accountability and litigation were also raised but overall, surgeons felt that the ESP role had a positive effect on their waiting lists.

A third study by the same authors (Ellis, Kersten & Sibley, 2005) used a Delphi survey to attempt to obtain a consensus on the parameters of the ESP role in hand therapy and the required knowledge, training, and competencies. Their expert panel (n=21) comprised educators, clinical experts, ESPs, consultants, and a single patient representative; it excluded participants in the earlier two studies. The response rate was excellent: 95% for the first and second rounds, and 100% for the third round. The first questionnaire round used themes arising from their earlier two studies, and experts were asked to indicate their level of agreement with a series of statements using a four-point Likert scale. Exact details of the analysis were not provided but the revised list comprised 49 statements. Ranking of statements occurred in the second and third rounds, and the items ranked most highly were those relating to in-house training, requesting diagnostic tests, and making diagnostic decisions independently.

A DH report, supported by the Universities of Sheffield and Bristol, and the King's Fund, reviewed new roles in nursing and the professions allied to medicine (Read, 2001). It found that the majority of training was *ad hoc,* idiosyncratic, and delivered in-house, usually by the medical consultant with whom the practitioner worked. In some cases, particularly where roles were pushing the boundaries of extended practice, practitioners were finding it difficult to identify what their training needs should be and many of them had devised their own training programmes. The use of protocols featured heavily and this is commonplace in clinical practice, where they are often substituted for a more rigorous competency-based framework.

A number of studies have demonstrated that ESPs view shadowing of their consultant colleagues as the best means of achieving relevant training. Dawson & Ghazi (2004) used a qualitative case-study approach to explore the experiences of four experienced ESPs working in different orthopaedic clinics alongside the consultant and medical team. ESPs' answers to questions relating to training and support from medical colleagues, responsibility in the role, and job satisfaction were tape-recorded. Analysis of the transcripts revealed that ESPs valued the relationship with the consultant and orthopaedic team. Indeed, all the ESPs commented that they felt competent because of the medical support that surrounded them. It would have been interesting to compare the experiences of ESPs who work in primary care and community-based settings where there may not be the same multidisciplinary team support. All ESPs identified the same training needs and described problems accessing this training; they also expressed concerns about the medico-legal aspects of their practice.

As well as physiotherapists' views about ESP practice, the views of doctors have been sought. In a small multicentre qualitative study, Milligan (2003) interviewed orthopaedic specialist registrars to ascertain their views on ESP practice. Five of them had experience of working with an ESP and five of them had no experience at all. Data were analysed using a grounded theory approach and the principal emerging themes concerned clinical ability, the effectiveness of the ESP service, and professional liability. He found doctors' perceptions to be more favourable when they had experience of working with an ESP. Some registrars were concerned about perceived inadequacies in ESPs' training, although none of them professed to know very much about the subject.

Although some papers have suggested that other professionals, including nurses, have an understanding of the ESP role (Bethel, 2005; Jackson, 2007), a lack of understanding of the scope of the ESP role is common even among ESPs themselves. For example, Oakes (2008) surveyed 270 ESPs working in orthopaedic medicine and questioned them about their roles. It transpired that most of them were unclear about their ESP status and struggled with the definition of extended practice within physiotherapy. Sarro, Rampersaud & Lewis (2010) described the role of a nurse-practitioner-led spinal clinic and contrasted this role with that of the MSK 'advanced practice physiotherapy role', which they associated with hip and knee conditions. The authors argued that nurse practitioners should be caring for patients with spinal conditions because nurses are more objective than physiotherapists, whose professional knowledge is likely to bias them towards a preferred management approach. This argument is somewhat flawed because an ESP seeing patients on behalf of a doctor does not use the same approach to a patient consultation as a physiotherapist assessing patients with a view to instigating physiotherapy treatment. Furthermore, physiotherapists' specialist knowledge is likely to be of more benefit to this patient group than knowledge derived from a nursing background. However, one cannot argue with the underlying principle that physiotherapists are not the only non-medical clinicians capable of managing back pain, or with the fact that one's professional background may influence the approach taken during patient examination and assessment. Even clinicians from the same professional background can differ in the way they assess and manage low back pain. Perhaps this is one reason why Murphy et al. (2011) explored the case for having specially trained primary-care practitioners for spine pain in the US, although they did not specify the preferred health-care professional background for these practitioners.

Reeve & May (2009) examined patients' views in a small sample (n=12) of patients on a waiting list for an ESP-led spinal service appointment. This qualitative study conducted semi-structured interviews with patients prior to their first appointment with an ESP. They questioned patients about their seeing a physiotherapist instead of a doctor, and asked them about their expectations from treatment. Their results highlighted a number of key issues: patients wanted information about the service, they valued interpersonal and professional skills, they wanted their patient journey to run smoothly, they were keen to be involved in their own management, and they wanted a diagnosis. It would have been more interesting if the researchers had repeated the patient interviews after contact with the ESP service, to find out whether or not these expectations were met. A small qualitative study of an ESP-led orthopaedic service found that patients' (n=6) experiences of being managed by an ESP were shaped by their prior expectations (Coyle & Carpenter, 2011). Another study from Wales (Welch, Paul-Taylor & John, 2012) evaluated patients' expectations and satisfaction with an ESP service; it was rated as good to excellent by 94% of patients and 88% of patients were happy to be seen by an ESP.

In Canada, Aiken & McColl (2008) compared the performance of one ESP managing a small sample of shoulder and knee conditions (n=25) with that of two orthopaedic surgeons. This was a prospective pilot study where the same cohort of patients was seen first by the physiotherapist and then by a surgeon. The aims of the study were to examine the level of agreement between the surgeons and the ESP in terms of the clinical diagnosis and management plan, and to compare diagnostic accuracy with a gold standard test (imaging or surgical findings). Analysis of raw concordance data revealed 80% agreement in clinical diagnoses and 87% agreement in management planning, although when differences in the number of treatment recommendations were accounted for the agreement in management planning was only 52%. Determination of diagnostic accuracy could only be attempted on the eight patients whose diagnoses had been confirmed either at surgery or with advanced imaging, and both groups demonstrated 75% overall accuracy. The ESP had worked with the surgeons for four months prior to data collection and the findings were supportive of the ESP role. The authors had seen a national shortage of orthopaedic surgeons in Canada over a number of years and a rise in the demand for hip and knee joint replacement surgery (Shipton, Badley, & Mahomed, 2003; Comeau, 2004); using ESPs to reduce inappropriate referrals to orthopaedic services provided one possible solution to the workforce pressures.

Another study by Aiken et al. (2008) aimed to evaluate the correlation between pre-operative assessment and management of patients referred for consideration of hip and knee joint replacement surgery, in terms of the indications for surgery and conservative management offered at the time of consultation in the hospital setting. Once again, the same cohort of patients initially saw an ESP and then an orthopaedic surgeon. If clinicians thought a patient was a surgical candidate, they measured surgical priority by using a recognized scoring tool. Forty patients entered the study but only 38 patients yielded useable data. The ESPs and surgeons reached 100% agreement that 13/38 (34%) of patients were non-surgical candidates. Of the 25 patients who needed surgery, the clinicians agreed on the priority score in 64% of cases; in the other nine cases, the ESP gave a higher priority rating. The ESPs provided patients with more conservative management advice (including patients recommended for surgery) but patients were equally satisfied in both groups.

An earlier correlational study by the same authors, Aiken et al. (2007), examined the role of an ESP in reviewing patients (n=76) in orthopaedic clinics following knee and hip joint replacement surgery. Both the ESP and the orthopaedic surgeon saw the patients and validated outcomes scores (Knee Society Score and Harris Hip Score) were recorded, together with recommendations regarding education and exercise prescription. Both groups demonstrated similar outcomes, which led the authors to conclude that ESPs could manage the post-operative management of these patients independently. However, it was not known exactly how many clinicians were involved in the study or at what point the clinicians saw the patients post-operatively. In addition, there did not appear to be any post-operative complications in any of the patients seen, which seems a little unlikely; such patients would have required a medical review.

A final study by these authors (Aiken, Harrison, & Hope, 2009) described the work of an advanced-practice physiotherapist (APP) in screening referrals for hip and knee surgery to orthopaedic surgeons. They assessed all patients (n=107) pre-operatively and performed all follow-up assessments from three months post-surgery. Surgeons' waiting times decreased following the introduction of this new service, but only one of the three surgeons involved took part in the entire programme. This paper added little new evidence for the APP role but the authors commented that the role brought additional benefits to the orthopaedic service because APPs were more likely to instigate conservative treatment in the form of physiotherapy, and offer advice on self-management for patients who were not yet ready for surgery.

Robarts et al. (2008) also described the hospital-based APP role in improving waiting times for hip and knee replacement surgery in Canada. APPs saw patients post-operatively during the first phase of this development. The second phase involved APPs seeing patients pre-operatively and triaging patients according to their suitability and priority for joint arthroplasty. The main outcome measure related to patient satisfaction; no significant differences in mean patient satisfaction scores were identified between the surgeon-led clinics and the APP-led clinics. The APPs underwent three months of intensive training, based on an orthopaedic surgery residency course (Frank, 2005), and they were expected to have five years' experience in orthopaedics at an advanced practice level.

One of the authors of the paper by Robarts et al. (2008) led on the publication of the results of a cross-sectional study conducted a few years later (Kennedy, Robarts, & Woodhouse, 2010), which compared patient satisfaction and follow-up care between APPs and orthopaedic surgeons for patients undergoing hip and knee joint replacement surgery. Again, the APPs completed a three-month training programme; they possessed relevant postgraduate research degrees and were experienced in their field. These authors also commented on the benefit that an APP brought to the orthopaedic clinic, because of their professional knowledge about movement impairment, and education and rehabilitation principles. A convenience sample of 123 consecutive patients was allocated to either the APP or the surgeon-led clinic. A good response rate (90%) was achieved, probably because patients were asked to complete a satisfaction questionnaire before leaving the clinic. Differences between the two patient groups were examined and the authors found a significant difference in satisfaction relating to clinic procedures in favour of the surgeon-led clinics ($p=<0.001$). They attributed this to the fact that the clinic members of staff were less familiar with the running of the APP clinic. There was also a significant difference ($p=0.014$) in the timing of follow-up appointments. Surgeons wanted to see patients for their first follow-up appointment at six weeks and as a result, 11/60 (18%) patients were seen in the surgeon-led clinic and 3/63 (5%) were seen in the APP-led clinic at the six-week visit; thereafter, patients were seen in the APP clinic for follow up. There were a number of limitations to the study. The authors used a standardized, validated questionnaire but then amended it to suit their needs. It is not known how patients were allocated to the two groups, or how many clinicians were involved in the study. Patients in the APP group had longer consultation times, which could have influenced satisfaction levels, and it appears that APPs could only request investigations 'by delegation' from the orthopaedic surgeons.

Again in Canada, MacKay et al. (2009) employed a hospital-based prospective cross-sectional design to compare the clinical recommendations of a group of orthopaedic surgeons (n=3) and a group of specially trained physiotherapists (n=2), using the same cohort of patients. The average number of years that these ESPs had been working in the field was 17.5 and they had all received advanced training in ‘arthritis management’. Patients (n=62) were assessed first by an ESP and then by an orthopaedic surgeon. A patient satisfaction measure and a variety of validated hip and knee outcomes measures relating to pain, function, and quality of life (Knee Injury and Osteoarthritis Outcome Score and the Hip Dysfunction and Osteoarthritis Outcome Score) were implemented prior to the start of the study. The concordance of clinical decision-making between the ESPs was assessed prior to the start of the study and 90% agreement was reached; the same was not done for the orthopaedic surgeons. The primary aims of the study were to focus on the appropriateness of an orthopaedic surgical opinion and patients’ suitability for knee or hip replacement surgery. Secondary aims were to examine levels of agreement regarding non-operative management and clinical diagnoses. Agreement between surgeons and ESPs on whether an appropriate referral to orthopaedic surgery had been made was reached in 56/61 (91.8%) cases (k=0.69). In terms of the suitability of patients for consideration of total joint replacement surgery, there was agreement between the ESPs and surgeons in 53/62 (85.5%) of cases (k=0.70). Clinical diagnostic accuracy reached 67% agreement and ESPs’ conservative treatment recommendations included more advice on exercise and patient education.

In the US, Overman et al. (1988) investigated an extended-scope, first-contact practitioner role for physical therapists. Support for ‘consumer direct access’ to physical therapy in the US is mixed, with some states refusing to reimburse third-party payers without a physician providing a diagnostic label (Davenport & Sebelski, 2011). The study by Overman et al. (1988) focused on patients with low back pain (n=174) attending a walk-in centre. Patients were randomized to one of five physical therapists or one of 17 physicians, although the randomization process was contaminated when 20% of patients initially assigned to the physician group were reassigned to the physical-therapist group (due to physicians’ work pressures). The authors concluded that physical therapists were able to practise safely in first-contact roles. Interestingly, the physical therapists were required to use a specially designed checklist to guide their assessment and management plans, which the doctors then countersigned. The physical therapists in this study received eight hours' training in how to use the algorithm; their training also included physical examination of the abdomen and the use of investigations and diagnostic tests. The checklist system originated from previous studies of the US Army AMOSIST program in the 1970s (Vickery et al., 1975). In order to deal with a shortage of military doctors, non-medically trained personnel used this checklist to manage acute minor illnesses. It is interesting that the authors felt physical therapists would need a checklist to guide their management of low back pain. However, they are right to draw attention to the fact that spinal pain might have a non-MSK cause, and that physical therapists might not have sufficient training to screen patients for medical conditions that masquerade as a MSK presentation.

It is hard to extrapolate findings from US Army studies to the NHS, not least because military physical therapists in the US undergo advanced postgraduate MSK training, which includes advanced diagnostic imaging. However, Moore et al. (2005), in another study based in a US Army community hospital, used a non-experimental retrospective design to compare the clinical diagnostic accuracy of physical therapists, orthopaedic surgeons, and non-orthopaedic doctors (including nurses and podiatrists) in patients with spinal and peripheral joint MSK problems who were referred for MRI scans. Agreement between the clinical diagnoses and MRI scan findings was found in 108/145 (75%) physical therapists, 139/172 (81%) orthopaedic surgeons, and 86/243 (35%) non-orthopaedic providers. Limitations of the study included the disparity in numbers of patients seen in the three groups and the fact that baseline patient demographics were not provided. In addition, there were no details relating to inter-rater reliability testing for the three radiologists who reported the MRI scans. The differences between the orthopaedic surgeons and physical therapists did not reach statistical significance ($p>0.05$) but the difference in diagnostic accuracy between physical therapists and non-orthopaedic providers was statistically significant ($p< 0.001$).

In Australia, Oldmeadow et al. (2007) described a prospective observational study of an ESP-led screening clinic dealing with a range of non-acute MSK GP referrals to orthopaedic clinics based in secondary care. Patients (n=45) initially saw one of two ESPs and then an orthopaedic surgeon. These two assessments did not occur concurrently; they took place between four and twelve weeks apart. This could have influenced results because symptoms might have changed over time. Both ESPs had postgraduate degrees in MSK physiotherapy and 10 years' experience. One of the aims of the study was to measure the percentage agreement (in terms of diagnosis and management) between the ESPs and the surgeon. Thirty-eight patients were reviewed by both an ESP and a surgeon, and they agreed on management in 74% of cases (k=0.38). It is questionable how 'extended' these ESPs' roles really were because they were not able to request X-rays or blood tests; these investigations were classed as 'surgical decisions'.

2.3.3 MSK ESPs in Accident and Emergency Care

Physiotherapists' management of minor injuries in accident and emergency departments is now widespread in the UK, but it is not always clear if they are examples of ESP practice. For example, a prospective cohort study by Morris & Hawes (1996) compared the physiotherapy services at two nearby hospitals. Hospital A provided physiotherapy for minor injuries in a traditional physiotherapy department setting, and hospital B based its physiotherapy service within the accident and emergency department. We can only assume that the patient populations were similar because of their geographic proximity, since these data were missing. They observed a four-fold increase in referral rates to physiotherapy at hospital B, possibly because having a physiotherapy service in the emergency department was a new development at this hospital and because doctors did not refer as many patients to the traditional physiotherapy service at hospital A due to the perceived long waiting times. Patient outcomes were not described and because data collection ceased after one month the timetable was too short to produce any firm conclusions.

In the UK, Smith & Buckley (2004) described a six-week pilot scheme introducing an ESP role to a minor injuries unit within an accident and emergency department. Although working in a first-contact practitioner role, the ESP could see only those patients who met certain criteria outlined in a predetermined protocol. Patient satisfaction with the ESP service was reported as high, but there was little evidence to support this. There was also little information regarding the competencies required, although the authors made a vague reference to postgraduate training in the management of MSK and soft tissue injuries. Although acute soft tissue injuries comprise the usual workload of ESPs in emergency care, Kempson (1996) and Ball, Walton & Hawes (2007) described ESPs managing uncomplicated fractures of the hand, elbow, chest wall, and joint dislocations in an emergency department. The specialist MSK skills possessed by ESPs based in a minor injuries unit may provide an education resource for other staff. However, Bethel (2005) observed that ESPs in emergency care lack the broad-based skills of emergency nurse practitioners, which can limit the overall impact of the ESP role. Hoskins (2011) also noted this limitation in her international review of adult and paediatric emergency care services, encompassing emergency nurse practitioners, emergency care practitioners (a generic role incorporating the skills of nurses and paramedics), and ESPs. The main aim of the review was to investigate patients' views and health-care professionals' acceptance of medical substitution roles in these settings. No randomized controlled studies of the ESP role were unearthed; furthermore, none of the nine studies of professionals' views included in the paper concerned ESPs, and only one of the 23 patient satisfaction studies reviewed considered ESPs (McClellan, Greenwood, & Benger, 2006). Although the approach to the literature search and the inclusion and exclusion criteria for the review were identified, there were no details regarding how the papers were critiqued.

In one of the few randomized controlled study designs concerning ESP practice found in the literature, Richardson et al. (2005) compared initial assessment and management of soft tissue injuries in an accident and emergency department by an ESP (intervention group) with routine care (control group). The primary outcome measured was time to return to usual activities; secondary outcomes were self-reported patient satisfaction and visual analogue pain scores, Health Assessment Quality scores (Bruce & Fries, 2003), and a health outcomes measure that incorporated an economic evaluation called the EuroQoL (Essink-Bot et al., 1997). Patients' use of health and social care was recorded using self-completed questionnaires designed by the researchers themselves. The authors provided no details regarding the validity and reliability of these questionnaires but commented that they could have chosen better primary outcome measures. Diaries facilitated patients' recall of events at the three-month and six-month follow-up point. The authors concluded that their overall 'best estimate' was that routine care represented the most cost-effective service because patients in the ESP arm took longer to return to usual activities. Assumptions about staff salaries might have influenced their cost-analysis, and a number of other issues arose during the evaluation this paper. The patient cohort (n=766) was highly specific and determined by the perceived capabilities of the ESP-led treatment arm; it comprised only those patients with simple soft tissue sprains and strains of the spine and peripheral joints. ESPs were not able to manage all the patients without medical input; they had to seek doctors' help when they needed to request X-rays and when analgesic medication was required. The evidence for ESP management resulting in patients taking longer to return to their usual activities was weak and did not reach statistical significance (p=0.071). The time taken to return to usual activities might have been longer in the ESP-led group because of different approaches to rehabilitation used by ESPs and doctors (patients in the ESP arm received more advice and reassurance, and were more likely to receive appliances or walking aids and to receive physiotherapy). Total health-care costs were higher in the ESP group but did not reach statistical significance. The follow-up time was reasonable but response rates were poor. At six months, there were no differences in HAQ, EuroQoL, and pain scores. Patients in the ESP arm were generally more satisfied but, as the authors observed, this could have been because patients who consented to take part in the study already viewed physiotherapists in a positive light. The trial was restricted to certain times to accommodate physiotherapists' normal working hours, which does not reflect normal working practice within an accident and emergency department. For this reason, it makes more sense to employ an emergency nurse practitioner to work in minor injuries, rather than an ESP. ESPs would need to review their traditional working hours in order to integrate fully into a 24-hour emergency care setting. Even then, the ESPs' niche may prove difficult to find because an overlapping of roles among doctors, emergency nurse practitioners, and ESPs is inevitable.

Jibuike et al. (2003) used a descriptive audit to explore the effects of introducing an ESP to an acute knee injury service based in an accident and emergency department. Acute knee injuries are difficult to assess and it is standard practice to review a patient 10 days later once a fracture has been excluded. They compared initial diagnoses, investigations, management, and outcomes before and after implementation of the new service. The ESP had been working in the department for three years and could request X-rays and MRI scans, and consultant radiologists and knee surgeons had provided additional training. However, the ESP could only see patients after nurse triage and after a doctor had seen them. The authors claimed that the ESP-led service prevented patients with significant injuries from being sent home without a follow up, but they provided no convincing evidence to support this. One has to question why a doctor had to assess these patients in the first instance, unless it was because the ESP-led service did not provide 24-hour cover, over seven days a week. The authors provided no information about the outcomes relating to the 39% of patients referred for an orthopaedic opinion, but 88% of MRI scans requested by the ESP detected a significant abnormality. The authors provided descriptive statistics but no details relating to how data were analysed.

Using an observational cross-sectional study, McClellan et al. (2006) compared the management of patients with unilateral ankle sprains (n=489) by ESPs, emergency nurse practitioners, and doctors in an accident and emergency setting. Outcome measures included a patient health and quality of life questionnaire (SF-36) and a pain visual analogue scale. A separate arm of the study compared patient satisfaction (n=780) across all three groups for a range of soft tissue injuries. They observed a trend towards improved outcomes and patient satisfaction in the ESP group. However, the results did not reach statistical significance and the patient response rates were very poor at both one month (22%) and three months (4.5%). Although there was only one ESP in the study, he or she was taking direct referrals and working as a first-contact practitioner through a range of shifts (8.30 a.m. to 3.30 p.m., and 12.30 p.m. to 7.30 p.m.) on four days of the week. The value of comparing ESPs with nurses and doctors is questionable, particularly using a non-randomized study. The authors commented that ESPs were unlikely ever to play a major role in accident and emergency care because their lack of versatility compared with emergency nurse practitioners and doctors limits the numbers of patients they can see. ESPs must either become more versatile (and more able to compete with other practitioners in accident and emergency care) or retain their narrow MSK focus and put their employability at risk.

In an unpublished PhD thesis, McClellan (2009) used a two-centre randomized study design to compare the management of peripheral joint soft tissue injuries in an accident and emergency department by emergency nurse practitioners and ESPs with routine care provided by junior doctors of all grades. Clinical outcomes included functional recovery, health-related quality of life scores, and cost-effectiveness. The author concluded that ESPs and emergency nurse practitioners were clinically as effective as routine care, but their economic analysis (including both direct and indirect costs) indicated that using ESPs or emergency nurse practitioners could prove to be more expensive. Limitations of the study included a short follow-up period of only eight weeks and the fact that only one ESP was included in the trial. The findings from this study were later published in the *Emergency Medicine Journal* (McClellan et al., 2009).

In a more recent study, McClellan et al. (2010) conducted a literature review of the evidence for the clinical effectiveness and cost-benefits of ESPs' management of minor injuries in accident and emergency departments. Their review excluded non-analytical research and expert opinion, which resulted in only four papers reaching their inclusion criteria: a narrative review of the literature (Anaf & Sheppard, 2007a), one non-inferiority trial (Richardson et al., 2005), and two superiority trials (McClellan et al., 2006; Ball et al., 2007). They concluded that ESPs are affordable and that they positively influence patient satisfaction, and might provide a solution to key targets and staffing problems in accident and emergency care. However, given the small number of papers in this review, these conclusions are somewhat ambitious.

In a retrospective case-control study that involved a review of case notes, the management of simple MSK injuries of the peripheral joints by emergency nurse practitioners, ESPs, and three different grades of medical staff were compared (Ball et al., 2007). Knee injuries were excluded, although it is not clear why; it might have been because there was already a separate acute knee injury service within the department. Outcomes measured included the number of X-rays requested, advice given, follow-up appointments made, and the number of patients requiring analgesia or supports and bandages. There were statistically significant differences among the groups, with ESPs using fewer supports and bandages, and providing more advice to patients. Reliance on documentation in medical notes weakened the study and the authors provided no details regarding the experience or training of the ESPs involved. The ESP role in emergency care in Australia seems to be developing along the lines of the UK model, as the next few studies demonstrate.

Anaf & Sheppard (2007a) conducted a narrative review of international research looking at physiotherapy in accident and emergency care, although they did not distinguish between routine physiotherapy and ESP roles. Six studies from the UK and three studies from Australia met their inclusion criteria; they included one randomized controlled trial, two descriptive case studies, two cross-sectional studies and four cohort studies. The authors used content analysis to summarise their findings because the review included both quantitative and qualitative methodologies (although only one of the eight selected studies was qualitative). A critical appraisal tool from McMaster University (Law, Steinwender, & Leclair, 1998) and the traditional hierarchy of evidence described by Sackett et al. (2000) were used to rank the papers. The Australian studies reviewed (Taylor, Bennett, & Cameron, 2004; Walker et al., 2006) seemed to describe physiotherapy based in an accident and emergency department. In contrast, the UK studies (Kempson, 1996; Morris & Hawes, 1996; Smith & Buckley, 2004; Richardson et al., 2005; McClellan et al., 2006) described ESP roles, with the exception of two studies (Morris & Hawes, 1996; Kempson, 1996), both of which described routine physiotherapy care.

These same authors also used an observational single case-study design (n=20) of a physiotherapy service based in a trauma centre in Melbourne (Anaf & Sheppard, 2007b). The aims of the pilot, conducted over five consecutive days (Monday to Friday, 7:00 a.m. to 5:00 p.m.), were to try to define the physiotherapist's role, to collect data relating to the types of patients seen, and to record the assessments and treatments delivered. The study's limitations included the fact that only one physiotherapist took part and the researcher worked at the participating hospital, which could have introduced bias. In addition, the physiotherapist did not appear to be managing patients independently, and so this study might not have described an extended physiotherapy role.

In a third study, Anaf & Sheppard (2010) used a qualitative study design to review patients' perceptions (n=80) of physiotherapy practice in two accident and emergency departments in Australia. Although the paper's title indicates that it concerned ESP practice, it actually focused on patients' perceptions of the scope of physiotherapy practice *per se* within this setting. It is unlikely that patients would be aware of the nuances of physiotherapy practice, and the results seemed to confirm this. Although physiotherapists were associated with MSK conditions and interventions, patients had little knowledge of other aspects of routine physiotherapy practice, such as cardio-respiratory care.

In a descriptive cross-sectional study, Kilner & Sheppard (2010) used an Internet-based survey in an attempt to access all physiotherapists working in accident and emergency departments throughout Australia. Their aim was to find out what Australian physiotherapists were doing in emergency care. Their inclusion criteria stated that physiotherapists had to be working in emergency care as part of the multidisciplinary team; only 28 physiotherapists met these criteria. The qualitative data generated were analysed using thematic analysis. The mainstay of physiotherapists' work seemed to focus on care of the elderly. They did not appear to be working in traditional physiotherapy roles, nor did their roles mimic the UK ESP first-contact practitioner role that they seemed to emulate. These physiotherapists had undertaken a variety of postgraduate training programmes, which included plastering techniques and the management of vestibular (balance) disorders. Overall, this paper pointed to a general lack of clarity regarding what constitutes extended-practice physiotherapy in Australia.

Taylor et al. (2011) used a prospective non-randomized trial comparing two physiotherapy service models within accident and emergency departments. The study took place at three Australian metropolitan hospitals. Patients saw either a primary-contact physiotherapist (PCP) immediately after triage or a secondary-contact physiotherapist (SCP) after triage - and after they had seen a doctor. PCPs were experienced physiotherapists with postgraduate MSK qualifications; SCPs were a mixture of experienced and junior physiotherapists. The PCP role was not as autonomous as the UK ESP role because PCPs had to approach the consultant if imaging or medications were needed. Patients with simple soft tissue MSK peripheral injuries (n=306) were allocated to the PCP (n=182) and SCP (n=124) groups according to the day of the week and the service being delivered on-site that day. Patients with more complex injuries such as open fractures or spinal pain were excluded from the study. The principal outcome measures were length of stay, waiting and treatment times; associated outcome measures were re-presentations to emergency care, staff and patient satisfaction, and the type and number of investigations requested. Primary-contact physiotherapy resulted in a reduction in length of stay by 60 minutes; secondary-contact physiotherapy resulted in a reduction in waiting time of 25 minutes. Waiting times might have been even lower in the PCP group had the physiotherapists been able to request imaging and review medication without recourse to a doctor. There were no significant differences between the two groups in terms of the number of referrals to radiology services or re-referral rates at four weeks. Patient satisfaction levels were similar with a score of 85% for the PCP group and 82% for the SCP group, and 96% of emergency department staff were satisfied with PCPs' competence to practise in this setting. The authors effectively compared a routine physiotherapy service with a new first-contact physiotherapy service. It is unclear whether doctors referred all the patients they saw to the SCPs or only those patients who they thought would benefit from physiotherapy treatment; therefore, the types of patients seen in the two physiotherapy groups might have been different. Nonetheless, the authors found that experienced physiotherapists could act as a first point of contact for simple soft tissue injuries without incurring any adverse effects. The study had a couple of limitations. The follow-up time was only four weeks and no information was supplied about the grades of the doctors in the study. However, the number of physiotherapists in the trial (n=19) was larger than in many other studies. Doctors, nurses, and other members of staff across the three sites were interviewed to determine their experiences of the new service using an instrument validated for use with emergency nurse practitioners. The lowest scores on this instrument related to questions about how well staff understood the scope of physiotherapy practice; despite this finding, 80% of staff viewed the PCP role positively.

A more recent randomized trial conducted in Australia by Jesudason et al. (2011) found that providing a physiotherapy service in an emergency department setting did not have a statistically significant impact on the rate of hospital admissions (the primary outcome measure in this study). The physiotherapy service also had no statistically significant effect on the secondary outcome measures, which included re-presentation to the emergency department and the number of visits to community health-care professionals. Similar results were found in relation to patient satisfaction and the speed with which patients returned to work and leisure activities. The authors were anxious to point out that using different outcome measures might have led to results that were more favourable because their patient population had a mean age of 70 years, thus presenting the challenge of medical co-morbidities. Furthermore, it is not clear if Jesudason et al. (2011) were writing about an ESP role or a physiotherapy role *per se.*

A systematic review by Kilner (2011) concluded that the current research evidence does not support the use of physiotherapists in emergency care. The author focused specifically on the effects on health outcomes (satisfaction, pain, and disability scores). Although there was some high-level evidence of an improvement in patient outcomes in the short-term, there was insufficient evidence at a system or provider level. The variety of methodologies found in the studies selected resulted in the author using an appraisal of bias tool that she had developed herself, which covered all methodologies and considered four key areas of potential bias within studies. One reviewer conducted the literature review and two reviewers, working independently, appraised the papers. Unfortunately, the appraisal tool was not described adequately and it is unknown whether the review and appraisal process involved two or three people, or if the author was one of the reviewers. The inclusion criteria stated that papers had to relate to adult physiotherapy services based in an accident and emergency department. Out of 212 articles identified initially, only 11 were retained for appraisal. These papers came from Australia (n=3), Hong Kong (n=1), Ireland (n=1), and the UK (n=6). Only three of these studies represented a medium to high level of evidence according to the appraisal of bias tool. The review was restricted to the previous 10 years and did not appear to differentiate clearly between an ESP service and a routine physiotherapy service, which rendered its conclusions somewhat misleading.

2.3.4 MSK ESPs in the Armed Forces

Army physical therapists in the US have been working in extended-practice MSK roles since the early 1970s (Worthingham, 1970a; 1970b), which predates the ESP role in the UK by 20 years. James & Stuart (1975) described a US army screening service for low back pain referrals led by physical therapists. These physical therapists took direct referrals from physicians and non-medical health-care professionals; they requested X-rays and made decisions about patient management and onward referral. They had undergone postgraduate training in joint manipulation and spinal mechanics, and they worked to a low back pain protocol when taking the medical history and performing the physical examination. Outcome measures were taken at baseline and were then repeated after the introduction of the new service. As part of the evaluation, 14 orthopaedic surgeons were asked to comment on physical therapists' performance, and physical therapists themselves were asked about their own competency levels. Nine surgeons expressed reservations about physical therapists screening for underlying non-MSK pathology, and 13 surgeons felt that trauma cases should not be seen by a physical therapist. Only one of the eight physical therapists involved in this two-centre study felt that their basic training had been insufficient to prepare them for their extended role.

Benson et al. (1995) also discussed US army physical therapists working as non-physician MSK health-care practitioners in a primary-care setting. These physical therapists generally undertake specific MSK postgraduate training before taking up these posts. One such programme is the neuromuscular evaluation course at Army-Baylor University, Texas, which offers a 27-month doctoral programme in physical therapy (Army-Baylor University, 2012). It is interesting that the authors used two different terms to describe these physical therapists, 'non-physician health-care providers' and 'physician extenders'; both referred to physical therapists working as first-contact clinicians, where they are seeing patients without a referral from a doctor. The two terms are presumably synonymous but by avoiding any reference to physical therapists, they could be describing any health-care role that is adjunctive to the physician role. The authors concluded that these roles were successful but they provided no supporting evidence, other than to comment on the absence of legal action against physical therapists in such roles. Greathouse, Schreck & Benson (1994) argued that army MSK physical therapists in primary care had reputedly supplanted the orthopaedic surgeon's triage role. As previously mentioned, the Vietnam War (1954-1975) was probably responsible for this development, because army physical therapists acquired the skills to work as non-physician health-care providers as a direct result of the huge numbers of casualties and shortage of doctors; non-surgical conditions needed managing in order to release surgeons' time to operate. The authors emphasised that non-physician health-care providers see patients without a physician's referral. This marks quite a distinction between physiotherapy extended-practice roles in the UK and the US, because ESPs in the NHS do not take direct referrals. However, patients can self-refer to NHS physiotherapy services.

NHS physiotherapy self-referral schemes, where physiotherapists accept referrals without an initial GP medical screening, are a relatively recent development (CSP, 2011). Prior to this, NHS outpatient physiotherapists could not see patients without a consultant or GP referral. Physiotherapists accepting self-referrals sometimes harbour concerns that they may not recognize a 'medical' problem that is mimicking or coexisting with a MSK condition (for example, spinal metastases, an apical lung tumour, or an abdominal aortic aneurysm). Physiotherapists are not expected to diagnose ‘medical’ pathology; however, they must recognize when there is a need to refer a patient to someone who can. Medical differential diagnosis is an important consideration for ESP practice. The legalities around this subject are unclear and the issues relating to ESPs’ competence, training, and vicarious liability are complex. If a physiotherapist treats a patient referred by their GP for physiotherapy and fails to recognize an underlying medical problem as the cause of the patient’s MSK symptoms, it is unlikely that the physiotherapist would be held accountable for his or her actions. However, the situation might be different for a MSK ESP who is accepting GP referrals that would normally be managed by a medical consultant and his or her team. In a legal test case, the training and competence of the ESP or physiotherapist concerned would be scrutinized. Self-referral schemes will be discussed again in section 3.5.1.

To return to the physical therapist role in the US armed forces, Ziemke, Koffman & Wood (2001) reviewed the role of physical therapists on the USS Car Vinson aircraft carrier during its six-month deployment to the Persian Gulf between 1998 and 1999. Inspection of safety and medical evacuation data revealed significant cost-savings compared with other carriers without this physical therapy input; in fact, they estimated that the physical therapy service had led to eleven fewer medical evacuations during the six-month period. One could argue that this was not solely an extended role for these physical therapists because they were also involved in providing an intensive rehabilitation service for the men and women on board the carrier.

The ESP role in the armed forces in the UK seems to be a more recent development. Minden (2002) commented that army physiotherapists represent an all-officer group and that their skills have to encompass both peacetime and operational working. A descriptive study by Heywood (2006) presented the results of a UK-based study of an ESP-led spinal triage clinic. The ESP was able to request X-rays, MRI scans and blood tests, and refer to orthopaedic surgery, rheumatology, and pain clinics. Training for the role involved observation in outpatient clinics and ward rounds, and observing spinal surgery operations. The

ESP managed 90% of referrals independently and the author reported that the impact of this clinic had effectively halved the waiting times for orthopaedic spinal surgery. Saeed & Parker (2006) also described the introduction of an ESP-led military orthopaedic screening clinic, which dealt with general (spine and peripheral joint) orthopaedic referrals. They described the results of their first 100 patients and reported that the ESP had managed 75% of patients independently.

There is clearly a general trend towards positive outcomes for the ESP role in the military, in both the UK and the US. However, no firm conclusions can be drawn from these studies because they are largely descriptive in nature.

2.3.5 MSK ESPs in Rheumatology

There seems to be a dearth of literature examining the role of the ESP in adult rheumatology, despite that fact that Langridge & Moran (1984) referred to such a role over 25 years ago. They conducted a two-centre correlational study of follow-up clinics for rheumatoid arthritis patients, which compared patient outcomes between a clinic led by a specially trained physiotherapist (n=29), and a clinic led by a consultant rheumatologist (n=37). Among the non-demographic outcomes measured were patients' knowledge about their disease and its drug management, their attitude to their disease, and their ability to communicate their concerns. Other measures included waiting and consultation times in clinics. The only statistically significant differences seen between the two groups were in waiting and consultation times (although the authors did not explain the reasons for this adequately), and in patients' knowledge relating to their drug management (which was significantly better in the consultant group). Bird (1987) cites this paper in an editorial about clinical metrologists, when he referred to it as the only serious assessment of the long-term management of rheumatology patients by non-medical practitioners. A recent systematic review by Stanhope et al. (2012a) identified 123 papers concerning the effectiveness of an ESP service in the management of inflammatory arthritis, but none of them met the authors' inclusion criteria for critical appraisal.

Campos et al. (2001) described the development of a 12-month training programme designed to prepare physiotherapists for managing pre-selected paediatric rheumatology patients in outpatient clinics. A subsequent paper (Campos et al., 2002) evaluated a physiotherapist-led clinic against the gold standard of the rheumatologist's clinic. Parent and patient satisfaction measures were recorded from the rheumatologist's clinic before the physiotherapist-led clinics commenced (n=15), and a further 58 patients and parents were included after commencement of the physiotherapist-led clinics; eighteen months separated the two questionnaire surveys. The paired-group sample (n=15) was analysed separately and it comprised respondents who had attended the rheumatologist's clinic and then the physiotherapist-led clinic for ongoing management. The rheumatologist's caseload was more than four times greater than the physiotherapist's caseload but there was no significant difference in satisfaction levels between the two clinics. The study's limitations included the small size of the paired-group sample (n=15), and the fact that patients were not randomly allocated to the two groups.

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Carr & Gordon (2001) conducted a cross-sectional survey that explored the nature of rheumatology extended-practice roles within physiotherapy, occupational therapy, and nursing (all three were referred to collectively by the authors as AHPs). They initially reviewed clinical roles and training requirements by using a postal survey of consultant rheumatologists and AHPs. They then employed a series of workshops with the aim of reaching a consensus on a number of statements regarding the core clinical competencies and training required of entry-level and advanced-level AHPs practising in the field of rheumatology. The report uncovered a wide range of posts and revealed that many of the post-holders had received little formal training. The clinicians reported finding it difficult to access training due to problems obtaining study leave and funding. One of the advanced-level clinical skills was the assessment of other organs systems, for example the skin or lungs. No consensus was reached in the occupational therapist and physiotherapist groups regarding these skills; however, the nurse and consultant rheumatologist groups felt that they should be included at an advanced level of practice. The report's main weaknesses included the likelihood of biased sampling, a lack of clarity around the exact composition of the sample, and poor response rates. A consensus was reached on the clinical skills, role responsibilities, and knowledge for entry-level extended clinical practice on all but one item; 17 items were identified for advanced-level practice and a consensus was reached on 15 of them.

Matthias et al. (2006) reported on an audit of the impact of a new ESP-led MSK service where GP referrals (n=787) to orthopaedics and rheumatology clinics were screened, and suitable referrals were triaged to the ESP-led clinic. Outcome measures included the number of referrals to secondary care, the number of patients managed by the ESP-led service, and patient satisfaction levels. Detailed information was not available because this was a published poster presentation, but the authors reported that the primary-care-based ESP service independently managed 78%, 80%, and 77% of shoulder, back, and lower limb conditions respectively. An accident and emergency study arm was included, which could have skewed the data but the authors concluded that ESPs could triage patients effectively, and that this yielded potential cost-savings and improved the quality of services. There was insufficient evidence included in this poster presentation to verify this claim fully, and the skills of ESPs involved were unknown.

MacKay, Veinot & Bradley (2008) interviewed 74 key informants from six countries about models of care for arthritis management. Their purposive sample was biased towards Canada (n=59 respondents). Two models of AHP extended practice emerged. The first used AHPs in extended-scope roles to provide ongoing management of patients with arthritis; the second used these practitioners to assess and manage GP referrals, accessing the most appropriate care provider or service for those patients who needed a specialist opinion.

Stamm & Hill (2011) explored the roles of non-physician health-care professionals in Europe; 479 professionals completed a web-based survey (representing a 92% response rate). Twenty-seven countries took part in the study, and 22% of respondents were physiotherapists. There were considerable differences among countries in terms of roles and models of care. The attitudes of rheumatologists were cited as a barrier to extended practice in all but eight countries; access to training was poor and the authors recommended more educational opportunities and strategies to limit barriers to extending practice.

2.3.6 MSK ESPs Primary Care

Primary care has been defined as ‘care provided by physicians specifically trained for and skilled in comprehensive first contact and continuing care for persons with any undiagnosed sign, symptom, or health concern (the “undifferentiated patient”) not limited by problem origin (biological, behavioural, or social), organ system or diagnosis’ (AAFP, 2011 cited in Murphy et al., 2011, p.2). There is a paucity of literature relating to the ESP role in primary care settings; indeed, only two studies were found and these are discussed below.

Hattam & Smeatham (1999) described an ESP-led, primary-care-based triage service for GP referrals to orthopaedics. They reported that ESPs managed 72.4% of referrals that previously would have been seen in hospital-based orthopaedic clinics. Their sample was small (n=76) and the study involved only two ESPs working in the same general-practice setting. New patient appointments were of 40 minutes’ duration, which does not reflect usual outpatient appointment times in orthopaedic clinics. Details of the level of appropriateness of ESP referrals to the orthopaedic service were not reported, and patient satisfaction with the service was not explored. Hattam (2004) later described a cross-sectional survey that included a retrospective review of hospital medical notes (n=192) for patients referred to one hospital orthopaedic service by primary-care-based ESPs. The reliability of the data-recording tool (used to collect demographic information and other outcomes) was tested with two ESPs, and its validity was tested by seeking the views of an orthopaedic surgeon. The outcomes measured included the accuracy of ESP diagnoses (which also looked for any prediction of subsequent orthopaedic surgery management) and the appropriateness of referrals to the orthopaedic service in secondary care (as documented at the initial orthopaedic clinic consultation). A referral to the orthopaedic clinic was deemed appropriate if treatment could only have been delivered by hospital-based specialists; for example, surgery. A referral was considered inappropriate if treatment could have been delivered in primary care. Their overall results demonstrated that 70.6% of referrals were appropriate, and that an operable diagnosis was given in 79% of these cases. The majority of referrals that were deemed inappropriate (29.4%) were referred to physiotherapy by the orthopaedic team. It is not clear how many ESPs were involved in the study or what grade of doctor saw the patients in the orthopaedic clinics. The lack of follow up meant that the definitive diagnoses were not supplied; therefore, it is not known how many of the patients managed independently by ESPs in primary care might have benefitted from seeing a surgeon. These ESPs were not able to access investigations and this might have influenced their referral threshold to orthopaedic clinics.

Arthritis Research UK conducted a study in 2011, which reviewed the evidence for non-GP-led primary care for MSK conditions, from 2006 through to March 2011 (Arthritis Research UK, 2011). They uncovered one systematic review, eight clinical trials and 25 primary research studies, some of which represented unfinished or unpublished studies. None of the papers described extended practice roles; rather, they concerned telephone assessment and advice services for physiotherapy, emergency-department-based physiotherapy services, early and direct access, and self-referral to physiotherapy treatment for MSK conditions.

2.4 ESP Practice: Systematic Reviews

This section details a number of systematic reviews that have covered extended practice role in physiotherapy, but not all of them are specific to MSK medicine.

McPherson et al. (2006), following an earlier study (McPherson et al., 2004) systematically reviewed extended-scope roles in five allied health professions (physiotherapists, OTs, radiographers, paramedics, and speech and language therapists). The four reviewers had two main objectives: first, to identify the range of extended-scope roles and second, to search for evidence on the effectiveness of extended-scope practitioner services in terms of their effects on patients, other health-care professionals, and health-care services. They included literature on non-NHS health-care settings and imposed no limitations on language or year of publication. Their definition of an extended-scope practitioner encompassed any activity that included role enhancement (extending skills or the role itself) or substitution (substituting one role for another). The authors used a broad search strategy to identify studies from a wide range of sources. They included published and unpublished 'grey' literature, and placed no limits on the type of study design considered. Their approach to the systematic review and appraisal was derived from guidelines developed by the Cochrane Collaboration (Olson, 1995; Clarke & Oxman, 2001). Out of 355 relevant papers, 22 were of a sufficiently high quality to enable data extraction to take place. Of these, 18 were from the UK, three were from the US and one was an international paper. They retained a further 333 papers because of the usefulness of the descriptive information contained within them, even though data extraction was not possible. Only five papers concerned physiotherapy and these included one randomized controlled trial (Daker-White et al., 1999), one unpublished MSc. dissertation (Hattam, 2002), three qualitative study designs (Atkins, 2003; Milligan, 2003; Dawson & Ghazi, 2004), and two surveys concerning physiotherapists and OTs (Ellis & Kersten, 2001; 2002). Interestingly, one of the qualitative studies they chose to include (Atkins, 2003) concerned physiotherapists' experience of using injection therapy, when this has been within the scope of general physiotherapy practice since 1995. The authors concluded that extended-scope practitioners usually undertook training on an *ad hoc* basis but that this varied considerably across posts. They cited the image-reporting course undertaken by reporting radiographers as an exemplar of extended-scope practitioners' training and education. This course is a prerequisite for radiographers who report X-rays and other imaging modalities (Berman et al., 1985; Hughes, Hughes, & Hamill, 1996). A more recent study examined postgraduate training for exended-scope radiographers and found wide variations in training standards, with most of it being *ad hoc* and rarely accredited or validated (Miller et al., 2011).

Kersten et al. (2007) published a systematic review that focused purely on extended-scope roles in physiotherapy, but it duplicated some of the information contained in the aforementioned review by McPherson et al. (2006). However, they did mention three additional studies (Hattam, 2004; McClellan et al., 2006; Pearse et al., 2006), one of which was a paper that McPherson et al. (2006)

referred to when it was still an unpublished MSc. dissertation (Hattam, 2002); none of these papers was evaluated, because they were all retrieved after the study's publication date. The authors identified 152 papers that met their search inclusion and exclusion criteria. These criteria were identical to the McPherson et al. (2006) review; in other words, there had to be an example of role enhancement, role substitution, or another form of extended-scope physiotherapy practice; moreover, the studies had to include a measure of the impact of ESPs on patients, health-care professionals, and services. Papers not meeting these criteria were still included for descriptive purposes but only those meeting the criteria proceeded to quality screening, which was performed using recognized guidelines (CRD, 2007; SPH, 2011); seven studies passed these quality checks. Not surprisingly, these were the same seven studies identified in the earlier review by McPherson et al. (2006). They also arranged all 152 papers into six categories, using a system that seemed to have been determined by the authors themselves. The categories ranged from A (evidence was present, even if it was limited, supporting the ESP role) to F (largely descriptive in nature, with authors expressing concerns about ESP role). No papers included data which did not support ESPs (category C), and no papers fell into category F. The majority of studies (89%) originated in the UK (n=135) and 66% of studies (n=100) concerned MSK ESP roles. The authors concluded that there was a preponderance of support for extended-scope physiotherapy in the literature but that very little of it came from robust research evidence. They highlighted the apparent void in training and education for ESPs, and proposed that they should undertake formalized training. They also cited the image-reporting course for reporting radiographers as an exemplary training model, and a course taken by paramedics to enable them to perform thrombolysis (Pedley et al., 2003). In short, this 2007 systematic review added little new information about ESP practice.

A systematic review undertaken at the University of South Australia (Lowe & Prior, 2008) considered five clinical areas of ESP practice; namely, orthopaedics, emergency care, obstetrics, gynaecology, and developmental disability. The first part of this paper focused on the literature review and proposed five aims and eight research questions; the principal aim was to ascertain the feasibility of introducing ESP roles into ACT (Australian Capital Territory) Health and DHCS (Disability, Housing and Community Services). The peer-reviewed international literature was searched for evidence on ESP practice, and both the national and the 'grey' literature were searched for an Australian perspective (in order to clarify relevant issues for ACT). Their definition of an ESP included working beyond the recognized scope of practice with some element of role expansion or enhancement, which also exemplified extended therapeutics, diagnostics or practice consultation. They imposed no limits on the type of study design, but limited the search to between 1998 and 2008, with the 'grey' literature search commencing from 2003. It was a little unclear how the initial search was performed and by whom, and the authors provided no information on their methods of data extraction beyond stating that they used a 'custom-built' descriptive data extraction template. A recognized system was used to rate the quality of papers (CEBM, 2010) and 36 peer-reviewed papers met their inclusion criteria. They found four systematic reviews (Bethel, 2005; McPherson et al., 2006; Humphreys et al., 2007; Kersten et al., 2007), one narrative review (Anaf & Sheppard, 2007a), and 31 primary research articles, which included two randomized controlled trials (Daker-White et al., 1999; Richardson, et al., 2005). The majority of studies came from the UK (n=33), but there were two from Australia and one from the US; the 'grey' literature yielded 51 studies that met the inclusion criteria but these had been limited to Australian papers. The PI contacted the research team and asked them to identify the systematic reviews. One of the reviews (Bethel, 2005) was not a formal systematic review but a critical appraisal of the relevant literature. Another paper (Humphreys et al., 2007) was a systematic review, but it concerned consultant posts in nursing and the allied health professions – and because consultant practitioners' practice should be at a more senior level than extended-scope practitioners' practice, one could question the inclusion of this paper in the review. In conclusion, the authors of this review reiterated the importance of medical support for ESP posts and the need to define clinical competencies. They also recommended that all stakeholders participated in the development of training programmes. A further systematic review updated this 2008 review (Stanhope et al., 2012b) and focused on the role of ESPs in orthopaedics. The authors discovered a further six studies that had been published since 2008. However, their poor quality meant that the evidence base effectively remained the same.

Laurant et al. (2010) conducted a systematic review that explored the evidence for the effectiveness of ‘non-physician clinicians’ (nurses, physician assistants, pharmacists, and AHPs) who extend their roles into areas of practice that used to be the domain of doctors. They focused on non-physician clinicians acting as either ‘doctor supplements’ or ‘doctor substitutes’. The former involved providing complementary additional services, and the latter involved these clinicians performing the same services as doctors (to enable doctors to do what only doctors can do). The authors separated supplementation into three categories of role revision: delegation (intra-professional shifting of service provision from a senior to a junior grade), innovation (a new type of professional) and enhancement (extending practice skills); however, they stated that non-physician clinician extended roles often demonstrate more than one type of role revision. In this review, studies were included if they were looking at the impact of non-medical clinicians compared with usual care provided by doctors; they also had to consider the effects on a range of structural, process, and outcome indicators. In their approach to the literature search, the authors initially focused on systematic reviews published in, or after 2005; review papers were considered ‘out of date’ prior to this. They then searched for randomized controlled trials, quasi-experimental studies, and controlled observational (cohort or case-control) studies; these studies were included only if they had not already been included as level A (systematic review) evidence. The earliest study included dated back to 1961, and they specifically excluded observational studies without a control, and expert opinion pieces. Three independent reviewers were involved in the evaluation of these papers, and they discussed any disagreements together when they occurred. The authors were unable to apply statistical tests to their data due to the heterogeneous nature of the studies; instead, they summarized data descriptively. They finally included 31 studies: twenty-eight systematic reviews and three original studies. The systematic reviews and professional group associations comprised five occupational groups: nurses (n=18), physician assistants (n=5), pharmacists (n=4), AHPs (n=1), and studies containing of mixture of non-physician assistants (n=3).

There appeared to be no adverse effects associated with extending the roles of non-medical clinicians, but the authors qualified this comment by saying that this could really only apply to the nursing profession; the evidence relating to the other allied health professions, including physiotherapy, was insufficient to allow any firm conclusions to be drawn. They recommended cluster randomized controlled trials (where possible) to examine the effectiveness and cost-effectivness of extended roles, and encouraged researchers to compare non-physician roles with physician roles. The sole systematic review concerning AHPs (McPherson et al., 2006) yielded little useful information about ESP physiotherapists working in 'substitution' roles. Many of the studies included in the review had a short-term follow-up and with overall sample sizes being small, the authors felt that this might have concealed potentially negative findings such as 'missed' diagnoses. Nonetheless, they still argued that within hospital orthopaedic outpatient settings, ESPs appeared to provide the same quality of care as doctors and produced similar outcomes. It is somewhat misleading to put forward an argument based on just one systematic review comprising five UK studies, only one of which was a randomized controlled trial (Daker-White et al., 1999); however, such is the state of the literature surrounding ESP practice. The authors highlighted the fact that the research evidence has not kept pace with practice and service developments. They also commented that ESPs are not able to substitute for doctors in their entirety. This seems such an obvious observation to make and yet few papers refer to this fact. Finally, the authors recommended further clarification about training and regulation of non-medical clinicians working in extended roles, and the inherent professional indemnity insurance issues involved. Doctors have been required to undergo revalidation and relicensing since 2009 (NHS Employers, 2009) and if this is introduced for physiotherapists, what will this mean for new and existing extended professional roles?

Sibbald, Shen & McBride (2004) reviewed the evidence for the effectiveness and efficiency of changing workforce skill-mix, which they grouped into four categories:

enhancement (role extension), substitution (substituting one worker for another), delegation, and innovation (introducing a new role). They systematically searched the literature for evidence that had used either a systematic review or a quasi-experimental design and for studies with a qualitative analysis or quantitative meta-analysis of findings. They excluded literature prior to 1990 on the basis that it would be unlikely to yield relevant studies. Two independent reviewers used an appraisal scoring system with a maximum possible score of 8/8. In the two categories relating to ESPs (enhancement and substitution), no studies relating to ESP physiotherapy were found. This is not surprising given the fact this this study predates later systematic reviews.

2.5 Summary

The literature surrounding ESP practice is generally poor and it remains a difficult subject to research due to considerable variations in the parameters of these roles. This chapter has reviewed the literature on ESP roles in the UK, Canada, Australia, and in the US. The majority of studies focused on ESPs working in orthopaedics and emergency medicine. It is difficult to make comparisons between the ESP role in the UK with that of its counterparts abroad because of the different health-care systems involved. The overall quality of research is inadequate; most studies are either observational or descriptive in nature and often concern one ESP at one site. This reflects the way ESP posts are set up, which is usually on an *ad hoc* basis, to meet the needs of local services. There is clearly a need for more robust research in the field of ESP practice.

The majority of ESPs work in secondary care and although ESPs may think that they are practising autonomously, the need for medical support is a prominent feature in the literature. A common theme running through many of the secondary-care-based studies is the desire to compare ESPs with doctors. The overall conclusion is that ESPs are on a par with doctors when certain activities are examined, for example accuracy in surgical prediction, managing minor MSK injuries, performing joint injections, and the appropriate use of diagnostic imaging. However, most studies use inadequate outcome measures and are poorly designed, and ESPs tend to be seeing a particular cohort of patients selected for them by their medical colleagues. One has to wonder about the merits of comparing physiotherapists' performance with that of doctors, because it is not a comparison of equals. It is surely better to accept the differences between the two, and focus on the strengths and benefits that can result from employing skill-mix more effectively. Perhaps the reason why so few studies have attempted a cost-benefit analysis is that researchers recognize that clinical effectiveness of role substitution should take precedence over financial savings.

The design of this current study was influenced by one paper in particular: a small-scale study, which engaged 21 experts in a three-round Delphi survey in order to obtain a consensus on the competencies required of extended-scope practitioners (physiotherapists and OTs) in hand therapy (Ellis, Kersten & Sibley, 2005). This literature review has revealed a significant gap in knowledge concerning the clinical competencies and training required of MSK ESPs in the UK. For ESPs in community MSK interface clinics (which act as gatekeepers for secondary-care specialist services), this is critically important, because these ESPs are unlikely to have access to the same level of specialist medical support as their colleagues in secondary care. It is apparent from the literature that ESP practice has changed over the years, which renders some of the older studies less relevant to current practice.

This current research focuses on the clinical competencies required for primary-care-based MSK ESP practice. Very few papers in the literature discussed the clinical competencies and training associated with the ESP role and those that did were rather vague and referred to experiential training. Interestingly, it was a non-UK study concerning the APP role in Canada, which seemed to define the most rigorous educational preparation (Robarts et al., 2008). Although APPs confine their practice to the management of patients undergoing hip and knee arthroplasty, the benchmark used to evaluate their competencies was a medical competency framework produced by the Royal College of Physicians and Surgeons of Canada.

The specific aims of this study were as follows:

1. ascertain the views of medical MSK experts on the nature of the core clinical competencies (skills, knowledge, and attitudes) required of MSK ESPs working in primary-care-based settings
2. ascertain these medical MSK experts views on methods of acquiring these clinical competencies
3. determine if a consensus on competencies could be reached by engaging these experts in a formal consensus exercise (Delphi)

The next chapter will discuss the NHS reforms and policies that have recently brought primary and community-care services into the spotlight.

Chapter 3
Focus on MSK Medicine in Primary Care

3.1 Introduction

The current study focuses on the MSK ESP role in primary care. This chapter highlights the prevalence of MSK conditions in the community and the importance of training and education for GPs and ESPs working in this field. It also discusses primary-care-based MSK interface clinics, which filter GP referrals to hospital-based MSK services. Many of these clinics are led by ESPs, with limited access to support from MSK medical specialists in secondary care. The primary-care clinician faces a wide variety of MSK presentations affecting the spine, and both upper and lower extremities. This requires knowledge of orthopaedic surgery, rheumatology, pain medicine, neurology, sports medicine, and non-MSK conditions that may be associated with, or masquerade as, MSK pathology. Hence, it is critically important to identify the core clinical competencies required of primary-care-based MSK ESPs.

3.2 MSK conditions: the Scale of the Problem

The direct and indirect costs of MSK conditions for health care and society in general are considerable (Woolf, 2007) and so it is not surprising that 2000-2010 was named ‘The Bone and Joint Decade’ (Lidgren, 2003). It is estimated that just over 9m working days were lost because of MSK disorders in 2008/9 (HSE, n.d.). Kemp & Davidson (2007) stated that 22% of people receiving employment support allowances or incapacity benefits do so because of a MSK problem, and MSK conditions are said to account for up to 60% of all disability pensions (Akesson, Dreinhofer, & Woolf, 2003). Bevan, Passmore & Mahdon (2007) estimated the societal cost of MSK disorders to be in the region of £7bn. Estimates on the prevalence of MSK conditions in primary care can vary due to differences across primary-care consultation databases (Jordan et al., 2007), but approximately 90% of all NHS activity takes place in primary care (Varnam, 2009; DH, 2011b). Parsons & Simmons (2009) calculated that MSK conditions account for 10% of all GP consultations; others have suggested that this figure is closer to 30% (DH, 2006a; Margham, 2011). Arthritis Research UK (2010) estimated that a typical GP practice, based on an average practice population of 10,000 registered patients, conducts 4,400 consultations for MSK problems over the course of one year. *The Musculoskeletal Services Framework* (DH, 2006a) stated that MSK conditions are the most common reason for repeat consultations in general practice and account for 20% of all emergency department attendances. With an ageing population and rising public health issues (Middleton, 2011), we will see an increase in the prevalence and cost of MSK disorders over the next few decades; this, in turn, will put more pressure on community-based services (Britnell, 2011).

3.3 Community-Based MSK Interface Services

The Government's recent White Paper, *Equality and Excellence: Liberating the NHS* (DH, 2010), set out proposals to hand over health-care commissioning and control of £70bn of the NHS budget to GPs by 2013. This followed significant pressure from the Government over recent years to move services out of hospitals and into community settings, closer to people's homes. In 2006, a White Paper was published outlining a new direction for community services and a vision for the future of health and social care (DH, 2006d); orthopaedics was one of six specialties mentioned in the paper. *The Musculoskeletal Services Framework*, published later the same year (DH, 2006a), focused even more attention on MSK services (DH, 2006a). These reports, and others (Parker, 2006; Singh, 2006; NHS Institute, 2009) referred to developing the role of specialist practitioners as a way of meeting the demand for enhanced primary-care services. *Framing the Contribution of Allied Health Professionals* (DH, 2008a) responded to the plans laid out in the *Transforming Community Services Quality Framework* (DH, 2009) by giving specific examples of ESPs' roles in community-based MSK services.

Each year in the UK, GP referrals to hospitals account for more than £15bn of the NHS spend (DH, 2009b), and a recent review of GP referrals by The Kings Fund considered a number of different referral management systems (Imison & Naylor, 2010). One such approach to managing GP referrals is to filter them through a primary-care-based MSK interface clinic. These 'Tier 2' services or 'CATS' (Clinical Assessment and Treatment Services) deliver a triage, assessment, and treatment service in the community. In a review of MSK services across England, ARMA found that by 2009, 79% of PCTs had established a 'CATS' service (ARMA, 2010). These interface clinics are usually led by GPs with a special interest in MSK medicine (GPswSI) or by ESPs, and their primary function is to reduce the number of referrals to hospitals by managing as many patients as possible within primary care. Hay & Adebajo (2005, p.1210) warned that 'simply transferring the workload from secondary to primary care will not work, as this will just turn our problem into their problem'. They also cited weaknesses in the other five systems studied: referral management centres, peer review and feedback, guidelines, and financial incentives. They mentioned a Cochrane review of methods designed to improve the process of referring patients to specialist care (Akbari et al., 2008), which found 17 studies concerning the need to educate professionals about referrals and the use of both financial incentives and organizational change to influence referral processes. They found little evidence for organizational change, but there was some evidence supporting a second opinion prior to referral to hospital services, and using physiotherapy to improve the referral process for orthopaedic patients (O'Cathain, Froggett, & Taylor, 1995).

The NHS Institute for Innovation and Improvement produced a report recommending key characteristics of best-practice MSK interface services, by observing a number of exemplary services in the UK (NHS Institute, 2009). The report acknowledged the importance of ESPs in these services and stressed the importance of clinical governance arrangements, including training, mentorship, and competencies. However, surprisingly little evidence exists for the effectiveness of these interface service models. Imison & Naylor (2010) confirmed that there was a lack of strong evidence to support them. In their conclusions they expressed concern that interface services could misdirect referrals (if GP referral letters contain inadequate information) and delay access to a hospital specialist. They also posited that they could be duplicating secondary-care work instead of substituting for it, with a resultant increase in overall costs.

A retrospective observational study by Patel et al. (2011) looked at the accuracy of a range of primary-care clinicians' diagnoses of shoulder disorders by comparing the diagnosis made in primary care with the diagnosis made in a single upper limb orthopaedic clinic in secondary care. MSK interfaces accounted for 63% of these referrals; the remainder were from GPs (35%) and independent physiotherapists (2%). Thirty-seven per cent of patients were referred without any diagnosis and where one was given, it matched the initial diagnosis made in the surgeon's clinic in only 50% of cases. This figure dropped to 32% if a comparison was made with the final diagnosis based on further information derived from imaging or surgery; diagnosis given by the surgeon was consistent with the final diagnosis in 70.5% of cases. Slightly higher kappa values in the GP group suggested that they were more accurate at diagnosing shoulder pathology than the MSK interface clinic, although GPs might have been referring complex shoulder presentations to the interface clinic for further assessment, and managing the more straightforward cases themselves. However, this observation led the authors to conclude that MSK interface clinics do not appear to be any better than general practice.

A report from the National Public Health Service for Wales (Webb, 2010) published a 'rapid review' of the evidence for the effectiveness of MSK interface services. The intended audience for this report was the North Wales Strategic Board and its aim was to find out if these services led to a delay in referral for a surgical opinion. Their search ran from January 2000 through to May 2009 and included systematic reviews and meta-analyses, randomized controlled trials, guidelines, and observational studies. The author, the sole reviewer, found no high-quality (level I or level II) evidence relating to effectiveness but they mentioned a level III evidence study by Maddison et al. (2004), which will be discussed later in this chapter.

The current Government's plans to relinquish power to GPs through GP commissioning consortia will only serve to increase the focus on GP referral management systems. Community-based MSK interface clinics (DH, 2006a; NHS Institute, 2009) provide commissioners with the foundation from which to develop their primary-care services. Ideally, these services incorporate the input of hospital-based MSK specialists (orthopaedic surgeons, rheumatologists, neurosurgeons, neurologists, and pain management consultants) and utilize the skills of ESPs and other clinicians working in extended roles, such as podiatrists.

In practice, a variety of interface service models exists and many of them are staffed by ESPs with little or no support from medical colleagues (Bernstein, 2009); if clinical governance arrangements are inadequate, this presents an unacceptable level of risk and employers should be concerned about this. Indeed, in a prospective audit of referrals made to a hospital orthopaedic clinic by a multi-professional MSK interface clinic, Rogers, Kabir & Bradley (2008) concluded that interface clinics delivered sub-optimal care, and that this could have far-reaching medico-legal implications.

Roberts et al. (2003) described a survey of the characteristics of community-based MSK services, either current or planned, by contacting Primary Care Trusts in the UK (n=461). Recruitment targeted five professional groups: business managers, chairpersons, chief executives, clinical governance leads, and commissioning leads. The overall response rate was 328/461 (71%), and 233 of these organizations identified at least one MSK service. In total, respondents described 350 services and alluded to a further 87 services. The majority of them were located in primary care but not all of them were necessarily interface clinics according to the ‘Tier 2’ or ‘CATS’ model. In fact, they identified five main service models: physiotherapy, ‘scanning services’, rehabilitation services, injection clinics, and ‘others’. Respondents identified clinical leads for the majority of clinics (n=237), and it transpired that physiotherapists or GPswSI led three-quarters of all services. It is not known how many of these physiotherapists were working in ESP roles. Education and training for community-based MSK practitioners were described as ‘patchy’ despite some examples of good practice and only six services referred to a specific level of competency for their MSK community staff. Rymaszewski et al. (2005) supported the MSK interface model in primary care but emphasized the importance of closer integration with hospital-based specialists and argued that ESPs need to experience working alongside orthopaedic surgeons and rheumatologists in order to acquire the level of expertise and experience needed for their extended role.

Maddison et al. (2004) described the introduction of 'TEAMS' (Target Early Access to Musculoskeletal Services), a community-based project in North West Wales led by ESPs and GPswSI. Its aim was to tackle the long waiting times in secondary-care orthopaedic, rheumatology, spinal, and pain management clinics. Despite an increase in overall MSK referrals of 116% following the introduction of the service, there was still a gradual reduction in hospital waiting times over 18 months – perhaps because 'TEAMS' referred less than 10% of patients overall to hospital services. The conversion rates for orthopaedic surgery in secondary care remained unchanged and there could have been any number of reasons for this, but the authors do not posit an explanation. Their outcome measures included not only waiting times for secondary-care services but also conversion rates for surgery, which were an indication of the appropriateness of referrals to orthopaedic clinics.

Sephton et al. (2010) described an evaluation of a primary-care-based MSK CATS using a prospective observational-cohort study design. The service, led by a team of advanced musculoskeletal physiotherapy practitioners (ESPs), managed GP referrals to orthopaedics, rheumatology, and pain management services based in secondary care. Patients (n=217) were sent self-administered postal questionnaires measuring general health status (Short Form-36 and the EuroQol EQ-5D), a pain visual analogue score, and two validated patient satisfaction questionnaires at three and 12 months following recruitment. Their results demonstrated a statistically significant improvement in pain at three months (p=0.001) and again at 12 months (p=0.002). They also found a statistically significant improvement in the EuroQol EQ-5D at three months (p=0.043) and 12 months (p=0.035), and an overall patient satisfaction rate of 72% (out of 167 completed questionnaires). Data were missing at three months from 45 patients, and two patients returned incomplete data sets. At 12 months, data were missing from 68 patients and a further two patients returned incomplete questionnaires. Changes in pain scores were the most significant but one could argue that this was simply due to the passage of time. A before and after study design might have resulted in a more robust measure of the effectiveness of the service but because it had been in operation for four years, this was not possible.

MSK services face competitive times ahead with the imminent arrival of GP commissioning consortia. Furthermore, the recent ‘Any Qualified Provider’ policy (NHS Choices, 2012) means that in the near future the ESP role is likely to be scrutinized by commissioners and patients alike. It is almost the norm for NHS services to be set up without any evidence that they will be successful, and without consideration for their subsequent evaluation. The pace of change within the NHS means that there is little time to evaluate services before the next health-care reform must be implemented. Indeed, Ferguson & Cook (2011) questioned whether the primary-care orthopaedic interface model was sustainable in a constantly changing NHS, which is at the mercy of the political and economic environment.

3.4 GP Education in MSK Medicine

Doctors in the UK typically receive little training in MSK medicine and this state of affairs is similar in the US (Jones, Maddison, & Doherty, 1992; Kay et al., 2000; Matzkin et al., 2005; Schmale, 2005; Day et al., 2007; Beran et al., 2012). Undergraduate medical education in MSK medicine typically amounts to between two and four weeks (and even this may be optional), which represents less than 2% of the curriculum (Williams, 2000; Dunbar, 2007). Freedman & Bernstein (1998) noted that 33% of doctors in the US graduated with no exposure at all to orthopaedics, and a few years later the same authors concluded that it was reasonable to assume that education in MSK medicine was still inadequate in medical schools (Freedman & Bernstein, 2002). It seems shocking to learn of the inadequacy of GP training in MSK medicine but perhaps it is not that surprising when one considers the nature of their practice; GPs are generalists and the breadth of knowledge required to underpin general practice is vast. A number of studies have reported on attempts to address the problem of poor exposure to MSK medicine in undergraduate medical training; some of these studies influenced the design of the first Delphi questionnaire used in this current study.

Coady, Walker & Kay (2004) acknowledged the poor training in MSK disorders in medical schools and the likelihood of orthopaedic surgeons and rheumatologists having different views on the nature of the skills and knowledge involved. They set out to produce a list of core regional MSK examination skills for medical students by using focus groups with five orthopaedic surgeons, nine rheumatologists, five geriatricians, and four GPs. The results were used to formulate a national questionnaire survey, which was then sent to clinicians (n=3,373) from these professions. It asked respondents to rate each skill on a five-point Likert scale, from ‘definitely not required’ to ‘essential’. Unfortunately, the response rate was only 46%, but the results were taken to a small group of clinicians (two rheumatologists, two GPs, one geriatrician, and one GP) who, through a nominal group technique (NGT) process, then produced a final list of 50 essential competencies relating to regional examination of the MSK system.

Doherty & Woolf (1999) and the EULAR (European League Against Rheumatism) Standing Committee on Education and Training developed a core set of objectives for a rheumatology curriculum for use in European medical schools. It included competencies in clinical assessment and diagnosis, knowledge of the key characteristics and principles of management and rehabilitation of specific conditions, and core knowledge underpinning diagnosis and management. Woolf, Walsh & Akesson (2004) later set out to produce international standards for undergraduate MSK medical education. They recruited experts (orthopaedic surgeons, rheumatologists, and experts in rehabilitation and osteoporosis) from 29 countries using an Internet-based consultation process facilitated by the Bone and Joint Decade Education Task Force, and supported by international and national societies. Their core clinical MSK competencies incorporated practical skills, theoretical knowledge, and professional attitudes involved in clinical assessment and diagnosis. They described four types of MSK presentations: common conditions such as low back pain, sprains and strains, and osteoarthritis; less common conditions such as fractures, rheumatoid arthritis, spinal stenosis; rare conditions such as bone tumours and malformations; and medical or surgical emergencies.

More recently, Queally et al. (2011) evaluated the effect of introducing a new two-week module in MSK medicine for undergraduate medical students, which focused on the management of common MSK conditions encountered in primary care. They used a previously validated MSK examination tool to compare the performance of an intake of students who had completed this new module (n=92) with a historical control group of students (n=72) from three years earlier (before the introduction of the new module). Not surprisingly, they found an improvement in scores in the group that had received the new training. The improvements in the pass rate were statistically significant (p=0.0002) but the overall pass rate was still an unimpressive 38.4% in the new group compared with 12.5% in the historical control group. Bilderback et al. (2008) conducted a similar comparison study with a historical cohort of medical students, using the same validated examination tool but a different education module. They reported on the success of their six-week course in MSK medicine and found that the MSK-educated cohort yielded positive results both in terms of performance and student satisfaction; scores improved from 59.6% in the control group to 77.8% in the new student cohort. In a similar study, Williams et al. (2010) examined the effects of introducing a seven-week MSK teaching programme for medical undergraduates in the UK. They used a short-answer paper and a multiple-choice examination to compare the results of students who had completed the programme with two control groups comprising students who had not benefitted from this training. The authors claimed to have seen an 'educationally significant' result, although there was only a 6% reported improvement in mean multiple-choice question scores.

GPs in the UK also have little MSK education in their postgraduate specialist training. This was highlighted by Lanyon, Pope & Croft (1995) in their survey of GP trainees and educators. A similar picture was revealed by Al-Nammari, James & Ramachandran (2009), who found that most medical graduates of the new foundation programme failed to achieve a basic level of competency in MSK medicine. Perhaps in an attempt to address these problems, The Arthritis Research Campaign produced a core curriculum for GPs and GP registrars in 2000 (ARC, 2000), and the Royal College of General Practitioners produced a curriculum statement on rheumatology and MSK conditions (Wise et al., 2007). In Canada, Murnaghan et al. (1995) also provided a list of orthopaedic knowledge and skills that they considered essential for GP training.

Hay et al. (2007, p.360) defined a GPwSI as a GP who 'supplements their core professional role, and/or undertakes advanced procedures not normally undertaken by their peers'. They set out to determine the knowledge and skill-based competencies for inclusion in an education curriculum for GPswSI working in rheumatology or MSK medicine. They first reviewed the available literature and produced a list of competencies based on this existing data. They then conducted a two-round Delphi survey with 16 MSK experts (GPs, rheumatologists, GPsWSI , and physiotherapists). In the first round, experts scored the importance of the listed competencies using a four-point scale, ranging from 'should definitely be included' to 'should definitely not be included'. In the second round they were asked to re-evaluate their scores and consider the level of knowledge required (basic or detailed) for each competency item. The Delphi survey results were then taken to two workshops where GPsWSI, rheumatologists, 'those interested in GP education', and 'MSK medicine practitioners' met to refine and agree a draft competency framework. They presented this framework at a GPwSI conference, following which they made a number of modifications; it was then circulated to relevant national bodies for a six-month consultation period. The authors presented supplementary data in their final report, which detailed 12 key competencies, together with a list of condition-specific (spinal, upper limb, lower limb, and chronic widespread MSK pain) competencies. The DH has also published MSK guidelines for GPswSI, which describe competencies relating to pain management, assessment and treatment of MSK problems (including clinically urgent conditions), joint injections, education and training, and minor surgery (DH, 2003b). The adequacy of current undergraduate medical MSK teaching programmes in the UK was questioned as early as 1993 (McManus et al., 1993) and it seems that it is still inadequate today, because it was highlighted again more recently by Sirisena et al. (2011).

3.5 The MSK ESP Role in Primary-Care-Based MSK Interface Clinics

Unlike the more specialist roles of hospital-based ESPs, ESPs in primary care are typically working in a more generalist role, outside a multidisciplinary team setting. There is no literature exploring the competencies required of MSK ESPs in these settings. However, ESPs need to be able to manage common MSK conditions presenting in primary care and long-term, chronic MSK conditions. They should also be able to recognize the urgent or emergency MSK presentations (suspected tumours, fractures, infections, or surgical emergencies), and recognize when the presenting MSK features do not fit a MSK diagnosis; they need to know when to seek medical input.

3.5.1 Primary-Care-Based ESPs and Medical Differential Diagnosis

MSK conditions can be challenging for GPs, and chronic widespread pain presentations and medically unexplained MSK pain can be particularly difficult to manage in primary care (Reilly, 1999; Bliddal & Danneskiold-Samsøe, 2007; Smythe, 2009). There is a high prevalence of MSK disorders in all fields of medicine, for example, dermatology, gastroenterology, ophthalmology, neurology, mental health, general medicine, cardiology and internal medicine. Stith et al. (1995, p.48) commented on the need for physical therapists to screen patients for medical conditions so that they can identify patients who fall outside physiotherapy practice expertise, by learning to 'identify clusters of signs and symptoms of significant medical conditions that may mimic problems commonly treated by physical therapy'. ESPs are understandably concerned about patients presenting with pathology that may be mimicking a MSK condition and worry about failing to recognize such medical diagnoses. The kinds of MSK presentations seen in primary care are many and varied, and they commonly present as an undifferentiated, early-stage problem. This means that MSK ESPs have to be skilled in differential diagnosis. They must correctly triage patients to specialist services and this includes not only MSK specialist services such as rheumatology and orthopaedics, but also other medical specialties such as neurology, neurosurgery, general medicine, metabolic medicine, general surgery, or pain management. This screening and triage role demands knowledge that extends beyond the MSK system and its examination. Thus, an exposure to clinical medicine and training in medical differential diagnosis (to screen for causative or associated non-MSK pathology) would appear to be the *sine qua non* of primary-care MSK ESP practice. It is interesting to note that there is a distinct lack of textbooks covering medical systems review and medical differential diagnosis for physiotherapists, and the few that do exist are written for physical therapists in the US; for example, Goodman & Snyder (2007) and Boissonnault (2010). If ESPs in primary care are acting as gatekeepers to MSK specialist services in secondary care then they need an appropriate level of knowledge of MSK surgery and medicine, for example, an awareness of the most up-to-date surgical procedures and indications for surgery. The MSK ESP in primary care is similar to the GPswSI in that they are both generalists; however, in other ways, the two roles are antithetical. A GPwSI has a very broad medical knowledge base but then has to develop specialist skills in MSK medicine; a MSK ESP has an in-depth knowledge of the MSK system but then has to think about broadening this knowledge base to place it within the context of general clinical medicine.

As previously mentioned, NHS physiotherapists have only recently been able to practise as autonomous first-contact practitioners, following the introduction of NHS physiotherapy self-referral schemes (Holdsworth & Webster, 2006; DH, 2008b; Webster et al., 2008). Arguably, physiotherapists who are seeing patients for physiotherapy treatment without a GP referral should possess the same skills in medical differential as an ESP. This is something that Leerar et al. (2007) felt strongly about when they stated that prior medical screening by a physician did not obviate the need for physiotherapists to perform a medical screening examination for themselves. Holdsworth, Webster & McFayden (2008) used a questionnaire survey of 26 GP practices to obtain the views of GPs (n=70) and physiotherapists (n=47) on physiotherapy self-referral schemes in Scotland. Just over a quarter of GPs were uncomfortable with physiotherapists seeing patients without prior medical screening by a GP, and 6% of physiotherapists said they preferred patients to see their GP first. ‘PhysioDirect’, a telephone assessment service for patients with MSK problems, operates in a few UK centres and offers timely access to advice and treatment from a MSK physiotherapist. Foster et al.

(2011) published a recent discussion article on the evidence for and against 'PhysioDirect', in which they mentioned the need for clinical risk management training - unfortunately, they did not stipulate what this training should entail. However, patient self-referrals seem to make up only a small part of established 'PhysioDirect' services; most of the workload comes from GP referrals. One has to question whether MSK ESPs working in primary care (where there may not always be medical support on-site) and NHS physiotherapists working in self-referral schemes as first-contact primary-care clinicians – and physiotherapists in private practice - should be practising at all if they do not possess adequate skills in medical screening and differential diagnosis.

A small study by Jette et al. (2006) attempted to address concerns voiced by opponents of direct access (self-referral) to physical therapy in the US (Durant, Lord, & Domholdt, 1989; Domholdt & Durchholz, 1992; Mitchell & de Lissovoy, 1997; Crout et al., 1998; Snow, Shamus & Hill, 2001). These concerns centred on physical therapists not being able to detect a condition requiring a medical opinion. They used a self-administered survey, containing twelve hypothetical case scenarios, to investigate physical therapists' ability to identify medical conditions that could mimic a MSK presentation. Out of a random sample of 1000 physical therapists, 394 responded. Their results suggested that physical therapists needed more education related to screening for medical conditions and differential diagnoses.

A recent Swedish study published by Ludvigsson & Enthoven (2011) evaluated physiotherapists' assessment and management of MSK disorders in a self-referral setting in primary care. From January 2004 through to June 2007, patients who would normally have seen their GP saw a physiotherapist for their first-contact appointment. This observational, retrospective cohort study (n=432) reviewed patients' medical records and re-presentation rates at three months post-intervention. At the initial consultation, physiotherapists were able to liaise with GPs when X-rays, prescriptions, and medical certificates were required (7% of cases), and refer patients to GPs if a more serious underlying pathology was suspected (6% of cases). At the three-month point, a further 9% of patients had re-presented to their GP with the same MSK problem, but the examining GP found no serious underlying pathology. Reassuringly, the physiotherapists had identified all patients with a serious underlying medical problem at the initial consultation. A separate arm of the study examined patient satisfaction levels and found that patients had greater confidence in the ability of physiotherapists to assess their disorder ($p<0.002$), although this could have been due to physiotherapists having longer consultation times. Unfortunately, patient allocation was non-randomized; practice nurses organized it based on information gleaned through a telephone triage system. Another weakness of the study was that it was conducted at a single centre.

Murphy, Greathouse & Matsui (2005) commented that primary-care physical therapists in the US should be skilled in medical differentiation of MSK problems. Donato et al. (2004) also viewed the identification of non-MSK signs and symptoms as an important part of physical therapists' primary-care role. However, Wolf, Katz & Krebs (1991) argued that physical therapists should be careful to limit their practice to their particular field of expertise, and that they should not be attempting to diagnose non-MSK pathology. Rose (1989, p.535) commented on the need to calm 'the fears of the medical community that physical therapists wish to diagnose disease, infringe on the practice of others, or perform clinical acts outside their scope of expertise'. Boissonnault & Bass (1991) argued strongly that physical therapists should include medical screening in their examinations, not to make a specific diagnosis (which is the responsibility of the physician), but to ensure that they know when it is appropriate to refer for a medical opinion. Although these studies concerned direct access to physical therapy in the US, parallels can be drawn with ESPs in the UK. The issues surrounding ESPs practising 'medical' skills was something that the PI was keen to investigate as part of this current study. How can ESPs identify the need for medical input if they do not have basic skills and knowledge in medical differential diagnosis?

3.5.2 ESP Training and Education in MSK Medicine

A study by Almeida et al. (2006) suggested that undergraduate MSK education for AHPs in the UK is inadequate. They found that the typical undergraduate curriculum for OTs and physiotherapists (and nurses) contained only five to 10 hours of rheumatology teaching over a typical three-year training programme. Hewlett et al. (2008) used a three-round Delphi survey followed by three inter-professional workshops to identify core topics in rheumatology for undergraduate AHPs and nurses. The expert Delphi panel (n=39) comprised representatives from occupational therapy, nursing, and physiotherapy; they produced six essential teaching units and proposed a range of delivery methods. Although the authors included the views of education experts (n=19) via separate interviews conducted over the telephone, they did not include medical experts' views.

Studies from the US and Canada have described similar inadequacies in MSK education for physiotherapists at undergraduate level (Jette & Becker, 1980; Westby, 1999; Li et al., 2009). Verma, Paterson & Medves (2006) attempted to define a set of generic essential competencies (values, knowledge, attitudes, and skills) for sharing across medicine, physiotherapy, nursing, and occupational therapy, by amalgamating discipline-specific competencies. Moncur (1985) surveyed physical therapists who were also clinical educators, physical therapists, and rheumatologists, in order to identify essential competencies related to managing the chronic problems of arthritis by entry-level physical therapists. The majority of the resultant 80 competencies focused on physical therapy treatment; for example, designing and implementing a physical therapy management plan. However, the authors commented that some competencies would traditionally have been the responsibility of other professionals, including rheumatologists. A subsequent publication (Moncur 1987) reported on the difference in perceptions among the same three groups of respondents. The only statistical differences found were between clinical educators and physical therapists for 20 competencies, which the authors attributed to experienced practising clinicians forgetting what their practice had been like as a new graduate.

In 1999, the CSP published recommendations for ESP practice (CSP, 2000). These recommendations stated that ESPs should possess at least five years' post-qualification experience and three years' experience in the specialist field, and that they should have completed a recognized or accredited course. Training currently available to ESPs in the UK includes *ad hoc* experiential learning in the workplace, masters-level modules and full masters' programmes, and short courses. Dawson (2006) described a new multidisciplinary course for AHPs at the University of Brighton, resulting from collaboration between rheumatology teaching centres throughout the UK and the Arthritis Research Campaign (now Arthritis Research UK). It included both entry-level and masters-level education and again, it used the competencies defined by Carr & Gordon (2001) as its foundation. The University of Salford offers inter-professional learning in trauma and orthopaedics, and surgical practice for trainee surgeons, GPs, and non-medical health-care professionals. Inter-professional training is likely to become more commonplace and for ESPs, this could promote a greater understanding of their roles and facilitate their professional development. Indeed, one physiotherapist has written about her training in orthopaedics, which was part of the specialty registrar training scheme for trainee orthopaedic surgeons (Kennedy, 2010).

Returning to Canada, Yardley et al. (2008) used a cross-sectional survey design to ask a randomly selected sample of physical therapists (n=500) and employers of physical therapists (n=500) their views on clinical specialist and advanced practice roles. The response rate was 53% and 60% respectively and although they stated that neither role was formally recognized in Canada (nor was there a legislative or regulatory framework to support these roles), 8% of physical therapists identified themselves as advanced practitioners. Overall, the results showed that both physical therapists and their employers were keen to pursue the formal development of ESP-type roles. Li et al. (2009) also surveyed Canadian physical therapists' views on specialist and extended practice roles using a postal survey and a random sample (n=600) of physical therapists. Although they had a low response rate (47.7%), they found that one in four physical therapists were keen to pursue an advanced practice career in rheumatology. It is interesting that both Li et al. (2009) and Yardley et al. (2008) indicated that advanced practice roles are not formally recognized in Canada, when Campos et al. (2002) and Campos et al. (2001) had already reported on the success of their advanced practitioner physiotherapy roles in paediatric rheumatology. In addition, Lundon et al. (2008) and Lundon et al. (2011) described the Canadian Advanced Clinician

Practitioner in Arthritis Care (ACPAC) programme for physical therapists and OTs with experience in MSK disease and arthritis management, designed to address a national shortage of rheumatologists. In fact, the situation in the UK is similar to that in Canada, because neither country can claim to have formal accreditation or regulation systems in place for extended practice physiotherapy roles.

In the US, the American College of Rheumatology published physical therapy competencies in rheumatology (ACR, 2010). These focused on the entry-level physical therapist but also detailed those competencies acquired with experience and supervision. Also in the US, Milidonis et al. (1996) conducted a survey to identify the practice of orthopaedic clinical specialists using a stratified convenience sample of 1,000 orthopaedic physical therapists, 325 of whom were orthopaedic clinical specialists. The overall response rate was low (42%), but 75% of clinical specialists responded. Their results provided a core set of knowledge and skills required of advanced practice therapists in orthopaedics and created a framework for their orthopaedic physical therapy specialty examination. This core skill set related to patient evaluation, design and implementation of care plans, research and documentation, and other professional practice issues.

Chehade et al. (2011) reported on the ongoing implementation of The Australian Musculoskeletal Education Collaboration (AMSEC) being developed through a national consensus process. The project began in 2005, with the objective of developing a core competency framework based on the Bone and Joint Decade curriculum recommendations for medical schools in Australia (Woolf et al., 2004). The Royal Australian College of General Practitioners has adopted this framework and the physiotherapy professional body is currently involved in discussions around their use of the AMSEC framework for MSK physiotherapists.

3.6 Summary

The current situation regarding MSK ESP training and education in the UK is disheartening. It is indefensible not to have a competency and curriculum framework detailing the skills, knowledge, and professional behaviours needed to perform effectively in a MSK ESP role. The absence of a framework results in a number of problems: there is no way of regulating ESP practice, because there is no demonstrable standard; ESPs are facing competition from other advanced practitioners who do have such frameworks supporting their practice; patient care may be suffering; and the risk of litigation may be increasing. Having a competency and curriculum framework would lead to a more standardized approach to ESP practice across different organizations and geographical boundaries, which would assist organizations in their workforce planning and succession planning, and improve recruitment and retention of ESPs. It would also help to clarify the parameters of individual roles and assist HEIs with their development of ESP-specific training programmes. Furthermore, the medico-legal aspects of extended practice, which is discussed in more detail in the next chapter, make it crucially important to establish core clinical competencies for the ESP role.

Chapter 4
Medico-Legal Aspects of Extended Practice

4.1 Introduction

The professional accountability within an ESP role extends beyond statutory regulation (Eddy, 2008) and well-defined competencies play a pivotal role. This chapter highlights the key medico-legal issues associated with MSK ESP practice.

4.2 Important Issues

Dimond (2009) discussed some important issues for physiotherapists taking on extended practice roles in the UK, which included patient consent to be seen by an ESP, access to medical support, agreeing the scope of practice with doctors (presumably this agreement extends to include other practitioners as well), and adequate training. ESPs are advised to clarify issues relating to their employer's vicarious liability and to make use of guidelines and protocols, but these come with a caveat. The courts may use guidelines in the assessment of questionable clinical conduct (Davies, 2009), but blind adherence to evidence-based clinical guidelines and protocols runs the risk of suffocating clinical reasoning. Working to a protocol requires little skill and does not obviate the need to use professional judgement. Clinical guidelines do not see patients as individuals, and it might actually be wrong to apply a guideline to a specific individual patient (Woolf et al., 1999). One could argue that only expert clinicians should be using protocols and guidelines since it requires considerable knowledge to be able to recognize when it is necessary to deviate from them; furthermore, guidelines and protocols do not necessarily translate across organizational boundaries. Scullard et al. (2011) suggested that guidelines developed in secondary care might be less useful to clinicians in primary care, a suggestion supported by Wise, Kumar & Walker (2006). Protocols can produce a false sense of security for both the employer and the ESP, and they should not be a substitute for appropriate training and competency frameworks. When a patient presentation is atypical and an ESP chooses not to adhere to an agreed protocol, he or she must be able to justify this decision because of the regulatory principles involved and the associated medico-legal implications.

An ESP is legally accountable for his or her own actions (Dimond, 2009). Since ESPs perform tasks usually carried out by doctors, neither inexperience nor absence of training and competence will be an adequate defence for an ESP should legal proceedings commence (Nightingale & Hogg, 2007). The legal implications of extended practice are complex and in the context of claims against ESPs, an understanding of the likely standard against which the courts would judge an ESP's conduct is crucial. The standard of care reached by ESPs should match that of the health-care professional whose practice they share; in other words, a reasonably competent doctor in the field (White & McKay, 2002; Buttress & Marangon, 2008). They must be able to demonstrate their competence to practise and undergo the necessary training and education so that their knowledge and skills are on a par with their medical colleagues (part of whose work they are carrying out). The literature indicates that patient satisfaction with ESPs is generally good. However, when something goes wrong and a patient makes a complaint, then the vulnerability of the ESPs may be exposed. The courts would scrutinize the role and seek to determine if the ESP could demonstrate that he or she held the required skills and knowledge. In each individual case, they would consider the standard of care expected and the line of accountability (who else was involved) and any transference of liability.

The plethora of different ESP job titles and variations in job outlines does little to elucidate the exact nature of many of these roles, which makes it difficult to determine practice boundaries and thus 'the remit against which they will be judged' (Armitage & Shepherd, 2005, p.312). ESPs remain professionally responsible to limit their practice to those areas in which they can demonstrate competence, and to recognize when they need to seek medical help. Role extension engenders a far greater potential for error and litigation than usual practice (White & McKay, 2002).

Armitage & Shepherd (2005) argued that practitioners in extended roles should remain accountable to their parent regulatory body, but that separate regulation should be instigated when extended practice is sufficiently different from the practice of the profession of origin. One wonders if a separate registration system, perhaps a subset of the physiotherapy register, is needed for extended practice physiotherapy. The Health Professions Council (HPC), which regulates the physiotherapy profession, defined scope of practice as an area in which one requires knowledge, skills, and experience (which are linked to standards and competencies) in order to practise lawfully, safely, and effectively (HPC, 2011). Woodhouse (2006) advocated a separate registration class for advanced physiotherapy practitioners in Canada. In this discussion paper, she presented a suggested education and curriculum framework for advanced practice physiotherapists in MSK medicine, which had the support of five university physiotherapy programmes. Admittedly, the application of this non-UK study is limited, because advanced practice physiotherapists in Canada at the time of the aforementioned study could only practise under a medical directive. However, In the UK, the DH has stated that ‘extended scope of practice does not necessarily require further regulation in its own right’ (DH, 2006e, p.35). In 2007, the Government published proposals for reforming professional regulation (DH, 2007c), which included the development of standards for advanced and extended practice in the non-medical professions.

In nursing, the Government advised The Nursing and Midwifery Council (NMC, 2010b) to ensure that advanced nurse practitioners were registered as advanced practitioners, and asked the NMC to consider if midwives working in advanced practice roles also needed this advanced level of regulation (The National Archives, 2010). No such proposal has been promulgated for ESP practice thus far. However, a recent government review of the future of professional regulation DH (2011c, p.11) stated that ‘health professions regulators will need to demonstrate that measures such as advanced practice registers, which have some professional support but where a compelling case for further regulatory action has yet to be made, are an appropriate and proportionate use of registrants’ fees’. In radiography, Miller et al. (2011) found that over 80% of radiographers supported the notion of a separate validating or regulatory body for their extended-scope practitioners.

Nightingale & Hogg (2003), in their paper on advanced practice in radiography, referred to the position of the General Medical Council (GMC) on delegation, which stated that doctors may delegate work to non-medical staff if they are confident that the individuals to whom they delegate are competent (GMC, 1995 cited in Nightingale & Hogg, 2003, p.79). Closer inspection of the revised 2009 edition of this GMC document reveals that a doctor, although not responsible for the actions of the person to whom they delegate, will 'still be responsible for the overall management of the patient' and accountable for their decision to delegate (GMC, 2009, p.26). It is somewhat unclear how delegation relates to the ESP role because, as Laurant et al. (2010) explained, extended practice roles are often poorly defined and may, or may not, involve an element of delegation. The issue of delegation is interesting. If the person to whom a specific task is delegated is already competent to perform the task then one has to wonder why it should be necessary to delegate the task in the first place. ESPs' autonomy may not be as prevalent as many ESPs think, despite the fact that some ESPs may consider that their practice represents the epitome of professional autonomy and empowerment. Having autonomy implies making decisions independently and being responsible and accountable for those decisions. Arguably, ESPs' empowerment is coming from a more powerful profession (medicine) relinquishing some of its own power, and so one could say that there is more autonomy in a pure (non-ESP) physiotherapy role.

The medical profession has held collective power in the NHS since its inception in 1948, and numerous authors (Porter, 1991; Adamson, Kenny, & Wilson-Barnett, 1995; Sandstrom, 2007) have discussed its dominance over the other health-care professions. Indeed, in a discussion of oppression in nursing, Roberts (2000, p.76) commented on the fact that 'medicine claims all of health care as its domain'. Sullivan (2000) defended medicine's position and emphasised the importance of medical professionalism and medicine's role in society. The hospital ESP role is inextricably bound to the role of the doctor, and ESPs benefit from this symbiotic relationship. When faced with a difficult case, hospital-based ESPs find it all too easy to divest themselves of their assumed autonomy by passing on the duty of care to the medical practitioner working alongside them in clinic. It is far less easy for ESPs working in community settings, where there may be limited medical support. Rothstein (2003), in a discourse that is not only convincing but also levelling, argued that striving for autonomy in professional practice is a grave mistake. He questioned why any profession would want to be truly autonomous, since seeking autonomy suggests arrogance and encourages potentially dangerous practice. The medico-legal issues surrounding ESP practice are grey and may well remain so until a legal test case occurs. ESPs must remember that they are responsible for their own practice; they should refuse to accept any delegated or assigned tasks that fall outside their personal competency framework. Moreover, case law dictates that if a defendant declares he or she has a particular skill and knowledge then it must be a proven skill; in the absence of this proof, a defendant is breaching his or her duty of care (Buttress & Marangon 2008).

4.3 How Far is Too Far?

The CSP referred to the four pillars of physiotherapy in its paper on scope of practice: massage, exercise and movement, electrotherapy, and kindred methods of treatment (CSP, 2008). This paper stated that it is an individual physiotherapist's responsibility to identify his or her own personal scope of practice, to work within those boundaries, and to demonstrate competence in the field. Physiotherapy practice must fall within one of these four pillars and it is the fourth pillar, kindred methods of treatment, which encompasses extended practice activity. Thus, if there is a body of evidence to support the task and the physiotherapist can prove his or her competence to undertake it, and if the task falls within one of the four pillars, then the physiotherapist is covered by public liability insurance, and he or she will be working within the scope of the profession. However, this is somewhat unhelpful because the four pillars of practice seem outdated when one considers how much extended practice roles have changed physiotherapy over recent years. In truth, this paper conveys little useful information for ESPs and merely advises them to contact the professional advisory board if they are unsure about their particular individual scope of practice. The CSP sees itself as the final arbiter of whether or not an activity is within an individual physiotherapist's scope of practice, and it was reassuring to discover that this guidance will soon be updated (Hunt, 2011).

Asking ESPs to establish how their practice relates to the principles of physiotherapy may be difficult because some extended practice activities bear little relation to physiotherapy principles. For example, Trueland (2009) described ESPs performing spinal nerve root and facet joint injections under an image intensifier (also described by Wells-West, 2012), requesting computerised tomography brain scans, and being trained to administer infusions of thrombolytic drugs in an emergency care setting. One has to question how such extended – practice activities relate to the principles of physiotherapy. These ESPs are practising neither physiotherapy nor medicine. ESPs cannot practise medicine because they are not doctors, so what exactly are they doing? It is at this point that one almost feels the need for a philosophical and legal discussion in order to clarify the whole concept of extended practice in the professions allied to medicine.

Physiotherapists may be extending their roles into a field of practice more usually covered by another non-medical heath care practitioner. McKiernan, Chiarelli & Warren-Forward (2011) surveyed physiotherapists' use of diagnostic US imaging, a skill traditionally associated with radiographers and sonographers. Email invitations to complete an online survey were sent to physiotherapists (n=483) who had attended US workshops at the University of Newcastle, Australia. Unfortunately, the response rate was poor (20.5%) and the sampling method was not ideal. However, the majority of respondents worked in the MSK field and had undergone some form of trainin, but in some cases, this had lasted for only a few hours. Most of the MSK physiotherapists were using diagnostic US imaging with biofeedback on the abdominal or back muscles to enhance rehabilitation methods; however, some of them were imaging the shoulder, hip, and elbow for diagnostic purposes. Despite the medico-legal implications, 32% of all respondents using diagnostic US imaging in their practice reported having had no training. Indeed, there are currently no specific training guidelines for physiotherapists using diagnostic ultrasound (Potter, Cairns, & Stokes, 2012).

It is possible that what is regarded as extended practice today will become part of standard practice tomorrow (Nightingale & Hogg, 2003; Eddy, 2008). In a description of his preferred interpretative approach to competence, Sandberg (2000, p.11) talked about workers' 'lived experience of work', and argued that workers' experience and ways of conceiving work define the competencies they go on to develop. Gutenbrunner et al. (2011) commented that clinical practice in physical and rehabilitation medicine (PRM) could vary among European countries, despite the existence of a European Board curriculum for PRM specialist certification; this could be due to a number of factors such as different health-care systems. Currie & Crouch (2008) queried whether role expansion could be taken too far. Is an ESP always going to be a physiotherapist with extended skills or will we see the ESPs of the future undergoing a metamorphosis and emerging as an entirely different health-care professional?

Pinder et al. (2005) used the term 'hybrid professional' to describe ESPs, and this seems to capture the very essence of extended practice. The expansion of extended roles for physiotherapists shows no sign of abating, and it does make one wonder what is happening to physiotherapy while some of the most skilled and experienced physiotherapists are busy 'extending' themselves. Rehabilitation and physiotherapy assistants, not to mention graduates from sports science degree courses, could move in and take over the bulk of routine physiotherapy work. Shields & Watson (2007, p.71) wrote about the rise of health-care assistants in nursing and referred to a potential demise of the nursing profession, which is 'haemorrhaging knowledge, skills and people from all sides'. Colyer (2004) warned of the dangers that health-care professions face from these innovative roles, remarking that a loss of professional identity may be the price these professions pay for their extended and advanced practice role development. However, these roles may threaten medicine as well; for example, Dowling, Barrett & West (1995) and Williamson (1995) questioned whether nurse practitioners would eventually make house officers' roles obsolete. This seems unlikely given that junior doctor posts form an essential part of post-qualification medical training. Nonetheless, extended practice roles can represent a double-edged sword for the health professions. Creating a ‘mini-medic’ model (Hutchinson et al., 2001) seems to do very little for the professions of origin. Instead, nurses and AHPs should be focusing on the unique skills that their professional backgrounds bring to these roles, instead of trying to medicalize them (Manley, 1996). At the end of the day, ESPs are physiotherapists, and it is difficult to see how striving to be pseudo-doctors can be beneficial to the profession as a whole, or to patient care. Castledine (1995) urged nurses to think in terms of becoming ‘maxi-nurses’ rather than mini-doctors’; he felt that it was important for nurses not to lose their fundamental nursing role. Perhaps the physiotherapy profession should heed his words and do the same.

4.4 What is known and where are the gaps?

The literature review uncovered evidence of a wide range of MSK ESP roles in the UK; it also revealed the prevalence of these roles in the US, Canada, and Australia. The majority of MSK ESPs in the UK work in hospital-based orthopaedic clinics as part of the wider orthopaedic team, and this no doubt reflects the early years of MSK ESP practice in the late 1980s. More recently, ESP services within emergency care minor injury units have become popular, and three of the four randomized trials found in the literature search concern MSK ESP practice in this setting. As expected, there is very little documented evidence concerning the MSK ESP role within primary or community-care settings. Differences in health-care systems make it difficult to compare UK roles with those abroad. Within the UK the exact nature and scope of MSK ESPs’ practice seems to vary considerably, making it hard to pool data or to draw meaningful conclusions regarding the effectiveness of these posts. Very few papers represented large-scale level I or II studies. Instead, there is a plethora of level III and IV evidence for the effectiveness of these roles. The commonest outcomes were patient satisfaction and the ability of an ESP service to reduce waiting times; the majority of studies demonstrated that ESPs could manage selected patients independently, thereby having a positive impact on waiting times for surgery. However, very few studies have attempted to address the cost-benefits of having a MSK ESP service adequately. A number of studies within the orthopaedic surgery field have compared ESPs’ performance (in terms of diagnostic accuracy and use of imaging modalities) with that of consultant or subconsultant grade orthopaedic surgeons – and the results are favourable. Patients' views have been sought, for example Reeve & May (2009), Anaf & Sheppard (2010), and Coyle & Carpenter (2011) and some papers have specifically examined doctors' views of MSK ESP roles, for example Milligan (2003), Ellis & Kersten (2001) and Dawson & Ghazi (2004).

Only two studies reported on doctors' views on the requisite training, education, and competency levels for MSK ESP practice (Carr & Gordon, 2001; Ellis & Kersten, 2002; Ellis, Kersten & Sibley, 2005). The majority of papers reviewed did not refer to training and education for ESPs, but those that did indicated that most of the training was delivered in-house and that it was mainly experiential in nature. There were exceptions, for example, Robarts et al. (2008) described a rigorous education programme that involved three months' training based on an orthopaedic surgical residency course. The literature review found no evidence of any competency framework for ESP practice, either in the UK or abroad, and this underpinned the need for the current study. Gilmore et al. (2012, p.54) commented that extending one's scope of practice has become commonplace despite the absence of 'appropriate processes'. They go on to state that extended scope of practice requires legislative change and 'some method of credentialing following additional training, competency development, and significant clinical experience'.

The physiotherapy profession has come a long way since four nurses founded the Society of Trained Masseuses in 1894 (Barclay, 1994), and the evolving scope of practice for MSK ESPs continues to push the profession's boundaries. Indeed, it seems that almost anything an ESP is trained and competent to perform will be considered within scope of practice by the professional body; it is as if the medico-legal implications of extended practice are acknowledged but not fully understood. With the scope-of-practice net now cast so wide, one cannot help but wonder what effect this is having on other professions. Furthermore, patients' views on extended practice roles have rarely been sought, and the effect of ESP practice on the physiotherapy profession as a whole has been overlooked. As more physiotherapists move into roles with an ever-increasing scope of practice, one wonders whether routine physiotherapy will become less attractive to junior physiotherapists entering the profession, or if those already in ESP roles are starting to feel deskilled. If ESPs continue to extend their practice then some of them may eventually experience burnout or decide to leave the profession to undertake medical training, where they will get more pay and recognition for doing some of the same work. Instead of breaking down professional boundaries, ESP roles may start to cause friction between the professions. It is essential to develop competency frameworks in order to regulate ESP practice. The next chapter introduces the Delphi method, its strengths and limitations, and some methodological considerations for the current study.

Chapter 5
The Delphi Method

5.1 Introduction to the Delphi Method

The aim of the current study was to engage medical MSK experts in a formal consensus exercise (the Delphi method) in order to reach a consensus view on the nature of the core clinical competencies required of MSK ESPs working in primary-care-based settings. The Delphi method is a ‘structured process for collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback’ (Ziglio, 1996, p.3). A key characteristic of the method is its use of experts, whose responses remain anonymous throughout a series of iterative questionnaire rounds. The controlled feedback during these rounds includes details of the collective group opinion, and it allows experts to either retain or amend their earlier opinions in light of information about other experts’ views. Given the ubiquitous influence of the Delphi survey in health-care research, it is interesting to learn that one of its early uses was in horse-race handicapping (Quade, 1967). However, its application in predicting future events was investigated even earlier by Kaplan, Skogstad & Girshick (1950) who posited, along with Dalkey (1969) and Holloman & Hendrick (1972) that decisions made by groups were superior to those made by individuals. Sahakian (1997, p.1) extolled the virtues of the Delphi method by commenting, ‘it shines when you use it on complex or ambiguous problems that exceed the capabilities of a single person’. In the 1950s, the intelligence think tank, RAND Corporation, developed Delphi for use in the US military and launched ‘Project Delphi’ (RAND Corporation, 2010). Its aim was to estimate preparedness for a Soviet attack on US soil. The project itself was classified, and the US Government delayed publication of the original paper Dalkey & Helmer (1963) because its results contained data relating to matters of national security. Mitroff & Pondy (1974) commented that it could be risky to base future decisions on expert opinion; however, expert opinion may be the best, and only, approach to a research problem.

Numerous authors have referred to Delphi as a methodology (Jairath & Weinstein, 1994a, 1994b; Buckley, 1995; Murry & Hammons, 1995; Keeney, Hasson, & McKenna, 2001; Baker, Lovell, & Harris, 2006). This is by no means a universal viewpoint (Stewart, 2001) and the literature is sprinkled with other terms; for example, survey, technique, process, method, and approach – or sometimes, simply 'Delphi'. Some researchers use Delphi to explore not only levels of agreement among experts, but also areas where they disagree. There has been an exponential rise in its use in health care over the last 20 years. It has been used to develop practice guidelines (Quintana et al., 2000; Hauser, Thieme, & Turk, 2010; Paikin & Crowther, 2010; Smolen et al., 2010; Avouac et al., 2011; Li-Yu et al., 2011) and its use in developing clinical guidelines has been reviewed (Murphy et al., 1998; Black et al., 1999). It has also been used to develop education curricula (Macdonald et al., 2000; Redman, Dollery, & Jordan, 2004; Kilroy & Mooney, 2007).

Its use in developing health-care competencies has been prolific since Dunn et al. (1985) extolled its virtues as a methodology well suited to the task; Table 5.1 gives some examples of such studies. What underlies the strength of Delphi in this field is the fact that the methods used to generate competencies are critical to their being accepted (Williams & Berry, 1999). Only a handful of studies have focused specifically on MSK clinical competencies. For example, Delphi has been used to define competencies in MSK ultrasonography for rheumatologists (Brown et al., 2005; 2006). Similarly, Ellis, Kersten & Sibley (2005) defined competencies in hand therapy for physiotherapists and OTs. In addition, Sizer et al. (2007) explored manual therapy competencies for physiotherapists, and Hay et al. (2007) used a Delphi survey to explore competencies for GPswSI in MSK medicine.

Table 5.1 Using Delphi to Investigate Competencies in Medicine

Baldwin et al. (1999)	'Consultant surgeons' opinion of the skills required of basic surgical trainees'.
Moercke & Eika (2002)	'What are the clinical skills levels of newly graduated physicians? Self-assessment study of an intended curriculum identified by a Delphi process'.
Boendermaker et al. (2003)	'Core characteristics of the competent general practitioner trainer: a Delphi study'.
Alahlafi & Burge	'What should undergraduate medical students know about psoriasis?

(2005)	Involving patients in curriculum development: modified Delphi technique'.
Perkins et al. (2005)	'The Acute Care Undergraduate TEaching (ACUTE) Initiative: consensus development of core competencies in acute care for undergraduates in the United Kingdom'.
Reetoo, Harrington & Macdonald (2005)	'Required competencies of occupational physicians: a Delphi survey of UK customers'.
Barrett & Bion (2006)	'Development of core competencies for an international training programme in intensive care medicine'.
Subbaroo et al. (2008)	'A consensus-based educational framework and competency set for the discipline of disaster medicine and public health preparedness'.
Singh et al. (2009)	'Core competencies for gynecologic endoscopy in residency training: a national consensus project'.
Hoyt et al. (2010)	'Nurse Practitioner Delphi Study: Competencies for Practice in Emergency Care'.
Rushton & Moore (2010)	'International identification of research priorities for postgraduate theses in musculoskeletal physiotherapy using a modified Delphi technique'.
Scott, Carson & Greenwell (2010)	'Disaster 101: A Novel Approach to Disaster Medicine Training for Health Professionals'.
Almoallim (2011)	'Determining and prioritizing competencies in the undergraduate internal medicine curriculum in Saudi Arabia'.
Lock (2011)	'Selecting examinable nursing core competencies: A Delphi project'.
Palter, MacRae & Grantcharov (2011)	'Development of an objective evaluation tool to assess technical skill in laparoscopic colorectal surgery: a Delphi methodology'.
Penciner et al. (2011)	'Using a Delphi process to establish consensus on emergency medicine clerkship competencies'.

Two other consensus-building methodologies were considered for the current study but were discarded in favour of the Delphi method: the NGT (Delbecq & Van de Ven, 1971), and the consensus development conference (Fink et al., 1984). A NGT involves a structured face-to-face meeting of experts. Individuals initially generate ideas in private. These ideas are then shared with the group in a round-robin fashion. A moderator then leads a group discussion in which ideas are presented and ranked. In a consensus development conference, a group of experts meet to consider evidence presented by other experts or interested parties who are not members of the decision-making group. The group members then retire to discuss the evidence and attempt to reach a consensus (Murphy et al. 1998). Jones & Hunter (1995) argued that although all three methodologies measured consensus, only the NGT and consensus conference developed consensus. They distinguished between consensus measurement (assessing the extent of agreement) and consensus development (resolving disagreement), and argued that because Delphi was the only one of the three methodologies not to include face-to-face interaction (which means there is no opportunity to resolve disagreements) it was therefore unable to develop consensus. However, a Health Technology Assessment review of these three consensus-building methodologies by Murphy et al. (1998) did not see fit to distinguish between the ability to measure or develop consensus. Furthermore, Linstone & Turoff (1975), in their authoritative work on the Delphi method, argued that consensus does not require full agreement among experts. A fourth consensus method, the RAND/UCLA appropriateness method combines expert clinical judgement with the current evidence (Fitch et al., 2001; Nair, Aggarwal & Khanna, 2011); it was not considered a viable option for this study because of the nature of the research question and the lack of available scientific evidence surrounding ESP roles. Table 5.2

Table 5.2 Methods of Formal Consensus

Consensus development method	Face-to-face contact	Structured interaction	Individuals make independent decisions prior to group discussion	Incorporates evidence	Involves questionnaires (mail, email or fax)
NGT	Yes	Yes	Yes	+	No
Delphi	No	Yes	Yes	+	Yes
Consensus development conference	Yes	No	No	+	No
RAND/UCLA appropriateness method	Yes	Yes	Yes	+++	Yes

Source: adapted from Nair, Aggarwal & Khanna (2011)

Delphi was the consensus method of choice for the current study primarily because it did not involve face-to-face contact of expert panellists. The PI wanted to recruit experts who were consultant surgeons and physicians, and senior physiotherapists in full-time clinical practice from across the UK. Experts were not required to meet in person and this conferred a number of advantages over the other methods. First, it meant that busy clinicians did not have to take time out of their clinical practice to attend a meeting; they could participate in the study at a time that suited them. Second, it meant that there were no geographical constraints on recruitment of experts. The fact that experts did not have to travel to attend a meeting was likely to enhance recruitment, and a UK-wide recruitment drive increased the likelihood of the results being generalizable. Third, it ensured anonymity of experts and their responses, and overcame the possibility that certain individuals could have felt intimidated in a face-to-face meeting; for example, the physiotherapists might have felt outnumbered by medical health-care professionals. Finally, not having a face-to-face meeting meant that there did not have to be an upper limit on the number of experts recruited into the study.

5.2 Delphi: Methodological Considerations

Delphi has been the subject of a number of books (Sackman, 1975; Adler & Ziglio, 1996; Sahakian, 1997; Linstone & Turoff, 2002). The flexibility and versatility of Delphi are said to be 'its power and its fallibility' (Gupta & Clarke, 1996, p.190). Mullen (2003) listed over 20 variations of the method in everyday use. Delphi researchers frequently modify the method to meet their needs, but this is probably the reason for the discredit levied against the Delphi method over the years. Hallowell & Gambatese (2010, p.1010) referred to its 'significant methodological diversity', but there are now so many modifications of the original Delphi that criticism of its lack of scientific rigour is commonplace; more often than not, such criticism is entirely justified. Even when researchers' implementation of Delphi is exemplary and they are careful to attend to the quality and rigour of the research process, they may still find themselves 'bearing the brunt of the new wave to denigrate Delphi as a methodology' (Jillson, 1975, p.222). Some authors, rather disparagingly, have referred to Delphi as a mere alternative to a committee meeting (Reid, 1988) and capable of nothing more than generating debate (McKenna, 1994); it has even been called 'a method of last resort' (Linstone & Turoff, 1975, p.573). It is unfortunate that there are no universally agreed standards relating to Delphi research and its implementation. The greater the departure from the theoretical underpinnings of the original method, the greater the need to consider validating Delphi results using another research approach (Kennedy, 2004). For example, Pitts, Rowley, & Sher (2005) produced a competency-based assessment tool for use in UK orthopaedic training using a

Delphi study. They then reviewed and tested their results using additional studies, thus demonstrating that their results were valid and reliable.

The purpose of a Delphi study is to 'elicit perceptions or judgements held by experts who are knowledgeable in a specialised area' (Vazquez-Ramos, Leahy, & Hernandez, 2007, p.112); in other words, it is suited to research problems that require the insight of experts in the field. It is also particularly useful where existing research is sparse or uncertainty exists (Whitehead, 1933; Churchman, 1948; Beech, 2001; Powell, 2003; Hardy et al., 2004). Delphi may also be the method of choice when a researcher is using a heterogeneous panel comprising experts from different professional backgrounds, or when the topic of investigation is controversial and the researcher anticipates conflicting opinions emanating from the panel. Delphi minimizes the effect of professional differences by eliminating 'interpersonal interactions as the controlling variables' (Goodman, 1987, p.729), while allowing each expert an equal chance to contribute. The anonymity conferred on experts is useful where hierarchical structures are present (as they are in health care) and the researcher wishes to prevent one professional group from dominating the others. It may be useful in drawing out contributions from people 'who would otherwise be quiet, reticent or timid' (Sahakian, 1997, p.4). It also avoids the need to bring experts together in a face-to-face meeting, which can be advantageous if available resources prohibit such expense, or experts cannot afford the time to travel.

Robson & Rew (2010) referred to the ability to proceed without experts needing to be together at the same time as 'asynchronicity'. It is a process which allows the researcher to engage more experts, and from more diverse geographical locations than could perhaps be managed at a face-to-face meeting. Thus, there can be practical and procedural advantages to using a Delphi study (Scheele, 1975). In practice, the decision to use Delphi often centres on the exclusion of viable alternatives. As with all research designs, researchers must justify their choice of methodology and consider other forms of group communication or consensus-building methodology before rejecting them in favour of the Delphi approach. Delphi may be the default position taken by the researcher because there is no ‘first best’ methodology available to answer their particular research question (Mead & Moseley, 2001). It is useful when there is a problem for which there is unlikely to be a straightforward or definitive answer. Indeed, Reid (1988, p.242) stated that Delphi should be used ‘where the problem being studied is not amenable to more standard approaches’.

Proponents of Delphi have argued that it is unhelpful for those coming from a positivist background to criticise the method for the lack of scientific method in its approach. The Delphi method, drawing on expert knowledge, should be viewed as a ‘valuable and underrated source of knowledge’ (Steurer, 2011, p.959). Numerous authors have argued that the positivist criticisms concerning Delphi are misplaced (Helmer, 1977; Keeney et al., 2001; Linstone & Turoff, 2002). Mullen (2003, p. 48) commented that it is ‘unhelpful to judge the validity of a particular Delphi from a research paradigm which is irrelevant to that particular application’. Delphi researchers would maintain that the main indication for using Delphi is where subjective judgement is seen as the only way to evaluate a problem (Skulmoski, Hartman, & Krahn, 2007), and that it achieves this through its ability to access the collective knowledge of professions, which is so often difficult to obtain (Stewart, 2001). Sprenkle & Piercy (2005) argued that Delphi is particularly good at bridging the gap between practice and research because its use of experts links it directly to practice.

Expert opinion is ranked low in the traditional hierarchy of evidence and is generally ‘discredited as a source of knowledge’ (Steurer, 2011, p. 959). Sackett, Strauss et al. (1998) defined expert opinion as low (level 5) evidence, although they supported clinical expertise as one of the three elements of evidence-based medicine. In order to deflect criticism from the higher echelons of the research world, Delphi researchers must do two things. First, they must be sure that Delphi is the best approach to use for their particular research problem and be able to defend their choice of methodology. Second, they must conduct their Delphi survey using the same high-quality standards of preciseness and rigour that researchers from a more traditional scientific background apply to their research. As Gugiu & Gugiu (2010) argued, well-executed studies that are not randomized controlled trials are often capable of producing stronger evidence than poorly conducted randomized controlled trials. Delphi is considered to be primarily qualitative in nature (Murry & Hammons, 1995; Rowe & Wright, 1999; Grisham, 2009), incorporating quantitative elements as each subsequent questionnaire round seeks 'quantification of earlier findings' (Powell, 2003, p.378). As a consensus-building methodology combining both qualitative and quantitative methodologies (de Meyrick, 2003), it straddles the divide between the two research disciplines (Critcher & Gladstone, 1998). Interestingly, Stewart (2001) argued that Delphi is fundamentally reductionist in nature because of the way it manages qualitative data, and that epistemologically, Delphi could be classified as objectivism or constructionism (Linstone & Turoff, 1975).

Black et al. (1999, p. 237) said that consensus development was not a scientific method aimed at creating new knowledge because it 'merely makes the best use of available information, be that scientific data or the collective wisdom of the participants'. Although it is true to say that Delphi produces a snapshot view of knowledge representing one point in time (Robson & Rew, 2010) or informed opinion 'at the time of the research' (Everett, 1993, p.182), it is not true to say that Delphi methodology never produces new information. Evidence-based medicine incorporates clinicians' judgements and experience, and must use the most appropriate approach to answer the clinical question (Sackett et al., 1996). However, researchers must consider carefully the type of knowledge produced by Delphi methodology. Delphi is concerned with opinion-based knowledge, which Delphi researchers cannot predicate as the truth. Murray (1979, p.157) said that 'the probability of truth of a statement of knowledge is greater than that of a statement of opinion which in turn is greater than that of a statement of speculation'. While Fish & Busby (2005) felt that expert opinion garnered a relative truth, Sprenkle & Piercy (2005) argued that the Delphi method is more concerned with the application of useful knowledge than with truth. In a paper challenging traditional beliefs about the certainty of knowledge generated by qualitative and quantitative research, and the known complexities of knowledge generated by qualitative research, Cutcliffe & McKenna, (2002, p.617) concluded that 'knowing in the quantitative paradigm does not appear to be as concrete as some might wish to believe'. Stitt-Gohdes & Crews (2004) stated that inappropriate use of Delphi methodology, where another method would have been more suited to the task, is likely to result in failure. However, researchers' poor application and execution of the Delphi method continue to feed its critics. Green et al. (1999) expressed concern about an apparent lack of attention to Delphi's epistemological origins, and commented that it was erroneous to present qualitative data in a quantitative form and to expect to preserve its qualitative elements. However, the majority of Delphi researchers have no problem with Delphi producing 'quantitative results from the qualitative beliefs of the panel' (Robson & Rew, 2010, p.231).

Questionnaire and survey design are notoriously difficult to do well, and data from poorly constructed studies is poor evidence on which to base future decisions (Desselle, 2005). Linstone & Turoff (2002) considered Lockean inquiry to be the philosophical basis underpinning Delphi methodology; others felt that it builds on the Lockean notion of the function of the human experience and agreement as the basis for truth (Mitroff & Turoff, 1973). Mitroff & Pondy (1974, p.472) called Lockean inquiry 'the epitome of inductive experiential systems' because it presupposes that data have to be collected before their meaning can be understood, and that collection of data can precede the building of theory. The conclusions drawn from Lockean inquiry are considered objective if they are agreed by others. Thus, Mitroff & Pondy (1974, p.473) called the original Delphi methodology 'as pure and perfect a Lockean procedure as one could hope to find'. They argued that a Kantian Delphi might be more suited to problems where it is acceptable simply to explore a subject area and elicit as many different opinions as possible. They added that a Kantian Delphi suited problems that are poorly defined, whereas a Lockean Delphi is more suited to a well-structured problem where there is already a degree of consensus. Whatever the type of Delphi used, few would argue with Powell (2003, p.381), who stated that Delphi represents 'expert opinion, rather than indisputable fact', or with Robinson (1991, p.337) who called the results of a Delphi 'group judgements, not assumed facts'. Some of the characteristics of Delphi (the use of experts, panel size and composition, anonymity, the iterative feedback process during questionnaire rounds, and consensus setting) will be discussed in chapter 10.

5.2.1 Validity

Williams & Webb (1994) argued that if experts are well matched to the topic being studied then face validity will be high, and if consensus is reached there will also be high concurrent validity. Some authors consider that using experts automatically conveys a degree of reliability and validity to Delphi research (Bardecki, 1984; Goodman, 1987; Parente & Anderson-Parente, 1987). Sackman (1975) seemed intent on discrediting Delphi, arguing that non-experts provide opinions that are indistinguishable from experts' opinions. Many will disagree with this view because if the subject matter is highly specialized then non-experts cannot possibly provide the same level of knowledge as experts. A clear decision trail detailing all methodological and analytical decisions made during a Delphi study is highly recommended because it is important to conduct Delphi research with rigour, in order to assuage the criticism so often directed its way. The arguments about validity and reliability, which continue to surround Delphi, will not go away if Delphi researchers fail to do this. The critical attack on Delphi's perceived lack of methodological rigour by Sackman (1975) did not deter Jones & Hunter (1995) from proclaiming it a viable alternative to a meta-analysis, and for arguing that such criticism results from poor-quality studies rather than an inherent weakness in the methodology itself. Scheele (1975, p.219) acknowledged that Delphi studies were often conducted badly but commented that 'rigor may better be applied not to improving the Delphi procedures for their own sake but to the study of how results are produced by the technique'. Keeney et al. (2001) advised Delphi researchers to consider transferability, credibility, applicability, and the ability to confirm Delphi results. The term 'accuracy' sometimes replaces validity in the Delphi literature, although this seems to be a throwback to Delphi's early days as a forecasting tool. In summary, Delphi researchers must be clear about their knowledge claims in order to try to deflect any criticism from positivist researchers.

The raw data in a Delphi study represent expert opinion, and the validity of the findings is really a measure of the consensus reached and the appropriateness of the expert panel for the matter under investigation. De Loe (1995) thought that Delphi studies would benefit from being combined with other approaches, for example, by replacing the second questionnaire round with in-depth interviews (Tapio, 2003). Others have attempted to validate their Delphi results with other methodologies; for example, Taylor et al. (2009) conducted two consecutive online Delphi surveys with two different expert rheumatology panels (they used a different panel for the second round of their Delphi survey). The first Delphi expert panel comprised rheumatologists with an interest in gout and the second Delphi panel involved rheumatologists who had published in the research field. Their study then culminated in a face-to-face meeting of a third group of experts and used a ‘cognitive mapping’ process within a modified NGT. A further single survey identified patients’ views. They did not explain the reasoning behind their approach but argued that because they had used a number of information sources, they had ‘strengthened’ their study’s design; this argument seems justified because they were testing their findings by using two different panels and a post-Delphi meeting of experts to review the final Delphi results. Others have combined Delphi with NGT (Cantrill, Sibbald, & Buetow, 1998; Daykin et al., 2002; Evans et al., 2004), most likely in an attempt to bolster the validity of their findings. More recently, Landeta, Barrutia & Lertxundi (2011) proposed a new methodology, the hybrid Delphi, a combination of Delphi, focus groups, and NGT.

Numerous researchers aim to test their Delphi results, particularly when they have deviated from the original Delphi design, using some other means or alternative methodology (Skulmoski et al., 2007). For example, a post-Delphi consensus conference or meeting of experts (Hay et al., 2007), face-to-face interviews (Dawson & Barker, 1995), focus groups (Koekkoek et al., 2009) or a follow-up narrative analysis (Kennedy, 2004). Few Delphi researchers take steps to evaluate or refine their findings and enhance external validity in this way. Using a comparable expert panel concurrently, or at some later point in time, to test Delphi results would necessitate setting up the two panels at the outset in order to avoid selection bias. As stated earlier, documenting a detailed and transparent audit trail throughout the research process will help to improve the methodological rigour and resultant trustworthiness of the final recommendations of a Delphi study (Rodgers & Cowles, 1993; Tobin & Begley, 2004; Koch, 2006).

Many Delphi researchers fail to discuss the generalizability of their results adequately, although some of the larger international studies that have used Delphi to formulate practice guidelines are producing findings that are generalizable to the wider community of clinicians (Sermet-Gaudelus, Mayell, & Southern, 2010; Smolen et al., 2010; Avouac et al., 2011). However, there may be a need for local interpretation, as Mackway-Jones, Carley & Robson (1999) stated in their Delphi study looking at major incident planning for child casualties in an accident and emergency department.

Consensus is not necessarily synonymous with agreement. The extent to which individual experts agree with a particular issue and the extent to which they agree with one another may differ (Evans, 1997). Scheibe, Skutsch & Schofer (1975) argued that examining the distribution of responses is important because group agreement may not be as strong as it appears. The importance of extremes of opinion was highlighted by Linstone (1975) and Sackman (1975), who both argued that outlying opinions were worthy of further study. Minority viewpoints may yield new information; they could be providing the ‘right’ answers in the face of strong opposition from the wider group. The strength of group opinion is considered the final arbiter of most Delphi studies: ‘the best argument should win’ (Tapio, 2003, p.85). However, the researcher can allow the minority viewpoint to be heard by using a system of analysis and feedback that does not mask extreme views (Rudy, 1996). Conversely, Scott & Black (1991) claimed that it is reasonable to disregard extreme or outlying views because the overall aim of a Delphi is not to judge the validity of views or the validity of any consensus view reached, but to identify areas of agreement. Delphi researchers argue that Delphi panellists are experts in the field under investigation, in the hope that this may help to assuage critics’ concerns about the validity and truth of Delphi outcomes; it rarely does.

5.2.2 Reliability

Williams & Webb (1994) stated that there was no evidence that the Delphi method was reliable. A different expert panel may produce a different set of results, even if both panels are provided with the same Delphi survey questionnaires under identical conditions (Goodman, 1987). This points to the subjective nature of

Delphi data and also raises questions about the generalizability of Delphi's results (Reid, 1988). The data from Delphi studies are essentially subjective in nature and critics' concerns over reliability issues in the Delphi methodology are therefore understandable (Sackman, 1975; Rowe, Wright, & Bolger, 1991; Williams & Webb, 1994; Hasson, Keeney, & McKenna, 2000). Reliability or reproducibility could be tested by replication of a Delphi study with a similar group of experts under the same conditions. However, Grisham (2009) felt that even this might not result in the same outcome. One study specifically addressed the reliability issues inherent in Delphi methodology (Duffield, 1993) and was able to demonstrate 93% agreement between two separate Delphi panels, even though they differed slightly in composition and size. Ono & Wedemeyer (1994) looked at the accuracy of predictions made by a Delphi study conducted 16 years earlier and discovered that the earlier study's findings were accurate in terms of forecasting events and trends in the communications field. Ament (1970) found a similar level of accuracy in their study comparing Delphi forecasting studies in 1964 and 1969. Quintana et al. (2000) looked at results from two parallel Delphi panels and a test-retest performance of one panel; they found a high degree of consistency between both panels' results, and test-retest consistency in the main panel.

5.3 Summary

While one has to concede that there are a number of unresolved issues with Delphi methodology, its use in the health-care field continues to be widespread. The next chapter describes the three phases of the Delphi survey used in this study. In a typical Delphi survey, the first questionnaire's results generate the second questionnaire round, the results of which then generate the third questionnaire round and so on, across rounds. Therefore, the next three chapters present the research process as it occurred in practice.

Chapter 6
The First Questionnaire Round

6.1 Introduction

The Delphi process used in this study included three rounds and Table 6.1 describes each step of the process. This chapter describes the first Delphi round. Details regarding recruitment of the expert panellists and ethical considerations are presented, and then the design and development of the questionnaire used in the first questionnaire round is discussed with reference to SurveyMonkey. Finally, the methodology used to analyse data and results for round one are presented.

Table 6.1 The Steps of the Delphi Process

1. Defining the research project.
2. Recruitment of experts.
3. Development of first questionnaire and round one pilot study.
4. Dissemination of first questionnaire and data collection.
5. Analysis of round one data.
6. Development of second questionnaire and round two pilot study.
7. Dissemination of second questionnaire and data collection .
8. Analysis of round two data.
9. Development of third questionnaire and round three pilot study.
10. Dissemination of third questionnaire and data collection.
11. Analysis of round three data.
12. Final report fed back to experts.

The National Research Ethics Service advised that the study did not require ethical review by an NHS Research Ethics Committee. The University of Salford ethics committee granted ethical approval for the study and Greater Manchester Primary Care Research Governance Partnership granted research governance approval. It was important to protect the anonymity and confidentiality of the research participants, and this is discussed later in this chapter.

6.1.1 Consent

The information letter soliciting prospective expert participants' involvement in the study contained information detailing how data would be handled and stored throughout the project. It informed experts that they would be completing the Delphi questionnaires online and that the Web survey host, 'SurveyMonkey', would be used to administer the questionnaires (SurveyMonkey, 2011). Experts were informed that they would be able to print the survey, complete it by hand, and then return it by post or facsimile if they so wished. Some studies have suggested that response rates for online surveys are inferior to other methods such as post, telephone, or facsimile (Cook, Heath, & Thompson, 2000; Manfreda et al., 2008; Shih & Fan, 2008). This could be due to poor design on the part of the researcher (Kaplowitz, Hadlock & Levine, 2004) or because recipients' Internet security identifies the incoming email as 'spam' (Sills & Song, 2002). Researchers usually offer a choice of two or more modes of dissemination in an attempt to combat non-response (Dillman, 2007), and a mixed-mode strategy seems to improve overall response rates (Dillman et al., 2009). It can be difficult to ensure informed consent in the absence of a face-to-face meeting (Eynon, Fry, & Schroeder, 2008). In this study, as with other online studies (Chou, Boldy, & Lee, 2002; Alahlafi & Burge, 2005; Farley, 2005; Holmes, 2009; Mostofsky et al., 2010; Webster et al., 2010) it was decided that consent was implied when experts responded by email to inform the PI that they were agreeing to participate in the study. The University of Salford's ethics committee approved this decision. Potential expert participants were encouraged to contact the PI by email or phone if they had any queries about the research.

6.1.2 Confidentiality and Anonymity

Individual experts were directed to the secure ‘SurveyMonkey’ host website through a hyperlink embedded in a personalized email. Using an embedded URL link avoids the risks associated with ‘digital pathogens’, which can occur when downloading infected material from the Web (Duffy, 2002). Experts were contacted via their preferred email addresses, using an NHSmail email account. NHSmail is the secure email and directory service for all NHS staff in England and Scotland; it is the only email system recommended for transferring patient data. It was not considered appropriate to use the PI’s work email address and there were fears that emails sent through a personal yahoo email account might appear unprofessional even if they were not treated as unsolicited mail by spam filters operating at the receiving end. All the survey results were stored on the ‘SurveyMonkey’ website and only the PI could access this data, using a unique username and password. Security was heightened by using a professional subscription to the site. This provided the enhanced security option, SSL encryption, which is the same system used in online banking. It ensured URL link encryption and meant that both the URL link and the survey Web pages were protected throughout all stages of communication and data transmission between the PI and respondents.

Experts’ individual responses were treated as confidential; neither their participation nor the information they provided was revealed to a third party. Experts were guaranteed anonymity during the data collection and report-writing phases, and in any future publication. The identity of the experts was protected by using the blind carbon copy method when group emails were necessary. Using a URL link embedded in a personalized email will return anonymous responses to the ‘SurveyMonkey’ website. Thus, in order to follow up non-responders, the PI had to know the identity of each respondent; experts were informed that they would be assigned a unique identifying code number known only to the PI.

6.2 The Expert Panel

6.2.1 Recruitment of Experts

Recruitment focused on seven professional groups known to demonstrate expert knowledge in the MSK field: orthopaedic surgeons, rheumatologists, neurologists, neurosurgeons, rehabilitation medicine doctors, GPswSI in MSK medicine, and MSK physiotherapists. Potential participants were contacted via the relevant professional organizations and special interest groups (Table 6.2). Special interest groups within professional organizations are established because of a perceived need of a certain group to protect an exclusive body of knowledge or professional practice. This approach to recruitment, referred to as 'sponsorship by legitimate authority' (Dillman, 2007, p.20) was the preferred method because it conferred approval of the study from an authoritative source, and might have improved recruitment.

This study required clinical experts - medical consultants in full-time clinical practice, GPsWSI in MSK medicine, and MSK ESPs – but in order to satisfy the study's inclusion criteria, they were still required to check their own eligibility to take part in the study. No exclusion criteria were specified but experts were required to fulfil three of the essential criteria and one of the desirable criteria listed below.

The essential criteria were as follows:

- be willing to complete an online questionnaire
- be a consultant medical practitioner in one of the following five professional groups: orthopaedic surgery, rheumatology, rehabilitation medicine, neurosurgery, or neurology OR be a GPwSI in MSK medicine OR a MSK ESP
- be committed to the project for its duration

The desirable criteria were as follows:

- be involved in MSK education and teaching
- have experience of working with an ESP

A key person within each professional organization was identified from contact details provided on the organizations' websites. Table 6.2 lists the names of the professional organizations and special interest groups that were approached, and provides the job titles of the key persons in each group. Each key person was contacted by email (Appendix I) to seek their approval to send more information about the study, and to enquire if they would be willing to forward this to potential expert participants on behalf of the PI. This additional information was contained in a letter of invitation, which outlined the aims of the study (Appendix II).

Table 6.2 Professional Organizations or Special Interest Groups, and Key Person/s Involved in Recruitment

Professional expert group	Professional representative body	Key person	Snow-balling	Other methods
Consultant rheumatologists	British Society of Rheumatology (BSR) www.rheumatology.org.uk	Senior Communications Officer and Head of External & Clinical Affairs	Yes	BSR Newsletter (September 2009)
Consultant orthopaedic surgeons	British Orthopaedic Association (BOA) www.boa.ac.uk	PA to the President & CEO	Yes	No
Consultant neurologists	Association of British Neurologists (ABN) www.theabn.org	Administrative Secretary	Yes	ABN Newsletter (November 2009)
Consultant neurosurgeons	Society of British Neurological surgeons (SBNS) www.sbns.org.uk	Senior Administrator	Yes	No
GPs with a special interest in MSK medicine	Primary Care Rheumatology Society www.pcrsociety.org.uk	Senior Administrator	No	No
Consultants in rehabilitation medicine	British Society of Rehabilitation Medicine (BSRM) www.bsrm.co.uk	Executive Secretary and Chair of the Research & Clinical Standards Committee	Yes	No
ESPs	CSP special interest group (ESP CIOG) www.esp-physio.co.uk	Administrative Co-ordinator	No	No

All key persons agreed to email this invitation letter to potential experts, although for two of them this meant having to approach another individual or subcommittee member within the organization for approval. In two of the organizations, the key person (whom the PI initially contacted) gave this responsibility to another key person who held a position of authority. The key persons approached members who fulfilled the inclusion criteria and who were likely to be willing to take part in the study; prospective expert participants were requested to email the PI directly if they were willing to participate.

The PI had little involvement in the recruitment process because the key persons were responsible for identifying, nominating, and contacting potential research participants. There was no way of knowing how many of their members the key persons contacted during this phase of recruitment, but they were aware of the target sample population in each group (n=5). For the most part, experts' identities remained concealed but in some cases, the key person included the PI in the group email soliciting selected members' involvement in the study. If targeting selected members in this way had resulted in the recruitment of too few experts then the key persons had agreed to disseminate the invitation email to a wider group of members, until the required sample size was obtained.

Some individuals who had already agreed to take part encouraged their colleagues to volunteer, which led to additional 'snowball' recruitment of consultant neurologists, consultant neurosurgeons, and consultant rheumatologists. Using a 'snowballing' technique (Lincoln & Guba, 1985; Patton, 1990; Petersen & Valdez, 2005; Valente & Pumpuang, 2007; Penciner et al., 2011, Lakke et al., 2012) is a conventional approach to recruiting experts in Delphi research, but it can lead to selection bias because of its unrepresentative approach (Steurer, 2011; Izal et al., 2009). However, some authors consider 'snowball' samples to be more representative, particularly when the target population is difficult to access (Wright & Stein, 2005). Two local universities also participated in this 'snowballing' process by contacting experts (rheumatologists, orthopaedic surgeons, neurologists, and neurosurgeons) who were either full-time or honorary lecturers involved in their MSK education and research programmes.

On the advice of the key person at The Society of British Neurosurgeons, the PI arranged to meet with a team of neurosurgeons in the North West in order to facilitate recruitment from within this professional group, although this risked biasing recruitment to the North West region. As advised by both The Association of British Neurologists and The British Society for Rheumatology, the study was advertised in relevant professional newsletters (Appendices III & IV).

Two months were allocated for the recruitment phase but recruitment took longer than anticipated, possibly because it took place over the summer holidays. Consequently, the recruitment phase was extended for an additional two months (from early July 2009 through to the end of November 2009). Some expert groups were initially slow to respond, which necessitated follow-up emails and the occasional phone call to the key person involved. Experts who had already been recruited received a monthly progress report in an attempt to minimize attrition rates before the study began. By the end of November 2009, recruitment was still slow in the rehabilitation medicine group (fewer than five experts had volunteered), but recruitment had been continuing apace in the other groups. The recruitment phase did not result in proportional representation from the MSK experts. However, the sample size in a Delphi study is based not on a power analysis but on group dynamics, and so there is no requirement for Delphi to use groups of equal size within a heterogeneous expert panel (Okoli & Pawlowski, 2004).

6.3 The First Delphi Questionnaire Round

6.3.1 Development of the First Questionnaire: Content and Design

The aim of round one was to identify potential competencies for further evaluation in succeeding rounds. A number of documents and papers guided the development of this first, unstructured questionnaire round. For example: *The Competence and Curriculum Framework for the Physician Assistant* (DH, 2006b); *Specialist Training in Trauma and Orthopaedics* (Pitts et al., 2009); GMC specialist training curricula (GMC, 2012); two documents relating to specialist GP MSK curricula (Hay et al., 2007; Wise et al., 2007; and Woolf, Walsh & Akesson 2004). This first questionnaire (Appendix V) comprised six main competency themes: history-taking skills; physical examination skills; methods by which these skills should be taught and assessed, and any barriers to skills acquisition; the requisite underpinning knowledge; methods by which this knowledge should be acquired and any barriers to knowledge acquisition; and important personal attributes, such as attitudes and behaviours. Experts were asked to consider a range of MSK presentations - in particular, ‘the ability to distinguish between common minor complaints and uncommon serious conditions’, which Margham (2011, p.657) described as one of the basic tenets of general practice. These presentations included: common MSK conditions; more complex MSK conditions, which require a medical opinion (for example, non-MSK conditions presenting as MSK problems or MSK signs and symptoms associated with underlying pathology or systematic disease); chronic spinal, and widespread or generalised MSK pain presentations; and ‘red flag’ presentations which require urgent, or immediate referral to specialist medical care. Questions relating to knowledge covered anatomy and pathophysiology, management strategies (for acute, chronic and clinically urgent MSK presentations), and diagnostic imaging and other investigations. A demographic data section was included at the end of the questionnaire, which included questions relating to experts’ locations (town or city), places of work (Acute Hospital Trust or Primary Care Trust) and specialist fields of interest. It also asked for information about experts’ experience of working with an ESP and their involvement in MSK education and training. Finally, experts were asked if they were willing to be contacted by phone if the PI had a query regarding any of their answers.

A number of papers and key texts relating to questionnaire and survey design were used as reference material during the development of the first online questionnaire (Couper, Traugott, & Lamias, 2001; Crawford, 2002; Schonlau, Fricker, & Elliot, 2002; Sills & Song, 2002; Crawford, McCabe, & Pope, 2005; Dillman, 2007; Reynolds, Woods, & Baker, 2007; Sue & Ritter, 2007; Austin, Richter, & Reinking, 2008; Gordon & McNew, 2008). The ‘SurveyMonkey’ website provides its own manuals and tutorials on survey design, together with specific guidelines relating to the design of online questionnaires and tips for improving response rates. The website also provides a number of sample design templates, which can be adapted for immediate use. A number of publications were found that provided useful tips on how to enhance questionnaire and survey response rates among physicians and surgeons (Cook et al., 2000; VanGeest, Johnson, & Welch, 2007: Sprague, Quigley, & Bhandari, 2009; Thorpe et al., 2009). The questionnaire was kept relatively short because there is some suggestion from a meta-analysis of email surveys that the number of questions and response rates in online questionnaires and surveys are negatively correlated (Sheehan, 2001; Leece et al., 2004). The design of the questionnaire was kept as simple as possible because of concerns about technical issues, such as the additional download time required for complex graphics, and capabilities of different web browsers and hardware platforms.

6.3.2 Pilot Study and Final Questionnaire Production

The first draft of the questionnaire was piloted with a group of 10 individuals, comprising three osteopaths, two MSK ESPs, a consultant rheumatologist, a consultant orthopaedic surgeon, a GPwSI in MSK medicine and the PI's two research supervisors. Piloting of questionnaire rounds is considered important because it supports the involvement of stakeholders and guides the Delphi process (Clibbens, Walters, & Baird, 2012). The aims of the pilot study were threefold: first, to highlight any ambiguity in the wording; second, to ensure that respondents would be able to navigate easily through the online medium; and third, to expose any software or hardware problems. It was important to test the survey on different computers (for example, personal computers and Apple Macs), with different Internet connection speeds, and with a variety of Internet browsers, providers, and screen settings. Certain design features built into the questionnaire also needed testing; for example, the formatting was set up in such a way that respondents could not continue with the questionnaire if they skipped a question. This design (which also featured in the two questionnaires that followed) took some time to perfect and, although some researchers prefer to use a 'choose not to answer' option (Cooper, 2001), it was important to try to discourage incomplete returns. A fourth aim of the pilot study was to find out how long it took to complete the questionnaire, in order to apprise experts of this information. Comments and suggestions received from individuals involved in the pilot study led to a number of amendments to the first draft, and after a second pilot study no further amendments were needed.

6.3.3 Questionnaire Dissemination and Data Collection

One week before disseminating the first Delphi questionnaire, all the experts received a pre-notification personalized email, as recommended by Mehta & Sivadas (1995) and Dillman (2007). In a meta-analysis of online surveys, Cook et al. (2000) found that the number of pre-contacts, personalized contacts, and the number of contacts overall were associated with higher response rates. A similar review by Sheehan (2001) concurred with these findings and concluded that follow-up contacts had the most positive influence on response rates.

One week after receiving the pre-notification email experts received another personalized email containing a unique URL link, which directed them to the 'SurveyMonkey' website and the front page of the first questionnaire. The covering email (Appendix VI) asked experts to contact the PI if they experienced any problems either accessing or completing the questionnaire, and advised them that it would take no more than 30 minutes to complete. Experts were requested to complete the questionnaire within four weeks and were advised that a first 'reminder email' would be sent to non-responders after two weeks, followed by a second 'reminder email' a few days before the expected completion date. In this first questionnaire round (and in the two that followed) experts were required to answer questions by clicking on radio buttons and entering free-text comments. An interactive, page-by-page, single-item screen approach was used to navigate through the survey (Peytchev et al., 2006). A progress indicator (Conrad et al., 2003) was aso used in the hope that it would motivate respondents to complete the questionnaire. All responses were stored on the 'SurveyMonkey' website, which collected the returned questionnaires. All experts, on completing their questionnaires, received a personalized email thanking them for their time and involvement in the study. One expert chose to print the Delphi questionnaire and return it by post, requiring data to be entered into the 'SurveyMonkey' website by the PI.

6.4 Analysis of Round One Data

6.4.1 Organizing the Raw Data

Responses from the 'SurveyMonkey' website were downloaded into an Excel spreadsheet and then into a word document, in order to reorganize the verbatim data into manageable sections for further analysis. Familiarity with the data during this stage was achieved by reading and re-reading it in order to identify recurring categories. The data were reorganized in such a way that all responses were brought together under the six key themes of the questionnaire. All identifiable information was removed and participants responses were allocated a study code which indicated the professional group, for example, RHEUM/000047, ORTHO/000038, and GP/000071. Data were then ready for the coding phase using content analysis; this phase involved the PI and two ESP colleagues.

6.4.2 Content Analysis

Content analysis is 'the systematic, objective, quantitative analysis of message characteristics' (Neuendorf, 2002, p1). Its key feature involves the reduction of text into fewer, more manageable content categories (Weber, 1990; Krippendorff, 2004). Researchers tend to use content analysis either in a quantitative (deductive) or in a qualitative (inductive) manner when attempting to answer research questions, test hypotheses, or generate theory (Cavanagh, 1997; Elo & Kyngäs, 2008). The quantitative approach focuses on the number of times each category occurs, and the frequency of occurrence of items in each category (Silverman, 2006); in other words, it is a way of 'categorizing data into elements that can then be counted and converted into frequencies to identify dominant issues' (Pope & Mays, 2006, p.149). Qualitative content analysis has been described as 'a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns' (Hsieh & Shannon, 2005, p.1278). A true qualitative approach moves away from manifest content to an analysis of latent content, which requires the analyst to seek nuances embedded within the text (Downe-Wamboldt, 1992; Boyatzis, 1998; Giacomini & Cook, 2000).

There are no set rules regarding the use of content analysis, which led Weber (1990) to declare that there was no right way to do it. Categories are usually decided prior to data collection, but emergent coding (which takes place after data collection) can also be used (Neuendorf, 2002). The challenge of content analysis is to reduce data while retaining the essence of the original text, thus ensuring nothing of importance is lost; in practice, a combined qualitative and quantitative approach is often used. The content analysis used in this study involved inductive coding because units of text emerged during data collection; however, there was a stronger element of deductive coding of manifest text, because the themed structure of the first questionnaire introduced *a priori* coding.

Content analysis relies on face and content validity. Although there is no doubt that the perspectives of both the PI and research participants influenced results, external validity is an important consideration. Both reliability and validity are highly desirable qualities, perhaps more readily associated with quantitative research. This led Morse et al. (2002) to comment that researchers who continue to refer to reliability and validity when discussing qualitative research are now in the minority. In qualitative studies the concept of 'trustworthiness' tends to be used as a measure of rigour (Guba, 1981; Lincoln & Guba, 1985). This is an important concept, as is the need to keep detailed records of each stage of the analysis (Malterud, 2001). Researchers should try to 'leave a trail of data and analysis that another investigator could potentially follow' (Giacomini & Cook, 2000, p.360). The content analysis in the current study was conducted while keeping thoughts of credibility, dependability, and transferability ('trustworthiness') in mind (Graneheim & Lundman, 2004). Throughout the content analysis stage, the PI retained copies of consecutive re-analyses of the raw data set in order to retain documentation of the reasoning processes behind the decisions made during the data reduction process.

6.4.3. Pilot coding

Two MSK ESPs assisted with the content analysis of raw data collected in round one. These ESPs worked alongside medical consultants in hospital-based orthopaedic and rheumatology clinics, and they both had a Master's degree in advanced practice. The first questionnaire generated a large amount of raw textual data and so a coder-independent rule system was used as recommended by Krippendorff (2004), in order to minimize the subjectivity of coding and to ensure inter-coder reliability. The definition of a descriptive code (or unit of text) in this study was the one given by King (2004, p. 257): ‘a label attached to a section of text to index it as relating to a theme or issue in the data which the researcher has identified as important to his or her interpretation’. The three coders (the PI and the two ESP research assistants) agreed that units of text would be words, phrases, verbatim sentences, and paragraphs with similar meanings. All units of text were to be extracted, regardless of the number of times they occurred.

High inter-coder reliability is an essential minimum standard for content analysis (Weber, 1990; Neuendorf, 2002). It is the extent to which classifying the content of text produces the same results when the same text is analysed by more than one coder. It was important to ensure that the three analysts in this study were approaching the coding of text in the same way. Therefore, the inter-coder reliability was tested by piloting the coder-independent rule system on sections of the raw data. This led to refinements of the rule system: if the three coders could not agree on the inclusion of a particular unit of text, then they would accede to the majority view. Inter-coder reliability was not measured statistically because the appropriateness of inter-rater reliability testing in qualitative analysis has been questioned (Armstrong et al., 1997); furthermore, a number of qualitative researchers have voiced their disapproval of the use of quantitative measures of reliability in qualitative research (Sandelowski & Barroso, 2003; Harris, Pryor, & Adams, 2006). At the end of this informal reliability-testing process, the inter-coder reliability was deemed acceptable by all three coders and the extraction of units of text commenced.

6.4.4 Coding I: Extracting Units of Text

The aim of this phase was to extract all units of text from the raw data (which were organized into the six key themes of the first questionnaire) that were relevant to the research question. The raw data were contained in a 145-page document, which amounted to approximately 24,000 words of text. The three coders initially worked independently and coded sections of the whole text in three stages. Questions one and two, followed by questions three and four, and then questions five, six, and seven were reviewed over an eight-week period. The three coders highlighted units of text (including all duplications and repetitions) that were to be taken through to the next phase of the content analysis. The coders met face-to-face at the end of each phase to compare results. The level of disagreement was low, and mainly concerned synonyms or phrases with similar meanings. The coders did not attempt to interpret the data but a number of ambiguous statements required further discussion, and this resulted in the coders agreeing to reassign some units of text to one of the other six themed categories; where data reassignment took place, placement did not occur in more than one category simultaneously. Krippendorff (2004) emphasized that categories should be mutually exclusive and exhaustive; in other words, data should not occupy more than one category, and where data fall between categories, a new category should be created. The coders found no need to create any new categories in this study since the six themes included in the questionnaire accommodated all units of text.

6.4.5 Coding II: Reducing the Data

The PI conducted the next phase of the content analysis without the help of the two ESPs. Initially, all units of text highlighted by the three coders in the first phase were extracted from the raw data and were then listed under the six predetermined themes. The next stage involved collapsing the units of text into a more manageable number. This meant managing duplications and repetitions in the data by introducing frequency counts (the number of times identical units of text or units of text with similar meanings appeared). The aim of this stage of the content analysis was to produce a list of competencies for evaluation by the experts in subsequent questionnaire rounds. Frequency counts were used more to ensure that no data were lost during the analysis process than to indicate the level of importance of different units of text (Table 6.3). The use of frequency counts with qualitative data is far from clear in the literature. Stemler (2001) questioned whether it was right to assume that words mentioned most often were truly representative of the most important issues, and cited synonyms and homonyms as two examples of confounding factors in content analysis. Morgan (1993) commented that many qualitative researchers have reservations about counting codes because they feel that they are meaningless in the absence of a random sample, although he also argued that frequency counting enhanced data interpretation in a qualitative content analysis by exposing patterns and relationships. King (2004) disagreed, and argued that frequency counts added nothing of consequence to textual data. If the amount of data had become too big to handle in the current study then units of text with low frequency counts could have been eliminated, as recommended by (Whitman, 1990; Green et al., 1999), but this might have resulted in the loss of valuable data.

6.5 Results: Round One

By the end of the recruitment phase the original target for the overall sample size (n=35) had been exceeded, and 72 experts from England and Wales had volunteered to take part in the Delphi survey. Four experts who had been involved in the pilot study (an ESP, a GPwSI, a consultant rheumatologist and a consultant orthopaedic surgeon) joined the expert panel. This group of 72 experts comprised 19 ESPs, 17 consultant orthopaedic surgeons, 12 consultant rheumatologists, 11 GPswSI, four consultant neurologists, eight consultant neurosurgeons and a consultant in rehabilitation medicine. Analysis of the demographic data from this group (Appendix VII) revealed that 58% of experts were men (42/72) and 42% were women (30/72); the gender-mix was unequal in the professional groups. Forty-seven experts worked in a hospital setting (Acute Trust), 19 in primary care (PCT), five worked in both, and one expert did not state the place of work.

The response rate in round one was 61/72 (85%). The 11 non-responders were the consultant in rehabilitation medicine, four consultant neurosurgeons, four consultant orthopaedic surgeons, one consultant neurologist, and one consultant rheumatologist. In this round, and in the two that followed, all non-responders were followed-up, but reasons for their not responding could not be elicited despite the two ‘reminder emails’; after the second ‘reminder email’ no further contact was made with non-responders.

The content analysis of raw data from round one resulted in a list of 99 competencies, which formed the basis of the second questionnaire. Table 6.3 lists these competencies with their frequency counts. Competencies with the highest frequency counts were: recognizing when features do not fit a MSK diagnosis; demonstrating advanced MSK physical examination skills; having one's practice observed, and being able to discuss clinical cases with a senior clinician; having an in-depth knowledge of MSK anatomy; being taught by a range of MSK experts; knowing one's limitations, and knowing when to seek medical advice. Two items in Theme 3 ('attend relevant postgraduate courses or conferences', and 'completion of an accredited course or qualification') were split into four separate items for use in the second round. In Theme 2, an additional two items (marked with an asterisk in Table 6.3) were not included in the second round because the first item in this section ('advanced skills in physical examination of the locomotor (MSK) system') already encompassed them.

Table 6.3 Competencies derived from Round One

Theme 1: History-taking skills (20 competencies)	**Total frequency count**
Recognize when features do not fit a MSK presentation, i.e., differentiate between MSK and non-MSK causes	36
'Red flag' MSK presentations or features suggesting serious pathology	31
Elicit a full and detailed history of presenting complaint	25
Formulate a clinical diagnosis from the history	24
Perform a review of systems (5 competencies): cardiovascular, respiratory, neurological, gastrointestinal, and genitourinary	19
Identify common MSK conditions	19
Social and family history	18
Drug history	18
Previous medical and surgical history	14
Identify more complex MSK presentations that may require a medical opinion	14
Any medical, non-medical and psychosocial factors that could influence treatment outcomes or prognosis	10
Be able to manage a presentation of chronic or widespread pain	10
Use history-taking skills to direct an appropriate physical examination in order to confirm or refute the initial diagnosis	7
Consider the impact of presenting complaint on the patient (functional activities, mental status etc.)	6
Inflammatory and non-inflammatory conditions	5
Use differential questioning relating to the symptoms originating from the nervous system	2

Theme 2: Physical examination skills (15 competencies)	**Total frequency count**
Advanced skills in physical examination of the locomotor (MSK) system (hips, knees, foot & ankle, spine, shoulders, elbows, wrist & hand)	39
Identify signs of neurological disease and localise to the correct neuraxis level	31
Systems examination (4 competencies): cardiovascular, respiratory, neurological, abdominal	28
Identify ‘red flag’ MSK presentations or features suggesting serious pathology	16
Screen for ‘yellow flags’ (psychosocial assessment)	15
Identify common MSK presentations	12
*Good observation skills	8
*Good handling and palpation skills	8
Use relevant special tests for each joint	8
Identify more complex MSK presentations that may require a medical opinion	8
Examination of a patient presenting with chronic or widespread MSK pain	7
Use GALS regional MSK examination screen	5
Theme 3: How history-taking and physical examination skills should be taught and assessed, and potential barriers to skill acquisition (17 competencies)	**Total frequency count**
Be observed in clinical practice and have the opportunity to discuss clinical cases with a senior clinician	39
Attend relevant postgraduate courses (M-level or other) or conferences *(this item was split into two separate items for use in round two)*	23
Case-based discussions and peer review of difficult cases	21
Video analysis using real patients, with evaluation and feedback	19
Completion of an accredited course or appropriate qualification, i.e., by examination and formal assessment *(this item was split into two separate items for use in round two)*	14
Clinical competencies assessed by medical consultant, measured against a competency framework	14
Ad hoc on-the-job learning, working alongside a medical consultant (rheumatologist or orthopaedic surgeon) either as part of the medical team, or in an adjacent clinic	12
Mentorship	10
Observe in medical consultants’ clinics	9
Assessed by OSCE (Objective Structured Clinical Examination)	8
Observe or shadow experienced ESPs or other advanced practitioners	8
Role play using actors or healthy volunteers	7
Attend multidisciplinary departmental meetings or training sessions	4
Assessed by DOPS (Direct Observation of Procedural Skills)	3
Formal apprenticeship with medical consultant	3
Assessed by Mini-CEX (Mini Clinical Evaluation Exercise)	2
Observe orthopaedic operations	1
Theme 4: Underpinning knowledge (25 competencies)	**Total frequency count**
Anatomy of the MSK system	50
‘Red flag’ features or serious pathology that require urgent investigation and management	44
Know the indications for a range of investigations to confirm the clinical diagnosis (X-rays, magnetic resonance imaging, blood tests, ultrasound	44

imaging, neurophysiology, etc.)	
Physiology, pathology and pathophysiology of the MSK system	35
Common MSK problems that can be managed in community	26
Know what, when and how to refer on to the most appropriate specialist, e.g., (secondary-care consultant, pain management, social services, podiatry, clinical psychology, neurology etc.)	25
More complex problems that require a medical opinion	18
Knowledge of systemic disease or medical conditions that can masquerade as MSK problems, e.g., metabolic disorders, somato-visceral reflexes	18
Chronic or widespread pain	16
Interpret tests accurately, i.e., act on reports	15
Triage skills, i.e., know which patients would benefit from investigations in community settings and which patients need to be sent on to secondary care for a specialist opinion or further investigations	15
Knowledge of local referral pathways	10
Current treatment and management options, both surgical and conservative	10
Knowledge of normal and abnormal patterns and presentations	9
Evidence base underpinning treatment and management decisions	8
Understanding of acute and chronic pain management	8
Working knowledge of operative procedures, including benefits and risks of surgery	7
Epidemiology and natural history of common MSK conditions	7
NICE and other guidelines	7
Knowledge of specificity and sensitivity of clinical tests or investigations	5
Basic rheumatology knowledge or knowledge of common conditions, e.g., gout, monoarthritis, polymyositis, inflammatory versus degenerative conditions, etc.,	4
Bio-psychosocial model of disease	4
How to write a good referral letter	3
Basic pharmacology	3
Good working knowledge of clinical neuroanatomy, i.e., neuraxis levels	1
Theme 5: How underpinning knowledge should be acquired, and potential barriers to knowledge acquisition (9 competencies)	**Total frequency count**
Teaching from a range of individual experts	14
Clinical experience or patient mileage or practice	13
Formal tutorials or lectures	12
Core medical texts and journal articles	9
Self-appraisal or appraisal of ongoing continuing professional development (CPD)	8
Independent study	5
Video or DVD educational material	3
Critical review of the literature	3
Online modules or e-learning	2
Theme 6: Important attributes, attitudes, and behaviours (13 competencies)	**Total frequency count**
Know where their limitations and boundaries are, i.e., when the should be seeking advice or help (when something is beyond ESP scope or the individual's competency level)	55
Advanced communication and interpersonal skills	47

Team player	22
Thirst for knowledge and motivated to learn, and commitment to life-long learning	20
Keep up-to-date and be aware of latest research and evidence base or be willing to challenge practice	18
Professionalism, trust, honesty and integrity	14
Ability to make independent decisions	10
Willing to learn new skills and apply them in practice	10
Appreciate the need for keeping good records	7
Time-management skills	7
Reflective and self-critical	7
Interest in chronic disease management	5
Ability to assess gaps in own knowledge and act on learning needs	3

The data reduction process requires a balanced view on the part of the content analysis researcher. If there are too many verbatim statements or if too much ‘authentic citation’ is used, then analysis may be incomplete (Elo & Kyngäs, 2008); conversely, if verbatim statements are excluded then the richness of the data may be lost, and the researcher risks representing the data inaccurately. Some units of text in the round one data represented a personal opinion (which was sometimes quite forthright) and this made the data reduction process challenging at times; it was important not to lose the core essence of some of these statements by putting one’s own interpretation on them. These particular units of text ranged in size from a single sentence to a clause or paragraph, but none of them concerned competencies not already covered by the other units of text; therefore, no attempt was made to collapse them. It was important not to lose their intended meaning or impact, since this might have threatened the validity of the study. Instead, they were retained as 50 verbatim statements and these are listed in Appendix VIII. These statements covered a number of issues facing ESPs in MSK medicine. For example, the level of skill acquisition required of ESPs compared with doctors, the need to have skills in medical differential diagnosis in order to recognize the non-MSK causes of MSK presentations, the differences between the ESP and the usual physiotherapy role, and the importance of ESPs knowing the limitations of their practice. Some of the qualitative data presented arguments for and against ESPs examining other systems:

‘Specific systems examination, e.g., abdominal, internal – should be the remit of physicians’. (GPwSI)

*‘ESPs should be able to examine cardiovascular, respiratory and abdominal systems as well as MSK’. (*Consultant rheumatologist)

*‘In view of the difficulties of differential diagnosis where pains may be referred from non-MSK origin the ESP will need to examine systems other than just the locomotor system’. (*Consultant orthopaedic surgeon)

‘Skills need to exceed junior doctors as need to encompass traditional medical skills…’ (ESP)

‘They should have some idea of examining the abdomen, the chest and heart as well’. (Consultant orthopaedic surgeon)

Medico-legal issues were also mentioned, especially in relation to ‘medical’ skills’:

*‘You can debate whether they should be able to lay hand on abdomen, listen to heart and lungs, etc. My feeling would be that they [ESPs] should not perform a partial superficial examination because what if they miss something? Far better to draw the boundary here, and refer on to a doctor’. (*Consultant rheumatologist)

The triage role of ESPs working in MSK interface clinics and the requisite competencies involved also featured:

‘Tier 2 services provide a substantial triage function, deciding whether patients should be managed in the Tier 2 service or referred onwards to secondary care. This presupposes that the clinicians seeing the patient in a Tier 2 service are able to triage patients effectively’. (Consultant orthopaedic surgeon)

‘ESPs should be able to triage complex conditions presenting in community clinics, including those with multiple pathologies or systemic pathology’. (GPwSI)

‘Essentially, if the role involves screening patients for specialists then knowledge at that specialist level is mandatory; without it mistakes are inevitable, either missing serious diagnoses or over-investigating and over-referring’. (Consultant orthopaedic surgeon)

'Having an ESP as an independent practitioner is a mistake – community ESPs don't work – they need to be in secondary care, working alongside secondary care consultants'. (Consultant orthopaedic surgeon)

Twenty-two of these anonymous verbatim statements (shown in bold in Appendix VIII) were chosen to go through to the next round. These statements were selected because they were representative of all 50 statements; including all 50 items would have made the second questionnaire unacceptably long. The 22 verbatim statements were included in round two as complementary feedback data; they were not included in the main competency list since they did not represent new competency items. However, in order to focus attention on this qualitative feedback, experts were asked to indicate their level of agreement with these 22 verbatim statements using a separate four-point scale.

6.6 Summary

This chapter presented the steps taken during the first round of the Delphi survey, from recruitment of the expert panel to dissemination of the questionnaire. The amount of qualitative data generated in this first round was considerable and at its conclusion, ninety-nine competencies were available for rating in round two, alongside 22 complementary verbatim statements. The next chapter describes the steps taken in the second round of the Delphi survey.

Chapter 7
The Second Questionnaire Round

7.1 Introduction

The previous chapter presented the process of conducting the first Delphi round, which resulted in the identification of 99 potential competencies and 22 complementary verbatim statements. This chapter presents the second Delphi round, from the development of the second questionnaire through to the data analysis and subsequent results.

7.2 The Second Delphi Questionnaire Round

The questionnaire used in round two was based on the results of round one, but it was more structured than the first questionnaire. It retained the same six themed headings and presented experts with the 99 competency items identified in round one, interspersed with the 22 complementary verbatim statements.

7.2.1 Development of the Second Questionnaire

Experts were asked to rate the 99 competencies on a three-point scale that partly reflected the scoring system allocated to personal specifications within NHS job descriptions (‘essential’, ‘desirable’, ‘not relevant’). The 22 complementary verbatim statements were given a separate four-point scale (‘agree strongly’, ‘agree’, ‘disagree’, ‘disagree strongly’) and were incorporated into each theme. The aim of the second round was to identify the competencies that reached an *a priori* consensus setting (this is defined in section 7.3); the items not reaching the *a priori* consensus would then be sent through to the third and final round for rerating. Comments boxes at the end of each themed section provided space for any additional remarks and this was encouraged, particularly where experts rated a competency item as ‘not relevant’. The comments boxes also provided non-responders from round one with the opportunity to add their own competency statements. Furthermore, experts could reinstate items in these comments boxes if they felt that their comments from the first round were not represented. The second questionnaire was piloted with four individuals, none of whom was an expert panellist. These individuals were the two MSK ESPs who had helped with coding in round one, and the two research supervisors. The second questionnaire was then ready for dissemination (Appendix IX).

7.2.2 Questionnaire Dissemination and Data Collection

The second questionnaire was sent to the 72 experts who had volunteered to take part in round one, therefore including those experts who had not responded in the first round - in accordance with the recommendations of French, Ho & Lee (2002). Experts were asked to return the questionnaire within four weeks and were advised that a first 'reminder email' would be sent to non-responders after two weeks, and that a second 'reminder email' would be sent a few days before the completion deadline. A personalized pre-notification email was sent one week prior to sending the second questionnaire, and a further personalized email was sent to each expert on receipt of a completed questionnaire, to thank him or her for participating in the study.

7.3 Analysis of Round Two Data

The *a priori* consensus rule used in this study stated that items scoring 70% or more in the 'essential' or 'desirable' category would be retained and would not be sent through to the next round for rerating. Items scoring less than 70% would be sent through to the next round for rerating. Items scoring 25% or more in the 'not relevant' category would be discarded. The ratings of the 22 verbatim statements from the first round were analysed separately.

7.4 Results for Round Two: Competency Items

The response rate in this round was 60/72 (83%). The respondent group comprised 19 ESPs, 11 GPswSI, 12 consultant rheumatologists, 14 consultant orthopaedic surgeons, one consultant neurosurgeon, and three consultant neurologists. Three neurosurgeons who had responded in round one failed to respond in this round, but two non-responders from round one (one consultant orthopaedic surgeon and one consultant rheumatologist) did respond in this round.

Forty-eight competencies met the *a priori* consensus (Table 7.1) and these items were removed from the Delphi survey at this stage; the modal scores are shown in shaded boxes. The experts rated all these items in the 'essential' category, except for two knowledge-related items: 'video or DVD educational material' and 'online modules or e-learning', which were rated 'desirable'.

Table 7.1 Round Two Items Reaching the *a priori* Consensus

Theme 1: History-taking skills **Respondents n=60 (%)** (7 competencies)	**Essential**	**Desirable**	**Not relevant**
History of presenting complaint	60 (100)	0 (0)	0 (0)
Consider the impact of presenting complaint on the patient (functional activities, mental status etc.)	57 (95)	3 (5)	0 (0)
Factors, medical or otherwise, that could influence treatment outcomes or prognosis	54 (90)	6 (10)	0 (0)
Drug history	49 (82)	11 (18)	0 (0)
Medical and surgical history	47 (78)	13 (22)	0 (0)
Neurological history	46 (77)	12 (20)	2 (3)
Social and family history	43 (71.5)	16 (26.5)	1(2)
Theme 1: Use history-taking skills to identify the following conditions or presentations **Respondents n=60 (%)** (3 competencies)	**Essential**	**Desirable**	**Not relevant**
'Red flags' or possible serious underlying pathology	59 (98)	1 (2)	0 (0)
Common MSK conditions	57 (95)	3 (5)	0 (0)
Use the history to direct an appropriate physical examination	57 (95)	3 (5)	0 (0)
Theme 2: Use physical examination skills to identify the following conditions or presentations **Respondents n=60 (%)** (2 competencies)	**Essential**	**Desirable**	**Not relevant**
Common MSK presentations	58 (97)	1 (1.5)	1 (1.5)
'Red flags' or features suggesting serious pathology	57 (95)	2 (3)	1 (2)
Theme 2: Physical examination skills **Respondents n=60 (%)** (2 competencies)	**Essential**	**Desirable**	**Not relevant**
Advanced skills in physical examination of the locomotor system (hip, knee, foot & ankle, shoulder, elbow, wrist & hand, spine and pelvis)	52 (87)	8 (13)	0 (0)
Neurological examination	44 (73)	16 (27)	0 (0)
Theme 3: How history-taking and physical examination skills should be taught and assessed **Respondents n=60 (%)** (6 competencies)	**Essential**	**Desirable**	**Not relevant**
Case-based discussions and review of difficult cases with medical consultant or senior colleague	50 (83)	10 (17)	0 (0)
Mentorship	49 (82)	11 (18)	0 (0)

Observing in consultants' clinics	47 (78)	12 (20)	1 (2)
Observing in ESP or other advanced practitioner clinics *(sent through to round two in error*)	42 (70)	17 (28)	1 (2)
Ad hoc on-the-job learning alongside a medical consultant, having the opportunity to be observed, and also to discuss cases *(sent through to round two in error*)	42 (70)	16 (27)	2 (3)
Attending multi-disciplinary meetings and in-service training sessions *(sent through to round two in error*)	42 (70)	18 (30)	0 (0)
Theme 4: Underpinning knowledge Respondents n=60 (%) (13 competencies)	**Essential**	**Desirable**	**Not relevant**
'Red flag' or serious underlying pathology	59 (98)	1 (2)	0 (0)
Know what, when, and how to refer on to the most appropriate specialist or service	58 (97)	2 (3)	0 (0)
Local referral pathways	53 (88)	6 (10)	1 (2)
Common MSK problems that can be managed in the community	52 (87)	8 (13)	0 (0)
Anatomy of the MSK system	50 (83)	10 (17)	0 (0)
Recognize normal patterns of MSK presentations and normal variants, and abnormal patterns, i.e., recognize when the features do not fit a MSK diagnosis	50 (83)	10 (17)	0 (0)
Triage knowledge, i.e., know which patients would benefit from investigations in community settings, and which need to be referred to secondary care for further investigations and a specialist opinion	49 (82)	11 (18)	0 (0)
Common rheumatology conditions	48 (80)	12 (20)	0 (0)
More complex MSK problems that require a medical opinion	48 (80)	12 (20)	0 (0)
Physiology pathology and pathophysiology of the MSK system	46 (76.5)	13 (21.5)	1 (2)
How to write a good referral letter	44 (73)	16 (27)	0 (0)
Indications for a range of diagnostic investigations to confirm the clinical diagnosis (X-rays, magnetic resonance imaging, blood tests, ultrasound imaging, neurophysiology, etc.)	43 (72)	17 (28)	0 (0)
Current treatment and management options – both surgical and conservative	42 (70)	18 (30)	0 (0)
Theme 5: How knowledge should be acquired, or taught Respondents n=60 (%) (3 competencies)	**Essential**	**Desirable**	**Not relevant**
Clinical experience or patient mileage	51 (85)	9 (15)	0 (0)
Video or DVD educational material	7 (12)	49 (82)	4 (6)
Online modules or e-learning	12 (20)	46 (77)	2 (3)
Theme 6: Important attributes, attitudes, and behaviours Respondents n=60 (%) (12 competencies)	**Essential**	**Desirable**	**Not relevant**
Professionalism, trust, and integrity	59 (98)	1 (2)	0 (0)

Know where one's limitations and boundaries are, and when to seek advice or help	56 (93)	4 (7)	0 (0)
Appreciate the need for keeping good records	53 (88)	7 (12)	0 (0)
Able to assess gaps in one's own knowledge, and act on learning needs	53 (88)	7 (12)	0 (0)
Motivated to learn and acquire knowledge	52 (87)	8 (13)	0 (0)
Commitment to lifelong learning	51 (85)	9 (15)	0 (0)
Willing to learn new skills and apply them in practice	49 (82)	11 (18)	0 (0)
Advanced communication and interpersonal skills	47 (78)	13 (22)	0 (0)
Willing to keep abreast of emerging evidence and challenge practice	46 (77)	14 (23)	0 (0)
Reflective and self-critical	46 (77)	14 (23)	0 (0)
Able to make independent decisions	46 (77)	12 (20)	2(3)
Team player	44 (73)	16 (27)	0 (0)

Modal scores are shown in shaded boxes.

Fifty-one items did not reach the *a priori* consensus at the end of this round and these are listed in Table 7.2.

Table 7.2 Round Two Items Not Reaching the *a priori* Consensus

Theme 1: History-taking skills **Respondents n=60 (%)** (5 competencies)	**Essential**	**Desirable**	**Not relevant**
Cardiovascular	18 (30)	36 (60)	6 (10)
Respiratory	18 (30)	36 (60)	6 (10)
Gastrointestinal	12 (20)	35 (58)	13 (22)
Genitourinary	12 (20)	34 (57)	14 (23)
Ability to make an initial diagnosis	32 (53)	28 (47)	0 (0)
Theme 1: Use history-taking skills to identify the following conditions or presentations **Respondents n=60 (%)** (5 competencies)	**Essential**	**Desirable**	**Not relevant**
More complex MSK presentations which require a medical opinion	32 (53)	28 (47)	0 (0)
Chronic widespread pain	41 (68)	18 (30)	1 (2)
Inflammatory v non-inflammatory conditions	40 (67)	19 (31)	1 (2)
Symptoms emanating from the nervous system	40 (67)	20 (33)	0 (0)
When the features do not fit a MSK problem, i.e., a possible non-MSK cause of a MSK problem	30 (50)	30 (50)	0 (0)
Theme 2: Use physical examination skills to identify the following conditions or presentations **Respondents n=60 (%)** (3 competencies)	**Essential**	**Desirable**	**Not relevant**
More complex MSK presentations which require a medical opinion	33 (55)	26 (43)	1 (2)
Chronic widespread pain	36 (60)	23 (38)	1 (2)
Signs of neurological disease localised to the correct neuraxis level	37 (62)	22 (36)	1 (2)
Theme 2: Physical examination skills	**Essential**	**Desirable**	**Not**

Respondents n=60 (%) (6 competencies)			**relevant**
Regional pain (using relevant special tests for each joint or region)	41 (68)	19 (32)	0 (0)
GALS (Gait Arms Legs Spine) regional MSK screening	27 (45)	24 (40)	9 (15)
Screening for 'yellow flags'	39 (65)	20 (33)	1 (2)
** Abdominal examination (Retained, despite consensus rule)*	1 (2)	40 (67)	19 (31)
** Cardiovascular examination (Retained, despite consensus rule)*	7 (12)	38 (63)	15 (25)
** Respiratory examination (Retained, despite consensus rule)*	8 (13)	35 (59)	17 (28)
Theme 3: How history-taking and physical examination skills should be taught and assessed **Respondents n=60 (%)** (12 competencies)	**Essential**	**Desirable**	**Not relevant**
** Observing orthopaedic operations (Discarded)*	12 (20)	31 (52)	17 (28)
Completing an accredited course	32 (53)	25 (42)	3 (5)
Obtaining a relevant postgraduate qualification	25 (41)	31 (52)	4 (7)
Attending relevant postgraduate courses	38 (63)	21 (35)	1 (2)
Attending conferences	19 (32)	38 (63)	3 (5)
Use of video analysis with real patients	10 (17)	41 (68)	9 (15)
** Role play with actors or healthy volunteers (Discarded)*	5 (8)	33 (55)	22 (37)
Completing a formal apprenticeship with a medical consultant (rheumatologist and orthopaedic surgeon)	26 (43)	29 (49)	5 (8)
OSCE (Objective Structured Clinical Examination)	27 (45)	28 (47)	5 (8)
DOPS (Direct Observation of Procedural Skill)	37 (62)	20 (33)	3 (5)
Mini-CEX (Mini-Clinical Evaluation Exercise)	29 (49)	26 (43)	5 (8)
Medical consultants' assessment of competencies, measured against an agreed competency framework	37 (62)	21 (35)	2 (3)
Theme 4: Underpinning knowledge **Respondents n=60 (%)** (12 competencies)	**Essential**	**Desirable**	**Not relevant**
NICE and other guidelines	33 (55)	26 (43)	1 (2)
The evidence base underlying treatment and management options	32 (53)	28 (47)	0 (0)
Working knowledge of operative procedures, including benefits and risks	23 (38)	33 (55)	4 (7)
The epidemiology and natural history of common MSK conditions	41 (68)	19 (32)	0 (0)
A working knowledge of clinical neuro-anatomy and neuraxis levels	40 (66.5)	19 (31.5)	1 (2)
Basic pharmacology - as it relates to MSK conditions	21 (35.0)	38 (63.3)	1 (1.7)
Systemic disease or medical conditions that can masquerade as a MSK problem, e.g., metabolic disorders, referred pain, etc.	40 (67)	20 (33)	0 (0)
Acute and chronic pain management principles	40 (67)	18 (30)	2 (3)
Biopsychosocial model of disease	39 (65)	18 (30)	3 (5)
Be able to interpret results of diagnostic tests or	33 (55)	25 (42)	2 (3)

investigations requested			
Sensitivity and specificity of clinical tests used in the physical examination	33 (55)	26 (43)	1 (2)
Chronic widespread pain	34 (56.5)	25 (41.5)	1 (2)
Theme 5: How knowledge should be acquired, or taught **Respondents n=60 (%)** (6 competencies)	**Essential**	**Desirable**	**Not relevant**
Formal tutorials	20 (33)	39 (65)	1 (2)
Teaching from a range of individual experts	37 (61.5)	22 (36.5)	1 (2)
Self-appraisal of ongoing continuing professional development	41 (68)	19 (32)	0 (0)
Core medical texts and journal articles	25 (42)	35 (58)	0 (0)
Critical review of the literature	22 (37)	35 (58)	3 (5)
Independent study	41 (68)	18 (30)	1 (2)
Theme 6: Important attributes, attitudes, and behaviours **Respondents n=60 (%)** (2 competencies)	**Essential**	**Desirable**	**Not relevant**
Interest in chronic disease management	28 (47)	30 (50)	2 (3)
Time-management skills	36 (60)	24 (40)	0 (0)

Modal scores are shown in shaded boxes.

7.5 Results for Round Two: Additional Verbatim Statements

The comments boxes in round two generated a considerable amount of additional qualitative data, amounting to approximately 6,500 words of text. Twelve sequential analyses of these data were undertaken using content analysis. This resulted in a final list of 32 additional verbatim statements (Appendix X) and five new competency items (Table 7.3). The 32 statements highlighted a number of key issues. First, the level of skill or knowledge that an ESP should have, as exemplified by the statements below:

'I personally regard ESPs should have history skills at level of registrars if not higher as they become more experienced'. (GPwSI)

'An ESP working in a community setting … would not be expected to have as advanced shoulder examination skills as an ESP who works in hospital in a shoulder clinic'. (GPwSI)

'If the ESP … acts as a triage service and therefore is able to deny patients access to secondary care then … they need to have knowledge and skills at or very near to the level of a consultant in that speciality'. (Consultant orthopaedic surgeon)

Second, some experts raised concerns about ESPs practising skills that are usually seen as ‘medical’, for example, abdominal examination:

‘If ESPs are expected to examine the other systems then they will lay themselves open to charges of negligence if they miss something’. (Consultant rheumatologist)

‘To say you have examined someone’s abdomen you would have to be confident that this was done to a medical level… a half-baked examination done by a physiotherapist … will not be taken seriously’. (ESP)

‘…from my experience ESPs are able to pick up breast lumps, lymph nodes ... but may be hesitant about CVS, respiratory and abdominal examination’. (Consultant orthopaedic surgeon)

‘It is potentially very harmful for the patient to have a physiotherapist examine their abdomen, tell them it is normal and miss an ovarian cancer. Litigation will inevitably follow if this line is pursued. ESPs should … not allow their professional integrity to be compromised as being “cheap” doctors’. (GPwSI)

Third, experts expressed concerns not only about ESPs working in isolation but also about MSK interface clinics in primary care:

‘I think ESPs function best when they are part of a MSK team …. not crashing about in isolation in primary care’. (Consultant rheumatologist)

‘Independent (in the sense of isolated) practice is often a mistake… services need to work in an integrated way’. (Consultant rheumatologist)

‘I think it would be difficult for an ESP working in isolation in the community, better if there are strong links with secondary care services’. (Consultant rheumatologist)

‘The ideal model is to have an ESP working independently in a clinic with access to a consultant orthopaedic surgeon for advice as necessary. This could be in the community or in secondary care’. (Consultant orthopaedic surgeon)

‘…the isolated practitioner is potentially dangerous – whether it be a GP, a consultant or an ESP. It is vital an ESP has peers with whom to discuss problems …’ (Consultant rheumatologist)

Table 7.3 New Competencies Generated in Round Two

Understand a patient's beliefs, wishes, and expectations.
Assess the impact of the presenting complaint on family members.
Able to recognize psychiatric or psychological problems, e.g., depression, sleep problems, etc.
Knowledge of a wide range of treatment or management options available, and the

different experts or services involved in delivery of care, e.g., occupational therapy, surgery, psychology, podiatry, pharmacology, injections, etc.
Knowledge of return to work programmes, i.e., rehabilitation for work.

The five new items would be included in the next round for rating on the same three-point Likert scale. A number of authors have included new items in subsequent rounds (Maiburg, Rethans, & van Ree, 2004; Kurubacak, 2007; Colucci et al., 2011). The 32 verbatim statements were retained for inclusion at the end of the third round, for information only; experts would not be required to rate them. The comments boxes in this second Delphi round contained a number of queries raised by experts while completing the questionnaire, for example, the use of unfamiliar acronyms or specific terminology: ‘GALS’ (Gait, Arms, Legs and Spine), ‘Mini-CEX’ (Mini Clinical Evaluation Exercise), and ‘neuraxis’ (the brain and spinal cord). These experts were emailed individually and asked if they wished to change their answers; none of them did. One expert argued quite strongly that the term ‘specialist care’ should be replaced by ‘secondary care’ because not all triage services are based in primary care; this expert also objected to the phrase ‘in the community’ for the same reason. A recent report (a joint initiative of the Primary Care Rheumatology Society, ARMA and the BOA) supports the notion that the quality of a MSK interface service is more important than its geographical location (PCR Society, 2011), and this expert’s concerns were acknowledged in a personalized email from the PI, and the recommended changes were then made. Experts were informed of this change at the start of the third questionnaire round. Finally, one expert queried if this study concerned ESPs seeing patients under 18 years of age; an email response stated that the study concerned adults, which generally indicates a population of patients aged 18 years or more.

7.6 Results from Round Two: Rating of Complementary Verbatim Statements from Round One

Results from experts’ rating of the 22 complementary verbatim statements from round one are summarized in Table 7.4 and the modal scores are in shaded boxes. Opinion was divided about whether or not ESPs should be examining other systems. However, 58% of experts agreed that ESPs should be able to identify non-MSK causes of MSK presentations, and 38% of experts disagreed with the statement, *'having an ESP as an independent practitioner is a mistake – community ESPs don't work – they need to be in secondary care, working alongside secondary care consultants'.*

Table 7.4 Complementary Verbatim Statements Rated in Round Two

Statements **Respondents n=60 (%)**	**Agree strongly**	**Agree**	**Disagree**	**Disagree strongly**
'History-taking skills need to approach the level obtained by junior doctors'.	22 (37)	17 (28)	13 (22)	8 (13)
'The history-taking skills are essentially the same as those required by doctors'.	23 (38)	27 (45)	9 (15)	1 (2)
'ESPs need to be able to take a full medical history'.	21 (35)	32 (53)	6 (10)	1 (2)
'Specialist community-based or Tier 2 services provide a substantial triage function, deciding whether patients should be managed in Tier 2 services or referred onwards to secondary care. Accordingly, physiotherapists will need to be able to take adequate histories from effectively all MSK presentations'.	37 (62)	19 (32)	2 (3)	2 (3)
'An ordinary physiotherapist and an ESP have a very different role. A physiotherapist approaches a patient with a view to applying therapy; the role of the ESP is very different and this requires a completely different approach to history-taking'.	26 (43)	26 (43)	7 (12)	1 (2)
'In view of the difficulties of differential diagnosis where pains may be referred from non-MSK origin the ESP will need to examine systems other than just locomotor system'.	17 (28)	25 (42)	15 (25)	3 (5)
'Specific systems examination e.g. abdominal should be the remit of physicians'.	7 (12)	23 (38)	27 (45)	3 (5)
'ESPs should be able to examine cardiovascular, respiratory and abdominal systems as well as MSK'.	5 (8)	30 (50)	19 (32)	6 (10)
'You can debate whether they should be able to lay hand on abdomen, listen to heart and lungs, etc. My feeling would be that they should not perform a partial superficial examination because what if they miss something? Far better to draw the boundary here, and refer on to doctor'.	15 (25)	30 (50)	13 (22)	2 (3)
'I would not expect an ESP to examine other parts of the body'.	6 (10)	16 (27)	36 (60)	2 (3)
'ESPs should have the same diagnostic MSK examination skills as an orthopaedic	16 (27)	30 (50)	9 (15)	5 (8)

trainee or senior SpR level (ST5)'.				
'ESPs should be able to triage complex conditions presenting in community clinics, including those with multiple pathologies or systemic pathology'.	20 (33)	28 (47)	11 (18)	1 (2)
'ESPs should have advanced level MSK examination techniques, equivalent to that of an orthopaedic surgeon'.	13 (22)	26 (43)	18 (30)	3 (5)

ESPs should be able to perform a general physical examination e.g. skin, lymph nodes, temperature, chest, breast and abdomen'.	2 (3)	23 (38)	28 (47)	7 (12)
'ESPs should be able to differentiate MSK from non-MSK causes for MSK presentations but do not specifically need to be able to identify the non-MSK cause'.	23 (38)	35 (58)	1 (2)	1 (2)
All medical examination skills need to be taught and assessed ideally by the relevant specialist e.g. neurological examination by a neurologist and not a spinal surgeon, shoulder examination by a shoulder surgeon rather than someone more generic'.	12 (20)	21 (35)	23 (38)	4 (7)
'Essentially if the role involves screening patients for specialists then knowledge at that specialist level is mandatory; without it the mistakes are inevitable, either missing serious diagnoses or over-investigating and over-referring'.	23 (38)	19 (32)	14 (23)	4 (7)
'Awareness of management strategies can be broad and is important only in so far as they affect referral decisions'.	9 (15)	37 (62)	13 (21)	1 (2)
'Whilst it is not realistic to expect this [underpinning knowledge] to be at the level of a very experienced doctor such as a consultant the level of knowledge required would certainly be that of an early years registrar in both orthopaedics and rheumatology'.	21 (35)	29 (48)	10 (17)	0 (0)
'Having an ESP as an independent practitioner is a mistake – community ESPs don't work – they need to be in secondary care, working alongside secondary care consultants'.	5 (8)	15 (25)	23 (38)	17 (28)
'ESPs tend to produce a list of symptoms rather than diagnoses'.	4 (7)	11 (18)	30 (50)	15 (25)
'Some physiotherapists become frustrated with the lack of ability to cure or deal with chronicity and the bio-psychosocial aspects of disease, and often seek further tests or surgery when it is not appropriate'.	6 (10)	23 (38)	22 (37)	9 (15)

Modal scores are shown in shaded boxes

Table 7.2 included five items that scored 25% or more in the ‘not relevant’ category, and these are italicized and marked with an asterisk. Two of these items were discarded: ‘observing orthopaedic operations’ and ‘role play with actors or healthy volunteers’, according to the *a priori* consensus ruling. However, the other three items (‘abdominal examination’, ‘cardiovascular examination’ and ‘respiratory examination’) were retained for rerating in the next round because the PI was particularly interested in finding out if these ‘medical’ skills (more usually associated with doctors’ clinical practice) would reach the *a priori* consensus in the next round. Changing the consensus level across Delphi rounds in this manner has been reported in the literature (Shield et al., 2003; Hewlett et al., 2008; Beniuk, Boyle, & Clarkson, 2011). Discarding two items from this list meant that 49 items were ready to be sent through to the next round for rerating. The addition of five new items generated in this round resulted in 54 items needing to be sent through to the next round. However, because three items that had already reached the *a priori* consensus in this round were sent through to the next round in error (these are presented in Table 8.2 in the next chapter), 57 items were sent through to round three.

7.7 Summary

Forty-eight competency items met the *a priori* consensus in this second Delphi round and fifty-one did not. Two items were discarded and 57 items were sent through to the next round. The 22 verbatim statements from round one that were rated in this round did not form part of the Delphi competency list and so they did not go through to the third round. The 32 verbatim statements generated in this round were sent through to final round for additional information only. The next chapter discusses the steps taken in the third and final questionnaire round.

Chapter 8

The Third Questionnaire Round

8.1 Introduction

This chapter outlines the third and final Delphi round. Round two resulted in 57 competency statements being included in this round, and 32 verbatim statements were included for information only. The development of the third questionnaire and the results generated from round three are presented in this chapter.

8.2 The Third Delphi Questionnaire Round

In this round, experts were able to see the group modal scores from round two alongside their own individual scores. This was a rerating round, during which more items reached the *a priori* consensus.

8.2.1 Development of the Third Questionnaire

The third questionnaire (Appendix XI) asked experts to rate the 57 competencies generated in round two and included the 32 verbatim statements generated in the previous round as supplementary data; experts were not required to rate these verbatim statements. This third questionnaire mirrored the structure and layout of the second questionnaire, except for an additional section comprising the five additional competencies; it used the same three-point Likert scale and consensus rule, and it was divided into the same six themes. Although it is not usual practice, some studies also include competencies that have already reached a consensus in subsequent rounds (Marshall et al., 2007); experts' attention is then drawn to these items but they are advised that they do not need to rate them. The PI chose not to do this because it would have created a lengthy questionnaire, which the PI wanted to avoid. Experts were already being provided with feedback in the form of verbatim statements from the previous round (as advised by Murphy et al., 1998) and it was felt that including the list of items that had already reached the a *priori* consensus would have been confusing. This final questionnaire round was piloted with the same individuals who had helped to pilot the second questionnaire round; no amendments were needed prior to its dissemination.

8.2.2 Questionnaire Dissemination and Data Collection

The third questionnaire was sent to the 60 experts who had responded in round two. The PI sent a personalized pre-notification email to experts, one week prior to sending a personalized email containing a URL link to the third questionnaire. On receipt of a completed questionnaire, a personalized ‘Thank You’ email was sent to each expert, and follow-up ‘reminder emails’ were sent to groups of experts using ‘blind copy’ emailing. During this questionnaire round, experts were provided with feedback in the form of their own rating in round two, together with the percentage modal scores for the whole group. They were then asked to rerate competencies (and rate the five new competencies) in light of this information, using the same three-point Likert scale. Experts were asked to state their reasons in the comments boxes provided in each section if they disagreed with the overall group’s modal score.

8.3 Results: Round Three

The overall response rate in this round was 56/60 (93%). This group of 56 experts comprised 11 GPswSI, 19 ESPs, 11 consultant rheumatologists, three consultant neurologists, one consultant neurosurgeon, and 11 consultant orthopaedic surgeons. Forty competencies met the *a priori* consensus in this round and Table 8.1 lists these competency items; the modal scores are in shaded boxes. One competency item attained a 50% score in both the ‘essential’ and the ‘desirable’ category but was included in this list (‘when features do not fit a MSK diagnosis, i.e., a possible non-MSK cause of a MSK presentation’). Three items were sent through to round three in error. These items are presented in Table 8.2 with their round two and round three modal scores, which shows an increasing consensus between rounds two and three.

Table 8.1 Round Three Items Reaching the *a priori* Consensus

Theme 1: History-taking skills **Respondents n=56 (%)** (5 competencies)	**Essential**	**Desirable**	**Not relevant**
Ability to make a working diagnosis after taking the history	46 (82)	10 (18)	0 (0)
Genitourinary system	7 (12)	43 (77)	6 (11)
Cardiovascular system	10 (18)	42 (75)	4 (7)
Gastrointestinal system	6 (11)	42 (75)	8 (14)

Respiratory system	12 (21)	39 (70)	5 (9)
Theme 1: Use history-taking skills to identify the following conditions/presentations Respondents n=56 (%) (5 competencies)	**Essential**	**Desirable**	**Not relevant**
Chronic widespread pain	47 (84)	8 (14)	1 (2)
Inflammatory versus non-inflammatory conditions	45 (80)	10 (18)	1 (2)
Symptoms emanating from the nervous system	45 (80)	11 (20)	0 (0)
More complex MSK presentations which require a medical opinion	43 (77)	13 (23)	0 (0)
When features do not fit a MSK diagnosis, i.e., a possible non-MSK cause of a MSK presentation	28 (50)	28 (50)	0 (0)
Theme 2: Use physical examination skills to identify the following conditions or presentations Respondents n=56 (%) (5 competencies)	**Essential**	**Desirable**	**Not relevant**
Screening for 'yellow flags'	49 (88)	6 (10)	1 (2)
More complex MSK presentations which require a medical opinion	46 (82)	9 (16)	1 (2)
Regional pain (using relevant special tests for each joint or region)	46 (82)	10 (18)	0 (0)
Chronic widespread pain	43 (77)	12 (21)	1 (2)
Signs of neurological disease localised to the correct neuraxis level	41 (73)	13 (23)	2 (4)
Theme 3: How history-taking and physical examination skills should be taught and assessed Respondents n=56 (%) (9 competencies)	**Essential**	**Desirable**	**Not relevant**
Attending multidisciplinary departmental meetings and in-service training sessions	49 (87.5)	7 (12.5)	0 (0)
Observing experienced ESP or other advanced practitioner clinics	47 (84)	8 (14)	1 (2)
Use of video analysis with real patients	5 (9.5)	47 (83.5)	4 (7)
Ad hoc on-the-job learning - working alongside a medical consultant, having the opportunity to be observed, and to discuss cases	45 (80)	11 (20)	0 (0)
Attending relevant postgraduate courses	41 (73)	14 (25)	1 (2)
Attending conferences	13 (23)	41 (73)	2 (4)
DOPS (Direct Observation of Procedural Skill)	44 (79)	10 (17)	2 (4)
Medical consultants' assessment of competencies, measured against an agreed competency framework	41 (73)	14 (25)	1 (2)
OSCE (Objective Structured Clinical Examination)	14 (25)	39 (70)	3 (5)
Theme 4: Underpinning knowledge Respondents n=56 (%) (10 competencies)	**Essential**	**Desirable**	**Not relevant**
The epidemiology and natural history of common MSK conditions	47 (84)	9 (16)	0 (0)
Acute and chronic pain management principles	47 (84)	9 (16)	0 (0)
A working knowledge of clinical neuroanatomy an neuraxis levels	46 (82)	10 (18)	0 (0)
The evidence base underlying treatment and	45 (80)	11 (20)	0 (0)

management options			
Chronic widespread pain	45 (80)	10 (18)	1 (2)
ESPs should be able to interpret the results of any diagnostic investigations they request	44 (79)	11 (19)	1 (2)
Systemic disease or medical conditions that can masquerade as a MSK problem	43 (77)	13 (23)	0 (0)
Biopsychosocial model of disease	43 (77)	13 (23)	0 (0)
Basic pharmacology as it relates to MSK conditions	14 (25)	42 (75)	0 (0)
NICE and other guidelines	40 (71)	16 (29)	0 (0)
Theme 5: How knowledge should be acquired, or taught **Respondents n=56 (%)** (4 competencies)	**Essential**	**Desirable**	**Not relevant**
Self-appraisal of ongoing continuing professional development	50 (89)	6 (11)	0 (0)
Independent study	48 (86)	8 (14)	0 (0)
Teaching from a range of individual experts	45 (80.4)	10 (17.9)	1 (1.8)
Formal tutorials and lectures	13 (23)	43 (77)	0 (0)
Theme 6: Important attributes, attitudes, and behaviours **Respondents n=56 (%)** (2 competencies)	**Essential**	**Desirable**	**Not relevant**
Time-management skills	39 (70)	17 (30)	0 (0)
Interest in chronic disease management	16 (28)	39 (70)	1 (2)

Modal scores are shown in shaded boxes

Table 8.2 Round Two Competencies Included in Round Three in Error

Competencies	**Round Two outcome n=60 (%)**	**Round Three outcome n=56 (%)**
Observing in experienced ESP or other advanced practitioner clinics	42 (70) Essential	47 (84) Essential
Ad hoc on-the-job learning - working alongside a medical consultant, having the opportunity to be observed, and also to discuss cases	42 (70) Essential	45 (80) Essential
Attending multidisciplinary department meetings and in-service training sessions	42 (70) Essential	49 (88) Essential

Seventeen competencies did not reach the *a priori* consensus at the end of the third round and these are listed in Table 8.3; the modal scores are in shaded boxes.

Table 8.3 Round Three Items Not Reaching the *a priori* Consensus

New competencies generated in Round Two, respondents n=56 (%) (5 competencies)	**Essential**	**Desirable**	**Not relevant**
Understand a patient's beliefs, wishes, and expectations	35 (63)	21 (37)	0 (0)
Assess the impact of the presenting complaint on the family	33 (59)	23 (41)	0 (0)

Be able to recognize psychiatric or psychological problems	28 (50)	27 (48)	1 (2)
Knowledge of a wide range of treatment or management options available, and different experts involved in the delivery of care	37 (66)	19 (34)	0 (0)
Knowledge of return to work programmes	22 (39)	34 (61)	0 (0)
Use physical examination skills to identify the following conditions or presentations – Theme 2 Respondents n=56 (%) (1 competency)	**Essential**	**Desirable**	**Not relevant**
GALS (Gait Arms Legs Spine) regional MSK examination screening	33 (59)	18 (32)	5 (9)
Physical examination skills – Theme 2 Respondents n=56 (%) (3 competencies)	**Essential**	**Desirable**	**Not relevant**
Abdominal examination	2 (4)	36 (64)	18 (32)
Cardiovascular examination	4 (7)	37 (66)	15 (27)
Respiratory examination	5 (8)	35 (63)	16 (29)
How history-taking and physical examination skills should be taught and assessed – Theme 3 Respondents n=56 (%) (4 competencies)	**Essential**	**Desirable**	**Not relevant**
Completing an accredited course	37 (66)	18 (32)	1 (2)
Obtaining a relevant postgraduate qualification	17 (30)	36 (65)	3 (5)
Completing a formal apprenticeship with a medical consultant	18 (32)	34 (61)	4 (7)
Mini-CEX (Mini Clinical Evaluation Exercise)	36 (65)	17 (30)	3 (5)
Underpinning knowledge – Theme 4 Respondents n=56 (%) (2 competencies)	**Essential**	**Desirable**	**Not relevant**
Working knowledge of operative procedures, including benefits and risks	18 (32)	35 (63)	3 (5)
Sensitivity and specificity of clinical tests used in the physical examination	38 (68)	18 (32)	0 (0)
How knowledge should be acquired, or taught – Theme 5 Respondents n=56 (%) (2 competencies)	**Essential**	**Desirable**	**Not relevant**
Core medical texts and journal articles	21 (37)	35 (63)	0 (0)
Critical review of the literature	17 (30)	37 (66)	2 (4)
Items discarded in Round Two (2 competencies)	**Essential**	**Desirable**	**Not relevant**
Observing orthopaedic operations	12 (20)	31 (52)	17 (28)
Role play with actors or healthy volunteers	5 (8)	33 (55)	22 (37)

Modal scores are shown in shaded boxes

8.4 Review Across all Three Rounds

A summary of the responses across all three rounds is provided in Table 8.4. The first questionnaire was sent to all 72 experts who volunteered to participate in the study. There were 11 non-responders in round one but two of these (an orthopaedic surgeon and a rheumatologist) responded in round two, but then dropped out in round three. Three neurosurgeons dropped out in the second round and in round three, a further three orthopaedic surgeons and one rheumatologist dropped out. Three neurosurgeons responded in round one only, and two orthopaedic surgeons responded only to rounds one and two. Nine experts (three orthopaedic surgeons, four neurosurgeons, one neurologist and one rehabilitation medicine consultant) did not respond to any of the three rounds. All 56 experts completing the third round had also responded to rounds one and two.

Table 8.4 Summary of Responses Across all Three Rounds

Round One (n=72)	**61/72 Responded**	**11/72 Did not respond**
ESP (n=19)	19	
GPwSI (n=11)	11	
Neuro (n=4)	3	1
Ortho (n=17)	13	4
Rheum (n=12)	11	1
N/Surg (n=8)	4	4
RehabMed (n=1)	0	1
Round Two (n=72)	**60/72 Responded**	**3/72 Additional non-responders**
ESP (n=19)	19	
GPwSI (n=11)	11	
Neuro (n=4)	3	
Ortho (n=17)	14 (plus 1 from round one)	
Rheum (n=12)	12 (plus 1 from round one)	
N/Surg (n=8)	1	3
RehabMed (n=1)	0	
Round Three (n=60)	**56/60 Responded**	**4/60 Additional non-responders**
ESP (n=19)	19	
GPwSI (n=11)	11	
Neuro (n=3)	3	
Ortho (n=14)	11	3
Rheum (n=12)	11	1
N/Surg (n=1)	1	

Consultant orthopaedic surgeon (Ortho); consultant neurosurgeon (N/Surg); consultant in rehabilitation medicine (RehabMed); consultant neurologist (Neuro); consultant rheumatologist (Rheum).

Table 8.5 presents the development of competencies across all three rounds. Ninety-nine competencies were generated in round one. An additional five competency items were created in the second round and by the end of the Delphi study, 85 items had reached the *a priori* consensus and 19 had not.

Table 8.5 Summary of Competencies Across all Three Rounds

Round One Competency items generated = 99
Round Two 48 items reached the *a priori* consensus in this round and were removed from the Delphi study at this point. 51 items did not reach the *a priori* consensus and 2 items were discarded, leaving 49 items to be sent through to the next round. 5 new items were generated in this round. Therefore, items going through to the next round: 49 + 5 = 54 3 items that reached the *a priori* consensus in round two were sent through to round three in error. Therefore, the total number of items going through to round three was 57.
Round Three 40 items reached the *a priori* consensus (these included the 3 items sent through for rerating in error) in this round. 17 items did not reach the *a priori* consensus.
Delphi Outcome: 48 items reached the *a priori* consensus in round two, with a further 37 items in round three (85 items in total) 17 items did not reach the *a priori* consensus at the end of round three. The total number of items not reaching the *a priori* consensus at the end of round three was 19 (the aforementioned 17 items plus the 2 items discarded in round two)

8.5 The Final Competencies

Eighty-five items had reached the *a priori* consensus at the end of the third Delphi round and these are presented with the modal scores in rounds two and three, in Table 8.6.

Table 8.6 Final Competencies Reaching the *a priori* Consensus

History-taking skills (12 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
History of the presenting complaint	60 (100) Essential	
Determine the impact of the presenting complaint on the	57 (95)	

patient	Essential	
Factors, medical or otherwise, that could influence treatment outcomes or prognosis	54 (90) Essential	
Drug history	49 (82) Essential	
Medical and surgical history	47 (78) Essential	
Neurological history	46 (77) Essential	
Social and family history	43 (72) Essential	
Ability to make a working diagnosis after taking a history		46 (82) Essential
Genitourinary system		43 (77) Desirable
Cardiovascular system		42 (75) Desirable
Gastrointestinal system		42 (75) Desirable
Respiratory system		39 (70) Desirable
Use history-taking skills to identify the following conditions or presentations (8 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
'Red flags' or possible serious underlying pathology	59 (98) Essential	
Common MSK conditions	57 (95) Essential	
Use history-taking skills to direct an appropriate physical examination	57 (95) Essential	
Chronic widespread pain		47 (84) Essential
Inflammatory versus non-inflammatory conditions		45 (80) Essential
Symptoms emanating from the nervous system		45 (80) Essential
More complex MSK presentations which require a medical opinion		43 (77) Essential
When features do not fit a MSK diagnosis, i.e., a possible non-MSK cause of a MSK presentation		28 (50) Essential 28/56 (50) Desirable

Physical examination skills (2 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
Advanced skills in physical examination of the locomotor system (hip, knee, foot & ankle, shoulder, elbow, wrist & hand, spine and pelvis)	52 (87) Essential	
Neurological examination	44 (73) Essential	

Use physical examination skills to identify the following conditions or presentations (7 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
Common MSK presentations	58 (97) Essential	
‘Red flags’ or features suggesting serious underlying pathology	57 (95) Essential	
Screening for ‘yellow flags’		49 (88) Essential
More complex MSK presentations which require a medical opinion		46 (82) Essential
Regional pain (using relevant special tests for each joint or region)		46 (82) Essential
Chronic widespread pain		43 (77) Essential
Signs of neurological disease localised to the correct neuraxis level		41 (73) Essential
How history-taking and physical examination skills should be taught and assessed (12 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
Case-based discussions and review of difficult cases with medical consultant or senior colleague	50 (83) Essential	
Mentorship	49 (82) Essential	
Observing in consultants’ clinics	47 (78) Essential	
Attending multidisciplinary departmental meetings and in-service training sessions		49 (88) Essential
Observing in ESP or other advanced practitioner clinics		47 (84) Essential
Use of video analysis with real patients		47 (84) Desirable
Ad hoc on-the-job learning – working alongside a medical consultant, having the opportunity to be observed, and to discuss cases		45 (80) Essential
Attending relevant postgraduate courses		41 (73) Essential
Attending conferences		41 (73) Desirable
DOPS (Direct Observation of Procedural Skills)		44 (79) Essential
Medical consultants’ assessment of competencies using an agreed competency framework		41 (73) Essential
OSCE (Objective Structured Clinical Examination)		39 (70) Desirable
Underpinning knowledge (23 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
‘Red flag’ or serious underlying pathology	59 (98) Essential	
Know what, when, and how to refer on to the most appropriate specialist or service	58 (97) Essential	

Local referral pathways	53 (88) Essential	
Common MSK problems that can be managed in the community	52 (87) Essential	
Anatomy of the MSK system	50 (83) Essential	
Recognize normal patterns of MSK presentations, normal variants and abnormal patterns, i.e., recognize when the features do not fit a MSK diagnosis	50 (83) Essential	
Triage knowledge, i.e., knowing which patients would benefit from investigations in community settings, and which need to be referred to secondary care for further investigations and a specialist opinion	49 (82) Essential	
More complex MSK problems that require a medical opinion	48 (80) Essential	
Common rheumatological conditions	48 (80) Essential	
Physiology, pathology, and pathophysiology of the MSK system	46 (77) Essential	
How to write a good referral letter	44 (73) Essential	
Indications for a range of diagnostic investigations to confirm the clinical diagnosis, e.g., X-ray, MRI, blood tests, ultrasound, neurophysiology	43 (72) Essential	
Current treatment and management options – both surgical and conservative	42 (70) Essential	
The epidemiology and natural history of common MSK conditions		47 (84) Essential
Acute and chronic pain management principles		47 (84) Essential
A working knowledge of clinical neuroanatomy and neuraxis levels		46 (82) Essential
The evidence base underlying treatment and management options		45 (80) Essential
Chronic widespread pain		45 (80) Essential
Ability to interpret the results of any diagnostic tests ordered		44 (79) Essential
Biopsychosocial model of disease		43 (77) Essential
Systemic disease or medical conditions that can masquerade as a MSK problem		43 (77) Essential
Basic pharmacology as it relates to MSK conditions		42 (75) Desirable
NICE and other guidelines		40 (71) Essential
How knowledge should be acquired, or taught (7 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
Clinical experience or patient mileage	51 (85) Essential	
Video or DVD educational material	49 (82) Desirable	

Online modules or e-learning	46 (77) Desirable	
Self-appraisal of ongoing continuing professional development (CPD)		50 (89) Essential
Independent study		48 (86) Essential
Teaching from a range of individual experts		45 (80) Essential
Formal tutorials and lectures		43 (77) Desirable
Important attributes, attitudes, and behaviours (14 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
Professionalism, trust, and integrity	59 (98) Essential	
Know where one's limitations and boundaries lie, and when to seek advice or help	56 (93) Essential	
Able to assess gaps in one's own knowledge and act on learning needs	53 (88) Essential	
Appreciate the need for keeping good records	53 (88) Essential	
Motivated to learn and acquire knowledge	52 (87) essential	
Commitment to lifelong learning	51 (85) Essential	
Willing to learn new skills and apply them in practice	49 (82) Essential	
Advanced communication and interpersonal skills	47 (78) Essential	
Reflective and self-critical	46 (77) Essential	
Willing to keep abreast of emerging evidence and challenge practice	46 (77) Essential	
Able to make independent decisions	46 (77) Essential	
Team player	44 (73) Essential	
Interest in chronic disease management		39 (70) Desirable
Time-management skills		39 (70) Essential

The rating shown is the modal score

Nineteen items had not reached the *a priori* consensus at the end of the Delphi study and these are listed in Table 8.7. These items were the 17 items not reaching the *a priori* consensus at the end of round three and the two items discarded at the end of round two. The five new items generated in round two were among these items, together with nine items generated in round one, and the three items chosen by the PI to be rerated in the final round (despite the fact that they scored more than 25% in the ‘not relevant’ category). Although these three items, which were the physical ‘medical’ examination skills more readily associated with doctors (examination of the abdominal, cardiovascular and respiratory systems), were not included in the final list of competencies, more than 60% of experts had rated these skills as desirable by the end of the Delphi study.

Table 8.7 Final List of Competencies Not Reaching the *a priori* Consensus at the End of the Delphi Survey

New competencies generated in round two **n=56 (%)** (5 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
Understand a patient’s beliefs, wishes, and expectations		35 (63) Essential
Assess the impact of the presenting complaint on the family		33 (59) Essential
Be able to recognize psychiatric or psychological problems		28 (50) Essential
Knowledge of a wide range of treatment or management options available, and different experts involved in the delivery of care		37 (66) Essential
Knowledge of return to work programmes		34 (61) Desirable
Items discarded after round two (2 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
Observing orthopaedic operations (28.3% voted ‘not relevant’)	31 (52) Desirable	
Role play with actors or healthy volunteers (36.7% voted ‘not relevant’)	33 (55) Desirable	
Items generated in round one (9 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
GALS (Gait Arms Legs Spine) regional MSK examination screening	27 (45) Essential	33 (59) Essential
Completing an accredited course	32 (53) Essential	37 (66) Essential
Obtaining a relevant postgraduate qualification	31 (52) Desirable	36 (64) Desirable
Completing a formal apprenticeship with a medical consultant	29 (48) Desirable	34 (61) Desirable
Mini-CEX (Mini Clinical Evaluation Exercise)	29 (48) Essential	36 (64) Essential
Working knowledge of operative procedures, including benefits and risks	33 (55) Desirable	35 (63) Desirable
Sensitivity and specificity of clinical tests used in the physical examination	33 (55) Essential	38 (68) Essential
Core medical texts and journal articles	35 (58) Desirable	35 (63) Desirable

Critical review of the literature	35 (58) Desirable	37 (66) Desirable
Three items that should have been discarded in round two (3 competencies)	**Round 2: respondents n=60 (%)**	**Round 3: respondents n=56 (%)**
Abdominal examination	40 (67) Desirable	36 (64) Desirable
Cardiovascular examination	38 (63) Desirable	37 (66) Desirable
Respiratory examination	35 (58) Desirable	35 (63) Desirable

The rating shown is the modal score

The statements below, from rounds one and two, illustrate some of the concerns voiced by experts regarding the 'medical' physical examination skills:

'For non-MSK conditions masquerading as a MSK problem, examination should be limited to identifying there is a non-MSK cause, but further examination/investigation should be outside an ESP's remit'. (GPwSI, round one)

'Whilst abdominal/cardiovascular/respiratory problems might be highlighted in the history, it would be unreasonable to expose an ESP to the risks of misdiagnosis of an unconnected medical condition on the basis of missing a physical sign in an area outside the musculoskeletal system'. (Consultant orthopaedic surgeon, round two)

'To say you have examined someone's abdomen you would have to be confident that this was done to a medical level. You can pass a comment over what you have found or demonstrate that you have done a modified examination at a basic level. If you suspect something is not musculoskeletal then you are going to be referring it on anyway and a half-baked examination done by a physiotherapist will not remotely help a consultant and won't be taken seriously. I would say the same of a respiratory assessment. Taking a blood pressure or checking pulses is relevant for a number of MSK reasons. Anything more isn't. (ESP, round two)

'Other than the neurological system, basic screening only – full examination should be conducted by specialists in respective fields'. (ESP, round two)

8.6 Summary

At the end of the third and final Delphi round, 85 competencies had reached the *a priori* consensus and 19 had not. No qualitative data were generated in this round. The final list of competencies (which included the list of items not reaching the *a priori* consensus) was forwarded to experts who had responded to all or part of the survey (n=63) together with a covering email thanking them for their participation in the study. The next chapter explores a section of the data further in order to examine opinion change between rounds two and three, and the levels of agreement between professional groups.

Chapter 9

Opinion Change and Agreement between Professional Groups

9.1 Introduction

The previous chapters presented results of the Delphi survey and related them to the findings of the expert panel as a whole. This chapter presents a cross-tabulation analysis of the data relating to the 56 experts who completed all three rounds, in order to identify where expert opinion changed between the second and third rounds. The levels of agreement between professional groups are also presented.

9.2 Cross-tabulation Analysis

In order to evaluate opinion change between rounds two and three, 12 items that were rated in rounds two and three were chosen for a cross-tabulation analysis. This analysis tabulated the results of round two against the results from round three, separating them into the six professional groups. These 12 items were chosen because although their round three modal rating was either 'essential' or 'desirable' (Table 9.1), they had still not reached the *a priori* consensus by the end of the Delphi survey.

Table 9.1 Competencies Used in Cross-tabulation Analysis (n=56)

Competency items	**Round 2 modal score n=56 (%)**	**Round 3 modal score n=56 (%)**
GALS (Gait Arms Legs Spine) regional MSK examination screening	26 (46) Essential	33 (59) Essential
Completing an accredited course	30 (53) Essential	37 (66) Essential
Obtaining a relevant postgraduate qualification	29 (52) Desirable	36 (64) Desirable
Completing a formal apprenticeship with a medical consultant	28 (50) Desirable	34 (61) Desirable
Mini-CEX (Mini Clinical Evaluation Exercise)	26 (46) Essential	36 (64) Essential
Working knowledge of operative procedures, including benefits and risks	33 (59) Desirable	35 (63) Desirable
Sensitivity and specificity of clinical tests used in the physical examination	32 (57) Essential	38 (68) Essential
Core medical texts and journal articles	32 (57) Desirable	35 (63) Desirable

Critical review of the literature	31 (55) Desirable	37 (66) Desirable
Abdominal examination	36 (64) Desirable	36 (64) Desirable
Cardiovascular examination	35 (63) Desirable	37 (66) Desirable
Respiratory examination	32 (57) Desirable	35 (63) Desirable

The data relating to these 12 items from the 56 experts who had completed all three rounds were subjected to a cross-tabulation analysis using StatsDirect software (StatsDirect, n.d.). The results of these analyses are shown in Tables 9.2 to 9.13; they show where opinion change occurred between rounds two and three within each professional group, in relation to the group (n=56) modal score.

See following pages for relevant Tables.

Table 9.2 GALS (Gait Arms Legs Spine) Regional MSK Examination Screening Cross-tabulation

Professional group				Opinion change between rounds two and three
ESPs (n=19)	**1**	**2**	**3**	3 ESPs moved towards the group modal score and 2 moved away from it
1	0	2	1	
2	0	7	2	
3	0	0	7	
GPswSI (n=11)	**1**	**2**	**3**	2 GPswSI moved towards the group modal score
1	2	0	0	
2	0	2	2	
3	0	0	5	
Consultant neurologists (n=3)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	1	0	
3	0	0	2	
Consultant neurosurgeons (n=1)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	0	0	
3	0	0	1	
Consultant orthopaedic surgeons (n=11)	**1**	**2**	**3**	1 consultant orthopaedic surgeon moved towards the group modal score and 1 moved away from it
1	1	0	0	
2	0	4	1	
3	0	1	4	
Consultant rheumatologists (n=11)	**1**	**2**	**3**	1 consultant rheumatologist moved towards the group modal score
1	2	0	1	
2	0	2	0	
3	0	0	6	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 3 (essential)
Group (n=56) modal score in round three: 3 (essential)

Table 9.3 Completing an Accredited Course Cross-tabulation

Professional group				Opinion change between rounds two and three
ESPs (n=19)	**1**	**2**	**3**	4 ESPs moved towards the group modal score and 1 moved away from it
1	0	1	0	
2	0	6	4	
3	0	0	8	
GPswSI (n=11)	**1**	**2**	**3**	1 GPwSI moved towards the group modal score
1	0	0	0	
2	0	3	1	
3	0	0	7	
Consultant neurologists (n=3)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	0	0	
3	0	0	3	
Consultant neurosurgeons (n=1)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	0	0	
3	0	0	1	
Consultant orthopaedic surgeons (n=11)	**1**	**2**	**3**	1 consultant orthopaedic surgeon moved towards the group modal score and 1 moved away from it
1	1	0	0	
2	0	3	1	
3	0	1	5	
Consultant rheumatologists (n=11)	**1**	**2**	**3**	2 consultant rheumatologists moved towards the group modal score and 1 moved away from it
1	0	1	0	
2	0	3	2	
3	0	0	5	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 3 (essential)
Group (n=56) modal score in round three: 3 (essential)

Table 9.4 Obtaining a Relevant Postgraduate Qualification Cross-tabulation

Professional group				Opinion change between rounds two and three
ESPs (n=19)	**1**	**2**	**3**	2 ESPs moved towards the group modal score and 2 moved away from it
1	0	1	0	
2	0	8	2	
3	0	1	7	
GPswSI (n=11)	**1**	**2**	**3**	2 GPswSI moved towards the group modal score
1	0	0	0	
2	0	6	0	
3	0	2	3	
Consultant neurologists (n=3)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	0	0	
3	0	0	3	
Consultant neurosurgeons (n=1)	**1**	**2**	**3**	1 consultant neurosurgeon moved towards the group modal score
1	0	0	0	
2	0	0	0	
3	0	1	0	
Consultant orthopaedic surgeons (n=11)	**1**	**2**	**3**	1 consultant orthopaedic surgeon moved towards the group modal score
1	1	0	0	
2	0	6	0	
3	0	1	3	
Consultant rheumatologists (n=11)	**1**	**2**	**3**	1 consultant rheumatologist moved towards the group modal score and 1 moved away from it
1	2	0	0	
2	0	6	1	
3	0	1	1	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 2 (desirable)
Group (n=56) modal score in round three: 2 (desirable)

Table 9.5 Completing a Formal Apprenticeship with a Medical Consultant Cross-tabulation

Professional group				Opinion change between rounds two and three
ESPs (n=19)				5 ESPs moved towards the group modal score
	1	**2**	**3**	
1	0	1	0	
2	0	12	0	
3	0	4	2	
GPswSI (n=11)				1 GPwSI moved away from the group modal score
	1	**2**	**3**	
1	3	0	0	
2	0	6	1	
3	0	0	1	
Consultant neurologists (n=3)				No change
	1	**2**	**3**	
1	0	0	0	
2	0	1	0	
3	0	0	2	
Consultant neurosurgeons (n=1)				No change
	1	**2**	**3**	
1	0	0	0	
2	0	0	0	
3	0	0	1	
Consultant orthopaedic surgeons (n=11)				2 consultant orthopaedic surgeons moved towards the group modal score
	1	**2**	**3**	
1	0	0	0	
2	0	2	0	
3	0	2	7	
Consultant rheumatologists (n=11)				No change
	1	**2**	**3**	
1	1	0	0	
2	0	6	0	
3	0	0	4	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 2 (desirable)
Group (n=56) modal score in round three: 2 (desirable)

Table 9.6 Mini-CEX (Mini Clinical Evaluation Exercise) Cross-tabulation

Professional group	Round 2	1	2	3	Opinion change between rounds two and three
ESPs (n=19)	1	0	0	1	6 ESPs moved towards the group modal score
	2	0	7	5	
	3	0	0	6	
GPswSI (n=11)	1	0	1	1	1 GPwSI moved towards the group modal score and 1 moved away from it.
	2	0	6	0	
	3	0	0	3	
Consultant neurologists (n=3)	1	0	0	0	No change
	2	0	0	0	
	3	0	0	3	
Consultant neurosurgeons (n=1)	1	0	0	0	No change
	2	0	0	0	
	3	0	0	1	
Consultant orthopaedic surgeons (n=11)	1	2	0	0	3 consultant orthopaedic surgeons moved towards the group modal score
	2	0	2	3	
	3	0	0	4	
Consultant rheumatologists (n=11)	1	0	0	0	1 consultant rheumatologist moved towards the group modal score
	2	0	1	1	
	3	0	0	9	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 3 (essential)
Group (n=56) modal score in round three: 3 (essential)

Table 9.7 Working Knowledge of Operative Procedures Cross-tabulation

Professional group				Opinion change between rounds two and three
ESPs (n=19)				3 ESPs moved towards the group modal score
	1	**2**	**3**	
1	0	0	0	
2	0	8	0	
3	0	3	8	
GPswSI (n=11)				1 GPwSI moved towards the group modal score and 1 moved away from it
	1	**2**	**3**	
1	1	0	0	
2	0	4	1	
3	0	1	4	
Consultant neurologists (n=3)				No change
	1	**2**	**3**	
1	0	0	0	
2	0	1	0	
3	0	0	0	
Consultant neurosurgeons (n=1)				1 consultant neurosurgeon moved away from the group modal score
	1	**2**	**3**	
1	0	0	0	
2	0	2	1	
3	0	0	0	
Consultant orthopaedic surgeons (n=11)				1 consultant orthopaedic surgeon moved away from the group modal score
	1	**2**	**3**	
1	0	0	0	
2	0	8	1	
3	0	0	2	
Consultant rheumatologists (n=11)				1 consultant rheumatologist moved towards the group modal score
	1	**2**	**3**	
1	2	1	0	
2	0	7	0	
3	0	0	1	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 2 (desirable)
Group (n=56) modal score in round three: 2 (desirable)

Table 9.8 Sensitivity and Specificity Cross-tabulation

Professional group				Opinion change between rounds two and three
ESPs (n=19)	**1**	**2**	**3**	4 ESPs moved towards the group modal score and 1 moved away from it
1	0	1	0	
2	0	6	4	
3	0	0	8	
GPswSI (n=11)	**1**	**2**	**3**	1 GPwSI moved towards the group modal score
1	0	0	0	
2	0	3	1	
3	0	0	7	
Consultant neurologists (n=3)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	0	0	
3	0	0	3	
Consultant neurosurgeons (n=1)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	0	0	
3	0	0	1	
Consultant orthopaedic surgeons (n=11)	**1**	**2**	**3**	1 consultant orthopaedic surgeon moved away from the group modal score and 1 moved towards it
1	1	0	0	
2	0	3	1	
3	0	1	5	
Consultant rheumatologists (n=11)	**1**	**2**	**3**	1 consultant rheumatologist moved away from the group modal score and 2 moved towards it
1	0	1	0	
2	0	3	2	
3	0	0	5	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 3 (essential)
Group (n=56) modal score in round three: 3 (essential)

Table 9.9 Core Medical Texts and Journal Articles Cross-tabulation

Professional group				Opinion change between rounds two and three
ESPs (n=19)	**1**	**2**	**3**	1 ESP moved towards the group modal score and 4 moved away from it
1	0	1	0	
2	0	6	4	
3	0	0	8	
GPswSI (n=11)	**1**	**2**	**3**	1 GPwSI moved away from the group modal score
1	0	0	0	
2	0	3	1	
3	0	0	7	
Consultant neurologists (n=3)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	0	0	
3	0	0	3	
Consultant neurosurgeons (n=1)	**1**	**2**	**3**	No change
1	0	0	0	
2	0	0	0	
3	0	0	1	
Consultant orthopaedic surgeons (n=11)	**1**	**2**	**3**	1 consultant orthopaedic surgeon moved towards the group modal score and 1 moved away from it
1	1	0	0	
2	0	3	1	
3	0	1	5	
Consultant rheumatologists (n=11)	**1**	**2**	**3**	1 consultant rheumatologist moved towards the group modal score and 2 moved away from it
1	0	1	0	
2	0	3	2	
3	0	0	5	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 2 (desirable)
Group (n=56) modal score in round three: 2 (desirable)

Table 9.10 Critical Review of the Literature Cross-tabulation

Professional group		1	2	3	Opinion change between rounds two and three
ESPs (n=19)	**1**	0	0	0	3 ESPs moved towards the group modal score
	2	0	8	0	
	3	0	3	8	
GPswSI (n=11)	**1**	1	1	0	2 GPswSI moved towards the group modal score
	2	0	6	0	
	3	0	1	2	
Consultant neurologists (n=3)	**1**	0	0	0	No change
	2	0	2	0	
	3	0	0	1	
Consultant neurosurgeons (n=1)	**1**	0	0	0	No change
	2	0	1	0	
	3	0	0	0	
Consultant orthopaedic surgeons (n=11)	**1**	0	0	0	1 consultant orthopaedic surgeon moved towards the group opinion and 1 moved away from it
	2	0	7	1	
	3	0	1	2	
Consultant rheumatologists (n=11)	**1**	1	0	0	1 consultant rheumatologist moved towards the group modal score
	2	0	6	0	
	3	0	1	3	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 2 (desirable)
Group (n=56) modal score in round three: 2 (desirable)

Table 9.11 Abdominal Examination Cross-tabulation

Professional group				Opinion change between rounds two and three
	ESPs (n=19)			2 ESPs moved towards the group modal score
	1	**2**	**3**	
1	2	2	0	
2	0	14	0	
3	0	0	1	
	GPswSI (n=19)			1 GPwSI moved away from the group modal score
	1	**2**	**3**	
1	7	0	0	
2	0	3	1	
3	0	0	0	
	Consultant neurologists (n=3)			1 consultant neurologist moved away the group modal score
	1	**2**	**3**	
1	0	0	0	
2	1	2	0	
3	0	0	0	
	Consultant neurosurgeons (n=1)			1 consultant neurosurgeon moved towards the group modal score
	1	**2**	**3**	
1	0	1	0	
2	0	0	0	
3	0	0	0	
	Consultant orthopaedic surgeons (n=11)			No change
	1	**2**	**3**	
1	2	0	0	
2	0	9	0	
3	0	0	0	
	Consultant rheumatologists (n=11)			1 consultant rheumatologist moved away from the group modal score
	1	**2**	**3**	
1	5	0	0	
2	1	5	0	
3	0	0	0	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 2 (desirable)
Group (n=56) modal score in round three: 2 (desirable)

Table 9.12 Cardiovascular Examination Cross-tabulation

<table>
<tr><th>Professional group</th><th>Opinion change between rounds two and three</th></tr>
<tr><td>

ESPs (n=19)

	1	2	3
1	1	1	0
2	1	13	0
3	0	2	1

</td><td>3 ESPs moved towards the group modal score and 1 moved away from it</td></tr>
<tr><td>

GPswSI (n=11)

	1	2	3
1	6	0	0
2	0	4	1
3	0	0	0

</td><td>1 GPwSI moved away from the group modal score</td></tr>
<tr><td>

Consultant neurologists (n= 3)

	1	2	3
1	0	0	0
2	0	3	0
3	0	0	0

</td><td>No change</td></tr>
<tr><td>

Consultant neurosurgeons (n=1)

	1	2	3
1	0	0	0
2	0	1	0
3	0	0	0

</td><td>No change</td></tr>
<tr><td>

Consultant orthopaedic surgeons (n=11)

	1	2	3
1	2	0	0
2	0	7	0
3	0	0	2

</td><td>No change</td></tr>
<tr><td>

Consultant rheumatologists (n=11)

	1	2	3
1	5	0	0
2	0	5	0
3	0	1	0

</td><td>1 consultant rheumatologist moved towards the group modal score</td></tr>
</table>

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 2 (desirable)
Group (n=56) modal score in round three: 2 (desirable)

Table 9.13 Respiratory Examination Cross-tabulation

Professional group		1	2	3	Opinion change between rounds two and three
ESPs (n=19)	1	2	1	0	1 ESP moved towards the group modal score
	2	0	15	0	
	3	0	0	1	
GPswSI (n=11)	1	7	0	0	1 GPwSI moved towards the group modal score and 1 moved away from it
	2	0	2	1	
	3	0	1	0	
Consultant neurologists (n=3)	1	0	0	0	No change
	2	0	2	0	
	3	0	0	1	
Consultant neurosurgeons (n=1)	1	0	0	0	No change
	2	0	1	0	
	3	0	0	0	
Consultant orthopaedic surgeons (n=11)	1	2	0	0	No change
	2	0	7	0	
	3	0	0	2	
Consultant rheumatologists (n=11)	1	5	0	0	2 consultant rheumatologists moved towards the group modal score
	2	0	4	0	
	3	0	2	0	

Round 2 responses; **round 3 responses**; **professional group**
Group (n=56) modal score in round two: 2 (desirable)
Group (n=56) modal score in round three: 2 (desirable)

The results of these cross-tabulations demonstrate the consensus-building effect of Delphi, because there was an overall movement towards the group modal score between rounds two and three in all professional groups – although the small numbers involved mean that the results should be interpreted with caution. Interestingly, movement away from the group modal score was also observed in round three. It is difficult to know why this occurred, since experts gave no reasons for their voting in this round. Table 9.14 summarizes the opinion changes observed and it indicates that the ESPs changed their opinions more often than the other professionals did, and that the degree of opinion change among orthopaedic surgeons, rheumatologists and GPswSI was similar. It is difficult to comment on the neurology and neurosurgery groups in relation to the other groups due to the small numbers of experts involved.

Table 9.14 Opinion Change According to Movement Towards or Away from the Group Modal Score between Rounds Two and Three (n=56)

	ESP (n=19)	**GP (n=11)**	**Neuro (n=3)**	**N/Surg (n=1)**	**Ortho (n=11)**	**Rheum (n=11)**
GALS	3 towards 2 away	2 towards	No change	No change	1 towards 1 away	1 towards
Completing accredited course	4 towards 1 away	1 towards	No change	No change	1 towards 1 away	2 towards 1 away
Obtaining Postgrad Qualification	2 towards 2 away	2 towards	No change	1 towards	1 towards	1 towards 1 away
Apprentice-ship	5 towards	1 away	No change	No change	2 towards	No change
Mini-CEX	6 towards	1 towards 1 away	No change	No change	3 towards	1 towards
Operative procedures	3 towards	1 away 1 towards	No change	1 away	1 away	1 towards
Sensitivity & specificity	4 towards 1 away	1 towards	No change	No change	1 away 1 towards	1 away 2 towards
Core texts	1 towards 4 away	1 away	No change	No change	1 away 1 towards	1 towards 2 away
Critical review	3 towards	2 towards	No change	No change	1 away 1 towards	1 towards
Abdominal examination	2 towards	1 away	1 away	1 towards	No change	1 away
CV examination	1 away 3 towards	1 away	No change	No change	No change	1 towards
Respiratory examination	1 towards	1 towards 1 away	No change	No change	No change	2 towards
Number of opinion changes	**48**	**18**	**1**	**3**	**17**	**19**

9.3 Levels of agreement

The heterogeneous nature of the expert panel resulted in the PI expecting to find different levels of agreement among professional groups. Table 9.15 lists the same 12 competencies with the professional group modal category at the end of round three. All groups agreed fully on three competencies: ‘GALS screening’, ‘completing an accredited course’, and ‘critical review of the literature’. The GPswSI disagreed with the other professionals on five competencies: ‘working knowledge of operative procedures’, ‘mini-CEX’, and the three physical examination skills (‘abdominal, examination’, ‘respiratory examination’, and ‘cardiovascular examination’). The neurologist disagreed with the other groups on one competency item (‘obtaining a relevant postgraduate qualification’) and the two competencies demonstrating the least agreement overall were ‘completing a formal apprenticeship’, and ‘sensitivity and specificity of clinical tests’.

Table 9.15 Levels of Agreement between Professional Groups at the end of Round Three for the 12 Items Subjected to a cross-tabulation analysis.

Competencies	ESP (n=19) modal score	GPwSI (n=11) modal score	Neuro (n=3) modal score	N/Surg (n=1) modal score	Ortho (n=11) modal score	Rheum (n=11) modal score
GALS (Gait Arms Legs Spine) regional MSK examination screening	Essential	Essential	Essential	Essential	Essential	Essential
Completing an accredited course	Essential	Essential	Essential	Essential	Essential	Essential
Obtaining a relevant postgraduate qualification	Desirable	Desirable	Essential	Desirable	Desirable	Desirable
Completing a formal apprenticeship with a medical consultant	Desirable	Desirable	Essential	Essential	Essential	Essential
Mini-CEX (Mini Clinical Evaluation Exercise)	Essential	Desirable	Essential	Essential	Essential	Essential

Working knowledge of operative procedures, including benefits and risks	Desirable	Essential	Desirable	Desirable	Desirable	Desirable
Sensitivity and specificity of clinical tests used in the physical examination	Essential	Essential	Essential	Desirable	Desirable	Essential
Core medical texts and journal articles	Desirable	Desirable	Essential	Desirable	Desirable	Desirable
Critical review of the literature	Desirable	Desirable	Desirable	Desirable	Desirable	Desirable
Abdominal examination	Desirable	Not relevant	Desirable	Desirable	Desirable	Desirable
Cardiovascular examination	Desirable	Not relevant	Desirable	Desirable	Desirable	Desirable
Respiratory examination	Desirable	Not relevant	Desirable	Desirable	Desirable	Desirable

9.4 Summary

This chapter presented a cross-tabulation analysis of 12 competencies, which demonstrated that the Delphi method was able to develop consensus, because opinion shifted in the general direction of the overall group modal score between rounds two and three. However, it also showed that there were inexplicable instances where experts changed their opinion but voted against the overall group modal score; this observation would have been missed had this analysis not been carried out. The reasons for this behaviour are not known but it could have been due to personality differences or because individuals wanted to try to influence voting in a specific direction. It provides weak evidence that the Delphi method can mask disagreements and one wonders if a face-to-face interaction used alongside Delphi methodology would have reduced this ‘negative’ voting. One can only speculate about possible trends in terms of the behaviour of different professional groups but, given the small sample of data and unequal numbers in each professional group, it would be unwise to draw firm conclusions from these observations. The next chapter discusses the Delphi methodology in more depth and discusses the implications and clinical importance of the results of this study.

Chapter 10
Discussion

10.1 Introduction

This chapter will discuss the various stages of the research process from the recruitment of experts to a discussion of the main findings in relation to the literature. It provides further insight into the Delphi process and challenges encountered during the study. It will also reflect on a number of limitations relating to the design of the study and its execution.

10.2 The Delphi Process

10.2.1 Experts and Expertise

Sheather (2010) talked about every age having its source of wisdom. He referred to ancient civilizations having the oracle at Delphi and called our modern times the age of the expert. Although experts are often exalted for their supposed infallibility and probity, the commonly held view that they always provide the right answer is misguided. Freedman (2010) remarked on publication bias within research, and discussed the failings of the expert involved in the case of Sally Clark, who was convicted of the murder of her two sons; the expert was later charged with serious professional misconduct and incompetence (Dyer, 2005). Perhaps this is why it has been said that ‘the group view has a higher probability of being correct than the view of any one individual’ (Goldstein, 2002, p.217). It is certain that a single expert or a homogeneous expert group could not have answered the complexity of the professional practice issues involved in this study.

The expert panel is the ‘lynchpin’ of the Delphi method (Green et al., 1999) and its size and composition influence the outcomes and validity of a study’s findings (Campbell et al., 1999; Dawson & Brucker, 2001). Defining expertise is essential in order to strengthen the validity of a Delphi study’s results (De Villiers, De Villiers, & Kent, 2005). According to Grisham (2009, p.6), the results of a Delphi study are ‘only as good as the experts who participate on the panel’. The difficulties associated with defining expertise are well known (Goodman, 1987; McKenna, 1994; Beech, 1999; Keeney et al., 2001), but there is still no universal definition of an expert. Some definitions are quite loose and use terms such as ‘informed individuals’ (McKenna, 1994) or ‘individuals with specialist knowledge’ (Goodman, 1987; Beech, 1999). Shanteau et al. (2002) discussed expertise in more depth and suggested a number of associated concepts: experience, certification, social acclamation, intra-person reliability, discrimination ability, behavioural characteristics, and knowledge tests; they even introduced the notion that it is possible to train people to become experts. Adler & Ziglio (1996) cited four criteria that they considered Delphi participants should possess: knowledge and experience of the subject, a capacity and willingness to take part in a Delphi survey, sufficient time to participate, and effective communication skills. It is important for experts to have credibility within the field (Fink et al., 1984; Jones & Hunter, 1995), and an experienced clinician is considered an appropriate expert (Nair, Aggarwal, & Khanna, 2011).

The experts in this current study were practising health-care professionals. Although using a knowledgeable group of busy clinicians did not necessarily guarantee expertise, the Delphi literature reveals this practice to be commonplace; furthermore, these individuals were best placed to answer the research question. Interestingly, experts are not always considered necessary for Delphi panels (Sackman, 1975; Walker, 1994), and Welty (1972) argued that if the nature of the research is such that using experts is doing little more than adding prestige to the proceedings then using non-experts is appropriate. Furthermore, some Delphi designs lend themselves to the non-expert panellist. For example, the policy Delphi makes use of the public at large (Turoff, 1970; Buck et al., 1993; De Loe, 1995). Some studies have used patients in their Delphi panels (Alahlafi & Burge, 2005; Elwyn et al., 2006; Sinha, Smyth, & Williamson, 2011; Lakke et al., 2012), because either the research question concerned the patient experience, or the researcher felt that patients would contribute a unique and valuable perspective. Patients were not included in this study because they would not have had sufficient knowledge to answer the research question in its entirety, although their views on attitudes and behaviours would have been valuable. ESPs were included because of their in-depth knowledge of their role, and because they were likely to contribute opinions not considered by the medical experts. Furthermore, there was a risk that an expert panel comprising solely of medical (non-ESP) experts might not have reflected the actual experience of MSK ESPs in practice. Carley et al. (2006) demonstrated disparity between what their expert panel considered important for junior doctors' education and training, and what these junior doctors were actually exposed to in clinical practice.

10.2.2 Panel Composition

Some authors have argued that if a heterogeneous panel reaches a consensus then its findings must be worthwhile, because diversity within a panel tends to decrease the chances of agreement (Atkinson & Gold, 2001; Mead & Moseley, 2001). Studies from psychology suggest that although heterogeneity improves decision-making in a group (Bantel, 1993), there is no guarantee that expert panellists will reach a consensus on the most important issues. It is thought that the greater the depth of expertise, the greater the possibility that bias will be introduced, which is referred to by Linstone & Turoff (2002) as 'illusory expertise'. A heterogeneous group should counteract this effect by introducing a wide range of views and a more balanced perspective (Hutchings & Raine, 2006). However, there may be more disagreement within a heterogeneous group and some authors have argued that if there is a diverse range of status or authority then there is still a possibility (despite the anonymity conferred by Delphi) that the minority view could be suppressed (Vinokur et al., 1985).

The choice between a heterogeneous and a homogeneous Delphi panel ultimately depends on the subject matter and the purpose of the study. Most Delphi researchers favour heterogeneity (de Meyrick, 2003; Mullen, 2003; Powell, 2003; Hardy et al., 2004) and cite an improvement in validity and an increased likelihood of considering all aspects of the research topic as their justification for this. The advantages of a heterogeneous panel have been noted in studies concerning appropriateness rating. For example, Leape et al. (1992) compared the ratings of an all-surgical panel with a 'balanced' panel of surgeons and physicians on the appropriateness of indications for carotid endarterectomy. They found that the all-surgeon panel was more likely to favour surgical treatment; these observations on the influence of medical specialty on appropriateness ratings have been reported elsewhere (Coulter, Adams, & Shekelle, 1995; Kahan et al., 1996; Ayanian et al., 1998; Fitch et al., 1999; Bernstein et al., 2001). Conversely, one could argue that some study topics lend themselves to a homogeneous panel. For example, Avouac et al. (2011) used a homogeneous panel of rheumatologists in their Delphi study investigating the early diagnosis of systematic sclerosis, and Taylor et al. (2009) applied the same principles to their Delphi study concerning the definition of a gout flare.

Hill & Fowles (1975) discussed the inherent bias in Delphi studies, and argued that experts volunteer to take part because they hold particular views about the subject matter. This is true – experts are most unlikely to be impartial - but this is part of what makes them experts. Robson & Rew (2010, p.235) commented that the expert panel is ‘more likely to reflect co-operating opinion than adversarial opinion’, which raises an important point. What are the implications of the Delphi researcher knowing the views of prospective experts? It is possible that researchers could approach experts who they know hold specific views about the subject under investigation. This could constitute a misuse of Delphi methodology and it was one of the reasons why prospective experts were not approached directly in this study. Interestingly, one expert did admit to holding ‘slightly negative’ views of ESPs and wondered if this would exclude her from taking part; she was advised that it would not. Delphi expert panellists are unlikely to be equally knowledgeable, especially in heterogeneous panels, and these differences in knowledge levels might need addressing when results of a Delphi are analysed or interpreted.

This current study focused on the management of MSK conditions in primary-care-based interface clinics by ESPs. Excluding trauma or emergency MSK conditions, primary-care services in the UK are the first point of call for patients with MSK pain conditions; they are the gateway to specialist services based in secondary care. A heterogeneous expert panel was used because MSK medicine crosses a number of medical specialties, in both primary and secondary care; MSK diseases can present with multiple organ problems and systemic conditions can masquerade as benign MSK conditions. Secondary-care experts were important to this study because the literature supports the deficit in GP training in MSK medicine, and the inadequacies in MSK community medicine in general. The study did not specify that the ESP volunteers needed to be working in a primary-care setting, because the ESP role in primary care is relatively new and there were concerns that having this as a specific inclusion criteria might affect ESP recruitment. ESPs from a range of MSK specialist fields were sought and it was surprising to discover that 53% of ESPs responding to all or part of the study were based in primary care; the remainder worked in secondary-care-based orthopaedic clinics, 'MSK trauma', and rheumatology.

10.2.3 Panel Size

This study recruited 72 volunteers and 63 experts responded to all or part of the Delphi study, with 56 experts completing all three rounds. The literature provides little guidance on the optimum size for a Delphi panel, let alone if there should be equal numbers of the different disciplines in a heterogeneous panel. The Delphi expert panel favours group dynamics over statistical power (Okoli & Pawlowski, 2004) because, as Powell (2003, p.378) argued, the representativeness of a Delphi expert panel 'is assumed on the qualities of the expert panel rather than its numbers'. Most authors agree that panel size varies according to the purpose and nature of the study, the consensus criteria used, and the resources available (Delbecq & Van de Ven, 1971; Bartu et al., 1993; Misener, Watkins, & Ossege, 1994; Cantrill, Sibbald, & Buetow, 1996; Hasson et al., 2000). Murphy et al. (1998) considered that fewer than six experts compromised reliability and so a typical Delphi panel comprises between 15 and 30 experts (Linstone & Turoff, 1975); the original Delphi study had seven (Dalker & Helmer, 1963). Recommendations in the literature vary from 20 (Reid, 1988; Jeffery et al., 2000; Fitch et al., 2001; Mullen, 2003) to several hundred (Wild & Torgersen, 2000), or even thousands (Lawrence et al., 1983; Cantrill et al., 1996). Perhaps the most important deciding factor is if the numbers can be justified for the study in question (Reid, 1988). Studies with larger panels may produce more outcomes that are reliable and allow for a more meaningful analysis of results, particularly if statistical tests are applied to the data. However, Linstone & Turoff (2002) argued that using experts negated the need for large panels, and Mullen (2003) felt that many of the criticisms of small panels resulted from researchers confusing a Delphi survey with one of the more conventional quantitative survey methods. There is very little guidance in the literature regarding sample size in a Delphi study (Steurer, 2011); it is generally accepted that Delphi sample sizes are variable (Delbecq, Van de Ven, & Gustafson, 1975). In the current study, a minimum of five experts from each of the seven professional groups was preferred but no upper limit was stipulated.

10.2.4 Recruitment Considerations

It is important for Delphi researchers to find a balance between fulfilling the requirements of expertise and more practical issues. This study required experts who were interested in taking part in the Delphi survey, and who understood the time commitment involved. Being a Delphi panellist can be onerous and time-consuming; lengthy or over-complicated questionnaires can result in expert panel fatigue. If attrition rates are to remain low, experts must be made aware of what is expected of them (Huckfeldt & Judd, 1974). Delphi studies are associated with high attrition rates (Mitchell, 1991); the PI knew this and had to be careful with the demands on experts' time in this study, because a high attrition rate would have resulted in an uneven representation of expert opinion over successive rounds. This, in turn, would have led to results based on a small subset of the original expert panel population, which would have compromised the internal validity of the study.

Careful selection of participants is essential to obtain trustworthy results (Steurer, 2011) and there were a number of reasons for the choice of recruitment method used in this study. Professional organizations keep members' names and contact details confidential and so it would have been difficult gaining access to experts without seeking the help of professional bodies. It helped to address the issue of coverage error (Dillman, 2007) by allowing more members of the target population an equal chance of taking part in the study. It also minimized the non-response error that can result from experts who respond being different (in a way that is relevant to the study) from experts who do not respond. Furthermore, purposive sampling by professional organizations enabled help to be solicited from a larger sample of the target population (and from a wider geographical area) than might otherwise have been achieved. Having the support of a professional body conferred a degree of gravitas to the proceedings. The other advantage of recruiting in this way was that the professional organizations had privileged knowledge about their members and were therefore able to target recruitment appropriately. However, this did not rule out the potential for bias in participant selection, because key persons made judgements about which experts to approach; this might have posed a threat to the external validity of a study and thus the generalizability of its findings. There could also have been a non-response bias in this study, although response rates were good – and significantly better than the response rates found in the majority of studies in the literature. There was no way of knowing if the experts who dropped out would have agreed with the other experts had they remained in the study. Examination of the demographic data did not reveal any obvious differences between responders and non-responders but it was impossible to establish if those experts who did not respond were in some way different from those who did.

Delphi methodology is often criticised by researchers from a more positivist background, who complain about the absence of a random sample and poor representativeness of the research participants. Although a small number of researchers have selected their panels randomly (Kilroy & Mooney, 2007) or have used stratified random sampling where there was a large number of potential experts to draw on (Loo, 2002), this is most unusual. Delphi researchers argue that because their methodology is predicated on expert opinion - and experts are unlikely to exist in large numbers or be representative of their own population - their panellists do not have to be randomly selected (Helmer, 1977; Beretta, 1996; Mullen, 2003) or representative for statistical purposes (Ziglio, 1996; Okoli & Pawlowski, 2004). The qualities of an expert panel and the way experts are selected supersede representativeness and random selection (Powell, 2003; Baker et al., 2006). For the purpose of this study, clinicians' consultant, specialist, and extended practice status defined their expertise; this was considered sufficient to confer the required level of expert knowledge. Of the 37 medical experts who completed all three rounds, 92% had experience of working with an ESP, which strengthened the study. Experts in Delphi studies are self-selected and this can introduce research participants who have biased opinions, or who have their own agenda and reasons for participating (Bender et al., 1969; Ishikawa et al., 1993). In practice, the reasons why people do or do not volunteer when approached are varied. McKee et al. (1991) looked at whether or not doctors volunteering to take part in expert panels were representative of their colleagues. They invited 503 medical consultants in one English health authority to participate in expert panels. The only significant difference seen between the consultants who agreed to take part and those who did not (or who did not reply) was in their place of employment; consultants employed by teaching hospitals were less likely to volunteer; in the current study, all non-responders were based in teaching hospitals.

The PI knew a handful of experts and this could have presented a conflict of interest, but there was no communication between the PI and these individuals throughout the Delphi process. There was no way of knowing if experts working at the same hospital spoke to each other about the study, and one has to assume that experts completed questionnaires themselves. The PI received assistance from two local university departments during the recruitment process, which might have introduced bias because the PI held honorary contracts at both organizations. The time required to recruit the expert panel was greatly underestimated, and this might have been because recruitment took place during the summer holidays. Using a financial reward during the recruitment phase might have improved matters, but this would have been a costly exercise and might have raised questions relating to the effects on the validity of research findings. It would also have been difficult to administer in an electronic environment**.** The use of a token financial incentive does seem to improve response rates among physicians (VanGeest et al., 2007; Thorpe et al., 2009). However, Goritz (2006, p. 65) conducted a review of the use of incentives in online surveys and concluded that 'material incentives increase the odds of a person responding by 19% over the odds without incentives'*.* Dillman (2007) commented that material incentives such as ballpoint pens resulted in less improvement in response rates than financial incentives of comparable value.

Although the numbers of females and males responding to all or part of the Delphi study (n=63) were roughly equal (29 women and 34 men), there were obvious differences between professional groups in terms of male to female ratios (Appendix XI). For example, there was only one female consultant orthopaedic surgeon, and the majority of ESPs (89%) were women. This study did not require an even gender split among the experts. As already stated, the Delphi method does not require panels to be representative for statistical purposes, and 'representativeness is assessed on the qualities of the expert panel rather than its numbers' (Powell, 2003, p.378). Furthermore, the anonymity conferred by the Delphi methodology meant that experts did not know the gender of the other participants, and the gender-mix within the groups did seem to be representative of these professions. Physiotherapy has always been a female-dominated profession, and men currently make up approximately 19% of the UK physiotherapy workforce (Clews, 2010). The Centre for Workforce Intelligence (CfWI, 2011) reported that in 2009, women made up just 4% of the trauma and orthopaedic consultant UK workforce; the situation is similar in the US (Lewis, Scherl, & O'Connor, 2012; Van Heest & Agel, 2012). However, the Royal College of Physicians predicts that there will be more women doctors in the NHS at some point between 2017 and 2022 (Elston, 2009).

10.2.5 Anonymity

Experts' identities and their responses remained anonymous throughout the Delphi process, which is a key characteristic of the Delphi methodology. However, only quasi-anonymity (McKenna, 1994; Keeney et al., 2001) could be guaranteed in this study since the PI knew the identity of panellists. True anonymity would have precluded the follow up of non-responders. Some Delphi designs only guarantee the anonymity of experts' responses, for example the decision-Delphi (Rauch, 1979). Researchers argue that anonymity balances the power dynamics that can occur with face-to-face groups by preventing certain individuals or groups from dominating others (Williams & Webb, 1994; Walker & Selfe, 1996). It can allow respondents the freedom to express views without feeling obliged to follow others' line of reasoning by conforming to group opinion. Thus, experts are not 'making a public statement of a position', because anonymity allows 'a reappraisal of viewpoint without loss of face' (Sumsion, 1998, p.154). This loss of inhibition can allow experts the freedom to express views that they would rather not share in an open forum, views for which they do not necessarily wish to take responsibility. Delphi critics argue that this lack of accountability is an inherent weakness in the method, because experts may make unconsidered or hasty judgements (Sackman, 1975; Goodman, 1987). There is no evidence that Delphi encourages snap decision-making, but even if it did Gladwell (2005) contended that experts often make better decisions with snap judgements than they do with lengthy consideration and analysis. Some authors view Delphi's absence of face-to-face discussion as a distinct disadvantage (Strauss & Ziegler, 1975; Campbell, Econ, & Cantrill, 2001) while others argue that the 'stimulation and spawning of ideas' which occurs in face-to-face meetings can still occur in Delphi studies (Rudy, 1996, p.19). Delphi experts may reveal their identities unintentionally and whether or not this influences results is almost impossible to determine; however, it is something that Delphi researchers should bear in mind, although there may not be very much they can do about it. The anonymity conferred by the Delphi process was considered advantageous in this study, because ESPs might have felt intimidated by their medical colleagues in a face-to-face meeting of experts.

10.2.6 The Questionnaire Rounds

There is little evidence in the literature to help researchers to determine the optimum number of rounds in a Delphi survey. A basic tenet of the Delphi method is that it uses as many rounds as are required to achieve consensus (Sackman, 1975). In reality, the number of rounds is often decided beforehand to suit the researcher's needs, and this may be due to the availability of resources and the complexity of the research question (Fink et al., 1984; Jones, Maddison, & Doherty, 1992; Jones, Sanderson, & Black, 1992). Limiting rounds in this way means that the Delphi process may stop before a full consensus is reached. The original Delphi had four rounds (Martino, 1983; Erffmeyer, Erffmeyer, & Lane, 1986; Sumsion, 1998) and the minimum number of rounds is two. Although two-round Delphi studies are uncommon, there are examples in the literature (Brooke et al., 1998; Shield et al., 2003; Tigelaar et al., 2004; Brill, Bishop, & Walker, 2006; Yousefi-Nooraie et al., 2007; Clay-Williams & Braithwaite, 2009; Green et al., 2009; Linney, Kernohan, & Higginson, 2010; Penciner et al., 2011). A minimum of two rounds (or three, if the first round is unstructured) is considered sufficient to allow for feedback and revision of responses in a Delphi survey. However, some authors have used an unstructured first round and only one additional round, giving their experts no opportunity to reconsider and revise their responses (Butterworth & Bishop, 1995; Gallagher, Branshaw, & Nattress, 1996); this begs the question of why they used a consensus-building methodology in the first place. The Delphi literature reveals that surveys containing two to four rounds are the standard to obtain a consensus view (Linstone, 1975; Procter & Hunt, 1994; Adler & Ziglio, 1996; Walker & Selfe, 1996; Sumison, 1998; Green et al., 1999; Hasson et al., 2000; Linstone & Turoff, 2002; Boulkedid et al., 2011).

A large number of papers were studied before deciding to limit the number of rounds in this study to three. There are many examples of three-round Delphi studies in the literature, where a full consensus has been reached; for example, Langlands et al. (2008a), Webster-Harrison, White & Rae (2002), and Evers et al. (2005). However, there are also examples where the Delphi survey has been limited to three rounds, leaving the consensus incomplete (Staggers, Gassert, & Curran, 2002; Beattie & Mackway-Jones, 2004; Greenhalgh & Wengraf, 2008; Glaessel et al., 2011; Hunter et al., 2011; Lakke et al., 2012). An incomplete consensus was considered an acceptable risk in this study because maintaining a good response rate throughout the study was of paramount importance. The experts were busy senior professionals in full-time clinical practice and, because the first round was so labour-intensive, it was hoped that limiting the number of rounds to three would ensure continuity of participation by minimizing experts' fatigue, as suggested by Landeta (2006). It was considered preferable to have an incomplete consensus achieved with a low dropout rate than to have a more complete consensus achieved with an ever-decreasing numbers of experts across additional rounds. With only one iterative round, it is possible that this study could have resulted in more competencies reaching the *a priori* consensus had there been further rounds. The experts knew when they volunteered that the study would end after three rounds, but whether or not the good response rate was due to this strategy is uncertain. Boberg & Morris-Khoo (1992) highlighted the length of time it can take to complete a Delphi survey and so the experts in this study were given estimated completion times for each questionnaire, as recommended by Jeste et al. (2010). Feedback during the pilot phases of this study indicated that completion times for all three questionnaires were acceptable.

The original Delphi used an unstructured first round, leaving experts to generate items for consideration in subsequent rounds. It was necessary to use an unstructured first round in this study because of the lack of existing knowledge relating to MSK ESP competencies. Iqbal & Pipon-Young (2009, p.599) supported the unstructured first round because they argued that Delphi should 'explore an area of future thinking that goes beyond the currently known or believed'. However, unstructured first rounds generate a large volume of data, leading some researchers to restrict the number of responses allowed (Schmidt, 1997; Hasson et al., 2000). Experts in this study had no such limits imposed on them. Providing references or links to sources of data in the first round is considered important by some researchers (Black et al., 1999; Roberts-Davis & Read, 2001) but not by others (Jenkins & Smith, 1994). It is more usual to provide this where the first round is highly structured and experts are presented with a list of items for rating or ranking. There are many examples of structured first rounds in the literature (Milholland, Wheeler, & Heieck, 1973; Romm & Hulka, 1979; Wheeller, Hart, & Whysall, 1990; Binkley et al., 1993; Procter & Hunt, 1994; Petry, Maes, & Vlaskamp, 2007; Kleier, 2009; Coleman & Nicholls, 2010). However, a structured first round risks introducing bias if the researcher imposes his or her own views and preconceptions regarding what should be included (Hsu & Sandford, 2007). Rowe, Wright & Bolger (1991, p. 240) called the use of structured first rounds a 'sloppy execution' of the Delphi method, and Keeney, Hasson & McKenna (2006) argued that they can limit the emergence of new ideas because panellists may feel pressured to reflect the literature in their responses. Some research topics lend themselves to this structured approach more readily than others, especially if there is already a considerable body of existing knowledge. The commonest way to generate a structured first round is to base it on a review of the literature (Hunter et al., 2011) or an existing body of work. However, some Delphi studies have used different methods to generate data for the first round: face-to-face interviews (Green et al., 2009), focus groups (McCarthy et al., 2006; Carnes, Mullinger, & Underwood, 2010), pre-Delphi conferences (Leisner, 1995; Paterson, 1995), and clinical vignettes (Procter & Hunt, 1994; Endacott, Clifford, & Tripp, 1999). In some Delphi studies, face-to-face interviews are interspersed with the Delphi questionnaire rounds (Jones, Sanderson, & Black, 1992; Kirk, Carlisle, & Luker, 1997). These modified Delphi studies are so far removed from the original Delphi design that one can appreciate why Delphi methodology sometimes struggles to shake off its critics – and for this reason, no accompanying methodology was used in this study.

Surveys have been called ‘the most used, and sometimes misused, methodological tool among academic researchers’ (Desselle, 2005, p.1), and because Delphi methodology uses sequential questionnaires to amass data, a Delphi study can exaggerate the problems associated with poor survey design. The ambiguity of questions used in many Delphi studies has been highlighted (Gordon & Helmer-Hirschberg, 1964; Sackman, 1974). However, Murray (1979) argued that in some cases, using ambiguous questions to uncover experts’ beliefs is an appropriate and ‘legitimate’ use of Delphi. Scheele (1975) agreed, stating that ambiguity could be used to glean broader views from experts. This was not the approach used in this study; indeed, every attempt was made to remove ambiguity from the survey questionnaires in the three piloting phases.

The current study used an online Delphi survey. Although there are many Web survey software products on the market (Fan & Yan, 2010), ‘SurveyMonkey’ was chosen for this study because the PI had some experience of using it, both in an NHS and a university setting. ‘SurveyMonkey’ is becoming more commonplace in the health-care literature as a way of conducting online Delphi surveys (Boynton, 2006; Crutzen et al., 2008; Shilton et al., 2008; Barton et al., 2009; Thomson et al., 2009; Valdez, 2009; Bisson et al., 2010; Melnick et al., 2010; Rao et al., 2010; Jerosch-Herold, 2011; Penciner et al., 2011; Lakke et al., 2012). Health-care professionals use computers every day at work, and most of us have access to a computer at home; therefore, there were no concerns about experts’ computer literacy. Using an online medium also meant that the PI did not have trouble deciphering experts' writing. 'Surveymonkey' is a secure Web-based survey system that offers a range of question types and allows immediate download of data into spreadsheets for further analysis, and it requires no software installation. The website also provides the facility to filter responses, which enabled responses to be categorized according to the professional group; data relating only to those experts who had responded in all three rounds could also be filtered.

Some researchers include non-responders in subsequent rounds (Bond & Bond, 1982; French et al., 2002). Non-responders were included in round two of the current study because voting did not commence until the second round. However, non-responders were not included in round three because the response rate in round two was good, and it was felt that it was important not to interfere with the Delphi process at this stage. Allowing the addition of experts who have not participated in previous rounds is unwise because, as Murray (1979, p.155) commented, 'If panels with one or more replaced members exist in different rounds the very core of the Delphi procedures appears damaged, and the results must be interpreted with caution'.

It is usual practice to send Delphi results to experts in a final round and in this study, results were sent to the 63 experts who had responded to all or part of the Delphi survey. Both Skulmoski et al. (2007) and Okoli & Pawlowski (2004) argued that it strengthened concurrent validity if experts were asked to validate the researcher's interpretation of results. Although experts in this study were not asked to comment on the final list of competencies or to rank them, a number of them (from the ESP, GPwSI, and rheumatology professional groups) contacted the PI to say how useful they had found them.

10.2.7 Consensus Setting

An *a priori* consensus rule was used in the current study. Competency items reaching 70% agreement or more in the 'essential' or the 'desirable' category had reached the required consensus level. Items reaching less than 70% agreement in either of these two categories were sent through to the next round for rerating, and items reaching 25% or more in the 'not relevant' category were discarded. There were a number of potential problems with this consensus rule. An item could have been ruled in and out at the same time, for example: ‘essential’ (3%), ‘desirable’ (71%), and ‘not relevant’ (26%). Separate ‘essential’ and ‘desirable’ categories were used in order to reflect the person specification within a typical NHS job description. In retrospect, it might have been better not to separate the ‘essential’ and ‘desirable’ categories because by doing so, it masked the overall percentage of positive views associated with many of the competency items. Table 8.7 highlights this fact, since 14 of the 19 items still not reaching the *a priori* consensus by the end of the study nonetheless achieved a combined ‘desirable’ and ‘essential’ rating of more than 90%. The *a priori* consensus rule detailed in Table 10.1 might have been an improvement on the one used in this study. Here, an item is ruled in if > 30% voted ‘essential’ or < 10% ‘voted not relevant’, and it is ruled out if > 70% voted ‘not relevant’ or < 10% voted ‘essential’. However, one would still have to be careful not to allow items to fall into more than one category; for example, if an item scored < 10% ‘not relevant’ and < 10% ‘essential’ then it still could be ruled both in and out simultaneously.

Table 10.1 An alternative *a priori* Consensus Rule

If > x% think ‘essential’ or < y% think ‘not relevant’ then the item is IN, i.e., it will be retained and will not go through to the next round.
If > x% think ‘not relevant’ or < y% think ‘essential’ then the item is OUT, i.e., it will be discarded at this point and will not go through to the next round.
Items falling between these values will go through to the next round for rerating.

Delphi’s *raison d’être* is to gain consensus among experts on the topic under investigation. However, it is important to consider that reaching a consensus view does not necessarily mean that true agreement is present among the panellists (Sackman, 1975; Woudenberg, 1991). Furthermore, ‘the extent to which participants agree with each other does not mean that the “correct” answer has been found’ (Keeney et al., 2006, p.210). It is always possible that the consensus reached represents ‘collective ignorance’ (Jones & Hunter, 1995) and a reflection of ‘the social pressures that an incompetent majority may exert on a competent minority’ (Steiner, 1972 cited in Rowe et al., 1991, p.236). Mullen (2003, p.43) argued that the aim should always be to find the right answer rather than the ‘unanimously agreed wrong answer’. However, Kaynak & Macauley (1984) commented that Delphi should not be considered a decision-making tool aimed at reaching a definitive answer, because there may be no 'right' answer in a Delphi study and an incomplete consensus is undeniably preferable to a consensus that is forced.

A certain amount of rejection of the minority view is an integral part of Delphi's consensus-building methodology; indeed, one could argue that the original Delphi design positively ignores dissent in order to achieve that consensus view. Thus, the outcomes of a Delphi study arguably represent a position of minimum compromise and, as such, they may be misleading because they can indicate a higher level of agreement than is actually present. Procter & Hunt (1994) referred to the use of Delphi in exploring divergent thinking among experts, and some researchers have focused on determining the extent to which different groups of experts agree with one another rather than striving for a consensus (Jones & Hunter, 1995; Xiao et al., 1997; Critcher & Gladstone, 1998; Campbell, Cantrill, & Roberts, 2000). An example of this would be the 'disaggregative' Delphi approach, which rejects the traditional consensus-building format and aims instead to maximize the range of opinions polled (Turoff & Hiltz, 1996; Wilenius & Tirkkonen, 1997; Tapio, 2003). Similarly, the policy Delphi's objective is not to produce a consensus, but to expose the strongest arguments for and against a number of different resolutions of a policy issue. Using Delphi to delineate 'differences and the extent of differences' was reported by Judd (1972, p.184), and Steinert (2009) discussed a Delphi design focusing on disagreement or dissensus. Researchers must know if their aim is to investigate the range of opinion on a topic or to steer the group towards a consensus, because this will determine the type of Delphi method used. In this current study, the aim was to work towards a consensus but not to ignore the competency items on which agreement was not reached.

Defining and agreeing the consensus setting is perhaps the most controversial issue in Delphi methodology (Crisp et al., 1997). There is still much debate surrounding this subject and little guidance in the literature for researchers to follow (Murphy et al., 1998; Rowe & Wright, 1999). Indeed, de Mayrick (2003) found 33 different statistical ways to measure consensus in the Delphi studies they reviewed. Researchers must decide how they will measure agreement between experts and what cut-off point they will use to define a consensus. Most authors recommend setting the consensus level before the commencement of the study, because failing to do this presents a serious challenge to validity (Crisp, Pelletier, & Duffield, 1999; Keeney et al., 2006). Some Delphi researchers have measured the stability of responses over successive rounds in order to preserve outlying opinions and disagreements within the panel (Scheibe et al., 1975; Dajani, Sincoff, & Talley, 1979; Erffmeyer et al., 1986; Buck et al., 1993; Duffield, 1993; Crisp et al., 1997; Graham, Regehr, & Wright, 2003).

Although setting the consensus level is an arbitrary decision for many Delphi researchers, they typically use one of three parameters individually or in combination; these are usually the percentage agreement, a measure of central tendency, and a measure of dispersion. The mean (a representation of group opinion) and standard deviation (a measure of agreement within the panel) tend to prevail, but ordinal data require the median and interquartile range because these are more robust in the presence of skewed data. The literature contains many examples of using median scores above a predefined threshold, with or without the interquartile range (Lynn, Layman & Englebardt, 1998; Jeffery et al., 2000; McBride et al., 2003; Kearney-Mitchell et al., 2006; Hejblum et al., 2008; Valdez, 2009). There are also many examples of using the mean and standard deviation (Smith & Simpson, 1995; Saranto & Leino-Kilpi, 1997; Erickson & Martin, 2000; Broomfield & Humphris, 2001; Turner & Weiner, 2002; Weidner & Henning, 2004).

A percentage rating, which was used in the current study, is also popular. Consensus levels are usually set between 60% and 80%, although most authors fail to justify their choice of setting. Some papers do give this information, particularly where a high consensus setting is needed to reflect the importance of the topic under investigation. For example, in their three-round Delphi study investigating incident planning and response within UK accident and emergency departments in the event of a biological incident, Brown et al. (2006) set their *a priori* consensus at greater than 94% for their second round and greater than 89% for their third round. Similarly, Redman et al. (2004) set a high consensus for their

Delphi study looking at a European competency-based colposcopy core curriculum. They rated an item as essential for the core curriculum if at least 90% of experts gave it a score rating of four or more on a five-point Likert scale. A 75% consensus setting has also been used (Binkley et al., 1993; Cantrill et al., 1998; Fleuren, Wiefferink, & Paulussen, 2004; Cornick, 2006; Edgren, 2006; Li-Yu, et al., 2011). Other levels can be found in the literature, for example, 80% (Green et al., 1999; Roberts-Davis & Read, 2001; Beattie & Mackway-Jones, 2004; Wallis, Carley, & Hodgetts, 2006; Marshall et al., 2007; Singh et al., 2009), and 60% (Chang, 2007; Zhang et al., 2007; Ferguson & Brownlee, 2008). McCarthy et al. (2006) used a 75% *a priori* agreement level with a 5% margin. Thus, an item was excluded if it reached less than 70% agreement and included if it reached more than 80% agreement, and items falling between these two margins were sent through to the next round for re-evaluation. Some authors have been highly specific with their consensus setting. For example, Langlands et al. (2008b) stated that if at least 80% of experts in each group rated an item as essential or important, it was included, but if 80% or more from one or two groups rated an item as essential or important then it went through to the next round for rerating. Furthermore, if 60% to 79% of experts from all three groups rated an item as essential or important then the item was rerated, and items not reaching the above three criteria were excluded. With settings this precise, one has to wonder if researchers are sometimes succumbing to the dubious practice of rejigging their consensus cut-off point after data collection. Nevertheless, the fact remains that the arbitrariness of cut-off points is a recognised problem with the Delphi method (Broomfield & Humphris, 2001).

Some authors have determined consensus empirically using a measure of variance, where stability is reflected in the similarity of responses across rounds, with a reduction in variance indicating a stronger consensus (Duffield, 1993; Xiao et al., 1997; Lynn et al., 1998; Hughes, 2004). A number of other researchers have used the stability of responses to identify their consensus: Scheibe et al. (1975), Dajani et al. (1979), Erffmeyer et al. (1986), Buck et al. (1993), Crisp et al. (1997), and Graham et al. (2003). One other approach to consensus setting is the RAND/UCLA Appropriateness Method (Fitch et al., 2001). This uses an 'interquartile range of the appropriateness ratings (30^{th} to 70^{th} percentiles) adjusted by a factor derived from experimental comparisons the index with agreement patterns observed in panel decision making' (Taylor et al., 2009, p.536), but it is not commonly used.

This study used a simple percentage (70%) rating to determine consensus, and a number of studies supported this: Mackway-Jones et al. (1999), Jerosch-Herold (2004), Ferguson et al. (2005), Stolper et al. (2009) and Colucci et al. (2011),.

10.2.8 The Iterative Process and Feedback

Raine (2006) argued that the only time Delphi experts give an independent opinion is in the first round, when it is first stated; from the second round onward, their opinions are influenced by the views of others. The sole means of communication among panellists is the feedback that occurs between rounds. This feedback presents each expert with his or her own ratings from the previous round alongside the aggregate of the expert group's responses; in light of this information about the collective opinion of others, experts are then asked to rerate items. Feedback is usually in a numerical or statistical form, although some authors have used graphical feedback in the form of histograms (Smart et al., 2010). Simple feedback is favoured (text, percentages, and graphs) because one cannot assume that panellists will be interested in translating complex feedback (Greatorex & Dexter, 2000). Numerical or statistical feedback typically includes a measure of central tendency (as the measure of agreement) such as the mean or median, or a percentage score together with an indication of the distribution or spread of responses (a measure of disagreement), such as the standard deviation or interquartile range. The value of providing some form of frequency distribution is that no outlying data are lost, and using the standard deviation as a measure of dispersion may demonstrate convergence (of opinion) through a narrowing of the distribution frequency.

Most Delphi studies content themselves with a measure of central tendency and an indication of the spread of responses, or a measure of central tendency on its own. The average (median or mean) is often all that researchers use for feedback

(Rowe et al., 1991). A number of studies have used the median scores and percentage agreement without a frequency distribution (McCarthy et al., 2006; Witt & Puntel de Almeida, 2008). The Likert scale in this study produced ordinal data and because there was no true mean, a simple percentage agreement (modal) score was used. In their review of consensus methods, Murphy et al. (1998) recommended the inclusion of qualitative verbatim comments in feedback. However, providing too much raw data in verbatim form could overwhelm participants and affect response rates adversely (Keeney et al., 2006). Thirty-two statements from round two were included in the third and final round, for information only. However, in round two, 22 verbatim statements from round one supplemented the numerical feedback and experts were required to rate their agreement with these statements on a four-point scale. These statements were placed at intervals throughout the second questionnaire, where they complemented the main body of the Delphi survey; the aim was to strengthen the qualitative feedback and focus experts' attention by asking them to rate these items. None of these statements represented new competency items; they had been left untouched by the content analysis in round one because it was felt that if they had been reduced and merged with existing items or discarded then their impact might have been lost.

There are opportunities for the Delphi researcher to introduce bias and misrepresentation during the feedback process. The researcher controls this process and he or she could face accusations of data manipulation if infrequently occurring items are disregarded or if outside views are ignored (Hasson et al., 2000). Welty (1972) voiced concerns about Delphi researchers deliberately presenting inaccurate data to their experts in order to influence results. Nelson (1978) questioned whether or not anyone had ever addressed the issue of misuse of the Delphi method, and suggested that Delphi might have been used by certain groups or individuals linked to organized crime or corrupt practices within politics and business. He referred to a study by Cyphert & Gant (1971), where incorrect statistical data about an item were deliberately fed back to experts by changing the ranking of one item from low to high; they found that the item retained its high ranking because of this data manipulation. Scheibe et al. (1975) also investigated the potential for creating an artificial consensus. They deliberately provided inaccurate feedback by moving the mean of the first round responses; they found that experts shifted their opinion towards the falsified mean. No further data manipulation occurred from that point onward, and the expert consensus gradually reverted towards the original true mean as the rounds progressed; however, the authors argued that the deliberate data manipulation process left some residual effect, because the final distribution of scores favoured the falsified mean. In contrast, Nelson (1978) reported that their artificial shift in opinion was enhanced when additional rounds were used and concluded that feedback in a Delphi study can have a powerful influence on decision-making, and that most experts will move closer towards the perceived consensus view. Finally, Campbell et al. (1999) experimented with collective (whole group) or group-only feedback (own professional group only) in their Delphi study comprising two kinds of experts. They found differences in the outcomes of the two randomly allocated groups according to which kind of feedback was received; those receiving collective feedback were influenced by the other professional group. The outcome of the current study might have been different if each expert had been provided with the modal score for his or her own peer group alongside that of the group as a whole.

It is not beyond the realms of possibility for a Delphi researcher to influence a study's results towards a predetermined outcome. Delphi researchers should be aware of probity issues and be mindful of the fact that 'the results of a Delphi must ultimately rely on the integrity of those who have administered the Delphi' (Nelson, 1978, p.55). For these reasons, the raw data set and every successive data analysis were retained in this current study; furthermore, no data were discarded during the content analysis phase (frequency counts detected duplicate data), and all items not reaching consensus at the end of the study were presented alongside those that did.

10.2.9 What Happened Between Rounds

The phenomenon of regression towards the mean (the consensus opinion) is the desired outcome of Delphi methodology. A shift of opinion towards the group modal score occurred in this study and the ESPs seemed to demonstrate this shift in opinion more than the other professionals did. The overall tendency for opinions to converge in a Delphi study renders those experts who maintain extreme views particularly interesting to the researcher. They also present challenges, because ignoring outlying views can result in an increased dropout rate (Bardecki, 1984), leading to a consensus that is induced or contaminated (Stitt-Gohdes & Crews, 2004). This was not a particular problem in this study since the three-point Likert scale did not provide much scope for extreme views. During the additional analysis of the 12 competency items rated in rounds two and three that did not reach the *a priori* consensus at the end of the study, it was interesting to find instances (in all professional groups) where experts shifted their opinions away from the group modal score. When presented with the feedback in round three, the experts had three options: ignore the feedback, and stick with their round two score; move towards the group modal score; or rebel against the feedback, and vote away from the group modal score. It is difficult to explain why some experts in this study voted against the group modal score. Linstone & Turoff, (2002) devoted a couple of chapters to opinion change across Delphi questionnaire rounds, and a review of their authoritative work suggests that individual experts in the current study might have been attempting to pull the group mean closer to their view, which perhaps indicates that the feedback was not altogether effective.

A weak association between a few personality factors and particular medical specialties has been identified (Borges & Savickas, 2002). An interesting paper by Stilwell et al. (2000) studied Myers-Briggs Type Indicator profiles and medical specialty choice. They found that women were most likely to choose primary-care medicine and that this specialty was also associated with men and women with a preference for feeling and introversion. Males, extraverted, and thinking types tended to choose surgical specialities. Gilligan et al. (1999) also found differences in personality between surgeons and physicians. In a light-hearted approach to doctors' personalities and choice of medical specialty in a Christmas edition of the British Medical Journal, McCain et al. (2010) covertly observed 103 consultants' parking habits at one hospital site over a three-day period. Outcomes included specialty and sex of the consultants, behaviour when approaching the barrier (pass-card ready or not), and time taken to park, exit the vehicle, and walk to a designated point. Their results showed a statistically significant ($p<0.001$) difference in each timed outcome. Surgeons were the fastest overall and physicians were the slowest. Anaesthetists and radiologists were in-between and there was no statistically significant difference between men and women matched by specialty. It is difficult to draw any conclusions regarding the impact of specialty or gender from the results of the current study, but no obvious trends were noticed.

Clayton (1997, p.382) remarked that it was ‘unknown whether panel members think through their relative positions and work towards authentic consistency of opinion, or if they are effectively pressured into conformity’. Perhaps consensus in a Delphi study is achieved more through pressure to conform to others’ views rather than through reconsideration of one’s own responses. Investigating the reasoning behind participants’ change of opinion would be fascinating. Examining the characteristics of participants who change their views radically and those who change very little may offer some insight; however, it would be difficult to achieve in practice. Uhl (1975) repeated his Delphi study one year later with the same group of experts. He found that the second Delphi study’s results were similar to the first round in the earlier study, leading him to conclude that because experts reverted to their original ideas, opinion change may be temporary. Delphi proponents would have us believe that experts change their opinions because the iterative process exposes them to different views, causing them to think about issues that perhaps they had not considered. Delphi critics, on the other hand, argue that the less knowledgeable participants are more likely to be swayed by a belief that group opinion represents the ‘right’ response, whereas the more knowledgeable experts are less likely to move towards the norm (Keeney et al., 2006). Dalkey (1975) coined the terms ‘swingers’ (experts who change their opinion between rounds) and ‘holdouts’ (experts who do not change their views). They suggested that ‘holdouts’ (whom they also referred to as ‘accurate’ experts) tend to draw ‘swingers’ (whom they deemed to be less knowledgeable experts) towards their viewpoint. Woudenberg (1991) felt that experts in a Delphi study could still feel group pressure to conform. Sackman (1975) referred to this as the ‘halo effect’, where experts are seen to conform to group opinion whether they agree or not. The ‘bandwagon effect’ (Linstone & Turoff, 1975) is another term that describes experts being carried along with the group effect. Delphi’s claim to remove peer pressure appears to be flawed. Personality traits might have a bearing on validity and reliability in Delphi studies, and psychometric testing of prospective experts may be seen in future Delphi research.

In practice, there could be any number of factors influencing experts’ shifts of opinion, for example, dogmatism, confidence, personality, experience, and core beliefs and values; perhaps even boredom, irritation, or a desire to end the Delphi process as quickly as possible (de Meyrick, 2003; Mullen, 2003; Hutchings & Raine, 2006). Sahakian (1997) suggested that the Delphi process in fact diminishes the influence of different personalities and personal attributes. Mulgrave & Ducanis (1975) investigated the role of personality within their Delphi study. They measured levels of dogmatism in their experts using a recognized dogmatism scale. They predicted that very dogmatic individuals would be least likely to change their opinion, particularly in relation to issues about which they considered themselves experts. They discovered that the most dogmatic individuals changed their opinion more often than the least dogmatic individuals, which they attributed to the very dogmatic individuals looking to the perceived ‘authority’ of the group median. Very dogmatic individuals were, as predicted, less likely to change their opinion about issues on which they considered themselves experts. Their overall conclusion was that personality traits do appear to influence opinion change within a Delphi process.

Opinions may shift during a Delphi study but individual biases and beliefs may remain unchanged. Rohrbaugh (1979) discovered that their respondents showed no greater agreement after participating in a Delphi than they had done beforehand. Asking experts to explain their reasoning and to elaborate on their views where they differ from the rest of the group may give experts the opportunity to express their views more feely. However, decision-making processes generally remain hidden in a Delphi survey. Bardecki (1984) felt that voting could become quite tactical if experts have an agenda of their own and deliberately set out to swing others’ opinions towards their views. Thus, a consensus could be reached because of self-interest if experts felt they could be affected in some way by the outcomes of the research (Hasson et al., 2000); there was no reason to suspect such behaviour occurred during this Delphi study.

10.3 The Questionnaire Rounds

10.3.1 Questionnaire Design

The Likert scale is an attitude or summated rating scale developed by Rensis Likert (Likert, 1932). As already stated, the current study used a three-point Likert scale ('essential', 'desirable' and 'not relevant') to reflect a typical person specification in an NHS job description, and to represent the fact that core clinical competencies were being investigated. Carley et al. (2006) used a three-point scale 'essential to know', 'useful to know', and 'not useful in clinical practice' in their Delphi study examining the content of an anatomy syllabus for emergency medicine clinicians. There are other examples of three-point scales in the Delphi literature, for example: Robinson (1991); Hewlett et al. (2008); Roberts (2009); and Fleuren et al. (2004). Lock (2011) used a three-point Likert scale ('absolutely essential', 'essential', and 'important') in the first of their five rounds in a Delphi study investigating core competencies in nursing. By the second round they were using a four-point scale ('absolutely essential', 'essential', 'important', 'less important') to encourage their experts to discriminate between options. Five, seven, or nine-point scales tend to be most prevalent in the Delphi literature but Bradburn (2004) commented that researchers often use scales with multiple points, only to collapse them later into simpler scales, such as 'disagree', 'neutral, 'agree'. The choice of whether or not to have a neutral point is usually determined by the nature of the study and its aims (Desselle, 2005). On reflection, the statements in rounds two and three of the current study were perhaps too positively weighted, and the ordering of questions could have introduced bias because of a 'contrast effect' (Tourangeau, Rips, & Rasinski, 2000, p.201).

Web-based surveys tend to provide a greater opportunity to introduce design features than traditional paper-based methods. They generally incur less expense, and a range of software is now available to support researchers in the design, delivery, and data collection process. Some authors have argued that the design of a survey (its graphics, colour, typography, animation, and other visual elements) can influence the efficiency with which respondents complete it (Couper, Traugott & Lamias, 2001; Couper et al., 2004). Others seem less convinced that ‘fancy’ survey design confers any additional benefits (Dillman, 2007).

10.3.2 Disseminating and Collecting the Data

Delphi questionnaires are typically distributed by post but facsimile distribution has also been used (Robert & Milne, 1999). Researchers sometimes use more than one distribution method; for example, Pesik, Keim & Sampson (1999) allowed experts to return their responses by email, facsimile, or post. Other researchers have delivered their initial questionnaires in person (Milholland, Wheeler, & Heieck, 1973; Miles-Tapping et al., 1990). As mentioned earlier, online Delphi surveys are becoming increasingly popular (Marsden, Dolan, & Holt, 2003; Beattie & Mackway-Jones, 2004; Ferguson et al., 2005; Taylor, 2005; Katcher et al., 2006; Hejblum et al., 2008; Grisham, 2009; Valdez, 2009; Coleman & Nicholl, 2010; Smart et al., 2010). The Internet provides a way of conducting surveys efficiently and effectively and this is perhaps why its use in research is now so widely accepted (Zhang, 2000; Sills & Song, 2002). Typically, respondents gain access to an online questionnaire or survey by clicking on a URL link embedded in an email or in a website. Although the questionnaires in this study were designed to be completed online, experts could still download questionnaires from the website and respond by post or facsimile. Using an online medium can reduce the time and expense involved in survey research (Hanscom et al., 2002). Some researchers have found no difference between the email and postal mail methods (McMahon et al., 2003), while others have found a poorer response rate with email (Snyder-Halpern, Thompson, & Schaffer, 2000; Schonlau et al., 2002). Online surveys tend to present more technical problems than traditional facsimile or postal surveys, although online surveys are usually completed more quickly (Schleyer & Forrest, 2000; McMahon, et al., 2003). Online surveys are also likely to present the researcher with fewer errors with data entry and transcription because many Web-based survey providers automatically download data into spreadsheets or databases, and statistical packages.

The choice of whether or not to use the Internet is likely to depend on researchers' preferences and the suitability of the medium to the target survey population. In order to avoid biasing the population sample, one must ensure that all respondents are Internet and computer-literate (Zhang, 2000). This is unlikely to be a problem where professional groups are concerned. Using the Internet does not obviate the need to apply the same rigour that one would use for the traditional paper-based medium. Indeed, Crawford et al. (2005) argued that there remains a pressing need to develop standards for Web-based survey practice. An online survey method was chosen for the current study because it seemed to offer three main advantages; namely, the facility to download data automatically into spreadsheets, the minimal cost involved, and the instantaneous nature of email transmission.

10.4 Analysis

The first round involved content analysis of a large volume of qualitative data. Three coders from similar professional backgrounds were used, as recommended by Krippendorff (2004) and each successive qualitative data analysis in this round was retained to enable the original data set to be accessed and referred to if necessary. The PI consulted a number of specific specialist texts (Weber, 1990; Neuendorf, 2002; Krippendorff, 2004), which provided useful information relating to the planning and piloting of the analysis. Data reduction and identification of key themes within the text are characteristic features of a qualitative content analysis, but there is no rule book to guide qualitative researchers in their choice of approach. Richards (2005) described three types of qualitative coding: descriptive, topic, and analytical, stating that they are usually involved simultaneously. Descriptive coding is quantitative in its approach, while the other two are qualitative; topic coding involves labelling text according to subject, while analytical coding is interpretive and deals with emerging theory. The bias towards topic coding in this study meant that using software such as NVivo was an option (Bazeley, 2007). However, the PI followed the advice of Spencer, Ritchie & O'Connor (2003, p.217), who strongly advised researchers not to view qualitative data analysis as a 'replacement for the intellectual role that is required of the researcher'. NVivo was considered for use in this study, but a trial of the software revealed that it would have been useful as a support tool only.

Statistical tests are commonly used in Delphi studies. For example: Kendall's coefficient of concordance (Hennessy & Hicks, 2003); Kappa statistic (Carley et al., 2006); Fisher's exact test (Chang, 2007); Mann-Whitney U test (McGee et al., 1987; Moncur, 1987; McBride et al., 2003; Cook, Brismee, & Sizer, 2006; Woods, 2006); Bonferroni method (Reetoo et al., 2005); and the t-test (Sims, 1979; Wakou, Keim, & Williams, 2003). However, the three-point scale used in this study represented an ordinal categorical scale because the difference between 'essential' and 'desirable', and 'desirable' and 'not relevant' was indeterminate. Assigning a numerical rating to the scale would have had no real meaning, so the numerical feedback used was the mode and the only test applied to the data was a cross-tabulation analysis.

10.5 Clinical Importance of the Main Findings

The analysis of round one identified 99 competencies within the six themes of the first questionnaire. At the end of the third and final round, 85 competencies had reached the *a priori* consensus (Table 8.6) and 19 items had not (Table 8.7). Some of the competency items in Table 8.6 relate to skills that are basic and indubitable, for example, taking a history of the presenting complaint. Others represent paradigms of skills and knowledge more commonly associated with doctors, for example, physical examination of the abdomen. These items present a challenge for MSK ESPs because they represent skills and knowledge not taught on undergraduate physiotherapy programmes and they are usually reviewed only briefly in postgraduate modules for ESPs. If we expect MSK ESPs to perform tasks more usually carried out by doctors, then it is important to ask doctors what 'medical' skills are required. Given the medico-legal aspects of extended practice, the competency level should be set at the level of a reasonably competent doctor. An exposure to clinical medicine seems essential for ESP practice.

MSK symptomatology can present in all medical specialties, for example, endocrinology (Lioté & Orcel, 2000; Arkkila & Gautier, 2003; Markenson, 2010), oncology (Fam, 2000), gastroenterology (Lövy & Starkebaum, 2000), and neurology (Collange & Burde, 2000; Sofat, Malik, & Higgens, 2006). Medical conditions affecting other systems can involve the MSK system, for example, frozen shoulder in thyroid disease, carpal tunnel syndrome in diabetes, and painful joints in inflammatory bowel disease. Conversely, diseases known primarily for their MSK symptoms are associated with serious pathology in other systems, for example, rheumatoid arthritis, the connective tissue diseases, and the vasculitides. In addition, MSK problems often coexist with non-MSK problems such as irritable bowel disease, sleep disorders, depression, and gynaecological problems. Some patients present with complex, medically unexplained symptoms (Maiden et al., 2003; Smythe, 2009). Chronic widespread MSK pain conditions, occurring in up to 13% of the population (Croft et al., 1993; Linsell et al., 2006), are also complex and commonly present to primary-care clinicians. Both acute and chronic simple MSK conditions are seen regularly, for example the acute shoulder impingement syndrome and knee osteoarthritis. All the aforementioned conditions may present in primary care. The variety of possible MSK presentations is vast and many of them present at an early, undifferentiated stage, making it difficult for the primary-care clinician to arrive at a correct diagnosis. Furthermore, early diagnosis and management is of paramount importance in some situations, for example in inflammatory arthritis, where early therapy with disease-modifying drugs is now the gold-standard treatment (Quinn et al., 2001; Emery et al., 2002; Nell et al., 2004; Suresh, 2004). Some presentations may be potential medical emergencies, for example, an acute monoarthritis, where the differential diagnosis must include a joint infection (Coakley et al., 2006). Degenerative conditions and chronic pain present a major cause of long-term pain and disability, and this can present additional challenges for primary-care clinicians, who have to help patients learn to live with their pain (Baker et al., 2011).

MSK undergraduate medical education is still inadequate (Sirisena et al, 2011). The complex nature of many MSK disorders means that MSK ESPs must have knowledge and skills that extend beyond the MSK system. They must be able to differentiate between those conditions that can be managed in community settings and those that need to be referred to more hospital-based care. They must also be able to recognize when to seek the advice of a medical practitioner. The final competency list (Table 8.6) supports this argument, for example, recognizing that a medical opinion was required was rated as ‘essential’ by 80% of experts, and identifying ‘red flags’ was an essential skill for 95% of experts. Knowing which MSK problems can be managed in community settings and which need referring on for more specialist care was also rated essential by more than 80% of experts.

Clinical history-taking incorporates a review of systems, which typically covers the respiratory, cardiovascular, gastrointestinal, neurological, and genitourinary systems (Douglas, Nicol, & Robertson, 2005; Grossman, 2005; Talley & O’Connor, 2006; Epstein et al., 2008). The MSK system tends to be the ‘the elephant in the room’ (Badley, 2008, p.6) because although the impact of MSK problems on health-related quality of life is recognized, (Badley, Rasooly, & Webster, 1994; Perruccio et al., 2007; Loza et al., 2008) it is not part of a routine review of systems. Woolf (2003, p.385) recommended that it be included ‘as part of any general history and examination of all patients’, and Sirisena et al. (2011, p.403) argued that the MSK examination should be ‘an integral part to the holistic clinical assessment’. The importance of medical differential diagnosis for physiotherapists is covered in a number of textbooks (Boissonnault, 1995; Goodman, Fuller & Boissonnault, 2003; Boissonnault, 2010; Goodman & Snyder, 2007) although, as mentioned earlier, these are American publications, written for physical therapists. A case-history review of systems was among the final competency items. However, physical examination of the abdominal, cardiovascular, and respiratory systems did not reach the final list. In fact, Table 7.2 and Table 8.3 show that the modal (‘desirable’) score dropped for abdominal and cardiovascular examination; it increased slightly for respiratory examination but overall, there was a slight shift towards the ‘not relevant’ category for all three skills.

The lack of agreement concerning ‘medical’ physical examination skills is not a new finding. In the study conducted by Carr & Gordon (2001), AHPs and consultant rheumatologists were surveyed in an attempt to define the clinical role of AHPs in rheumatology. The consultants were in favour of AHPs assessing other systems but interestingly, the AHPs themselves were undecided.

The 19 items not reaching the *a priori* consensus still demonstrated positive views. For example, Tables 8.3 and 8.7 show that if the round three ‘desirable’ and ‘essential’ modal scores for the nine items generated in round one and then rated in rounds two and three are added together, they were all viewed positively by 90% of experts. Even the three items that should have been discarded in round two (abdominal, respiratory, and cardiovascular examination) achieved a positive rating of between 68% and 73%. Furthermore, the two items discarded at the end of round two (observing orthopaedic operations and role play with actors) reached a positive rating of 72% and 63% respectively. Therefore, these 19 items are still important and merit further discussion and debate, ideally in a post-Delphi consensus conference.

In section 3.5.1 of this thesis, physiotherapy self-referral schemes and skills in medical differential diagnosis were discussed. MSK ESPs may be ‘experts’ in examination of the MSK system, but they tend to examine the MSK system in isolation, approaching a patient from a physiotherapy perspective. A doctor will adopt a medical perspective because this is their paradigm of health care. One has to question whether a physiotherapy paradigm is adequate for an ESP role. It is one thing to approach a patient examination with a view to treating the patient with physiotherapy; it is quite another thing to be expected to make diagnostic and management decisions that a doctor would normally make. Although they will perform a cursory medical ‘systems review’ while taking a case history, physiotherapists tend not to perform a physical examination of other body systems, such as abdominal palpation or chest auscultation, even if the patient history indicates a need to examine these tissues and structures. This reflects not only the difference in training between doctors and physiotherapists but also the expectations of patients, doctors, and other health-care professionals.

This current study has shown that there is support, although not a strong consensus, for ESPs to be practising ‘medical’ skills relating to examination of other systems. The results also support doctors’ involvement in ESPs’ training and education, and confirm the important role played by medical practitioners in providing governance for MSK ESP practice. There are clearly areas of medical knowledge and skill that should be common to all primary-care clinicians, regardless of their professional background. Although one would not expect an ESP to have the same level of knowledge or skill as a consultant medical practitioner, it would seem reasonable to expect them to demonstrate competence in core medical physical examination skills to the same level as a reasonably competent doctor. The majority of competencies identified in the study concern skills and knowledge relating to specialist MSK work, and this concurs with comments made by Dunn et al. (1985), who stated that the nature of a clinician's work determines the competencies required for the role. Indeed, eighty-seven per cent of experts in this study expected MSK ESPs to demonstrate advanced skills in relation to examining the MSK system. This level of advanced MSK knowledge was specified in a few cases as that of a ST5 (senior specialist registrar) and CT2 (clinical fellow) in orthopaedics, or equivalent to that of a consultant orthopaedic surgeon. This skill is already recognized within the ESP community and two books concerning advanced MSK examination have been published recently, both authored by ESPs (Day, Fox, & Paul-Taylor, 2009; Hattam & Smeatham, 2010).

The majority of studies in the literature have focused on ESPs requesting MRI scans (Morgan, 2007; Inman, et al., 2009; Newsome, et al., 2009). Far less has been written on other diagnostic imaging and investigations such as X-rays, US imaging, blood tests, and neurophysiology. In the current study, 72% of experts considered the ability of MSK ESPs to understand the indications for a range of diagnostic tests an essential competency and this has implications for ESP training programmes. This study has also identified methods of acquiring competencies. With reference to clinical examination skills and how they should be taught and assessed, six out of the nine final competencies in this section focused on experiential learning methods. Self-appraisal of ongoing continuing professional development achieved the highest rating in the underpinning knowledge section, and the two lowest scores in this section were 'attending relevant postgraduate courses' and 'attending conferences'. These findings are encouraging given the current lack of any accredited, recognized national training programme for MSK ESPs. Assessment of methods followed a medical model, incorporating direct assessments of clinical or procedural skills such as OSCEs, Mini-CEX and DOPS (Sloan et al., 1995; Norcini et al., 2003; Carr, 2006). With reference to important attributes, attitudes, and behaviours, experts considered the most important factors to be professionalism, an awareness of one's own levels of knowledge and skill, and knowing when to ask for help.

The role of a MSK interface service is to manage as many patients as possible in the community, thus deflecting patients away from hospital-based care. Opinion was divided concerning ESPs working independently in these community-based settings and the literature supports these findings; a number of authors have written about the importance of the multidisciplinary team in community-based clinics in offering support to non-medical clinicians in extended roles (Rymaszewski et al., 2005; Cushnaghan, Hay, & Warburton, 2010; PCR Society, 2011).

10.6 Summary

This Delphi study produced 104 core clinical competencies relating to MSK ESP practice. The experts reached a consensus on 85 of these competency items, which covered history-taking and physical examination skills, underpinning knowledge, methods of teaching and assessment, and important attributes, attitudes, and behaviours essential for the role. Although the current list of core clinical competencies will need refining and modifying through further consultation with relevant stakeholders, including HEIs, this study represents the first development of competencies for ESPs working in MSK interface clinics in primary-care settings.

Chapter 11

Conclusion

11.1 Introduction

This Delphi study used a panel of MSK experts to identify core clinical competencies for primary-care-based MSK ESP practice. Methods of acquiring and assessing these competencies have also been identified. This chapter will address whether or not the study met its original aims; it will also discuss the contribution to knowledge and implications for practice, and recommendations for future research.

11.2 The Contribution to Knowledge

The *sine qua non* for this Delphi panel was the medical expert, since ESPs are undertaking tasks previously performed by doctors. No matter how autonomous or independent ESP roles may appear, what underpins each of them is the symbiotic relationship with the medical profession. This is the first time that medical experts from a range of different specialist fields in MSK medicine have been brought together to consider the competencies required of MSK ESPs working in the field of general MSK medicine and surgery; furthermore, it is the first study to focus on competencies relating to the primary-care MSK ESP role. The methodology was appropriate for the research question and the results have shown that it is possible to reach a consensus view using the Delphi method. Eight-five competency items met the *a priori* consensus, which identified skills and knowledge competencies together with methods of acquiring and assessing them, and important attributes, attitudes, and behaviours for ESPs. A further 19 items were identified that did not reach the *a priori* consensus in this study, but which nonetheless achieved a positive (‘desirable’ or ‘essential’) rating from more than 50% of experts. These results should help HEIs to ensure that their education curricula are tailored to meet the requirements of MSK ESPs. They should also provide employers with a foundation for succession planning, and help ESPs themselves to identify ways of obtaining support and mentorship for their roles. The professional body could also use these results as the initial step towards the development of a national competency and curriculum framework for MSK ESP practice.

11.3 Limitations of the current study

It is possible that more competencies would have reached the *a priori* consensus in this Delphi study if there had been more iterative rounds. The results might also have been different if a modified Delphi method had been used, where there was an opportunity for experts to meet. Although a physical meeting of experts 'contradicts one of the basic rules of the Delphi procedure' (Boulkedid et al., 2011, p.6), the study might have benefited from a face-to-face interaction. One could argue that the expert opinion from this study (as in all pure Delphi studies) has not been cross-examined because experts did not meet, and because the PI was little more than an unquestioning conduit through which they communicated with each other. Furthermore, there is no way of knowing if an equal number of experts in each professional group would have resulted in a different outcome. This study might have been strengthened by the inclusion of a group comprising representatives from HEIs and a patient group.

11.4 Recommendations for future research

Triangulation is sometimes used with Delphi studies as a way of enhancing the quality of the results and the credibility of the analysis used (Loo, 2002). Indeed, the results of Delphi studies usually require some form of external validation. One way of achieving this for the current study may be to follow the example of Hoyt et al. (2010) and Hay et al. (2007), by using a post-Delphi consensus conference with relevant stakeholders to refine and agree these competency items. This study's results represent the views of one expert Delphi panel at one point in time and to validate the results, the Delphi survey could be repeated with a different, but comparable, expert group. Some of the competencies generated in this study require further discussion, for example the 'medical' physical examination skills.

Another option might be to ask a random group of ESPs to self-rate their skills and knowledge against the final Delphi competency statements. There are a number of examples in the literature of using self-rating scales with competency statements

(Moercke & Eika, 2002; Danielson, Dillenberg, & Bay, 2006; Baldwin et al., 2009). However, the validity of self-assessed performance is thought to be poor (Gordon, 1991; Woolliscroft et al., 1993; Board & Mercer, 1998; Stewart et al., 2000; Wen et al., 2011), because it is a representation of people's perceptions of their ideal or potential performance rather than their actual performance; or more simply, a reflection of confidence levels. Pitts et al. (2005) and Fuller (2011) warned of the pitfalls involved in relying on the self-assessment of competence, and a systematic review of doctors' self-assessment (Davis et al., 2006) concluded that their ability to self-assess was limited. It is difficult to distinguish between job-specific and person-specific competencies in the current study. However, a physiotherapist in an ESP role will find their competency level changing as they become more experienced or undergo more training; roles are also subject to change. The competencies identified in this study do not distinguish between a novice and an experienced MSK ESP. However, the courts are likely to judge an ESP using the benchmark of a reasonably competent doctor and so it would seem important to try to differentiate between different levels of ESP experience – perhaps even to have an 'ESP-in-training' role, where the ESP is working under supervision.

11.5 Implications for practice

There are insufficient grounds to make firm recommendations from this study beyond stating that the results represent the first step towards developing a nationally agreed competency and curriculum framework for MSK ESPs. These expert-driven consensus competencies are in a prototypic form at this stage but they are definitive in the sense that they have an authoritative basis and they were achieved with a good representation of experts across all three Delphi rounds. However, the competencies need refining and agreeing through an external validation process with all relevant stakeholders, possibly by using a post-Delphi conference. These stakeholders should include the relevant medical Royal Colleges and the CSP; they should also include experts from education because in their current form, some of the competency items are difficult to distinguish from training requirements. The effect of ESP roles on physiotherapists in general and on the physiotherapy profession is unknown. Within nursing, Denner (1995) concluded that nurses often do not wish to undertake enhanced roles because they detract from their basic nursing roles. This could reflect an altruistic concern for the nursing profession as a whole, or represent more selfish concerns about deskilling in core nursing skills; perhaps even a fear of accountability and litigation. The same may be true of extended practice within physiotherapy, as a two-tier system develops within the profession: the 'extended scopers' and the 'non-extended scopers'. It will be important for the CSP and HPC to work together to decide if a separate registration system will be required for MSK ESPs.

This study's results will have little effect on practice if they remain unpublished. Publication would ensure their dissemination to a wider audience. Where to publish is perhaps the most important decision, because the implications for practice may be far-reaching. The precursory question is to decide who has responsibility for setting and reviewing ESP competencies and the most obvious answer has to be the health-care educators and HEIs. However, responsibility for acquiring, maintaining, and developing these competencies also lies with the employing organizations, professional and regulatory bodies, and the individual ESPs themselves. The challenge, of course, is not so much in generating and agreeing competencies for extended physiotherapy practice, but in ensuring that ESPs acquire them, and then maintain and update them.

The extent to which these results may be transferable or generalizable is unknown. However, these competencies represent core skills for MSK ESPs and so they could, perhaps, be adapted or supplemented with more specialised and bespoke skills for ESPs in other MSK settings, for example, ESPs working in hospital-based orthopaedic clinics. The ESP role in primary care is akin to that of the general practitioner role, because a wide range of skills is required to determine which patients are suitable for management in the community and which need onward referral to secondary care for a more specialist opinion. Wise et al. (2006, p.6) explained the distinction between primary and secondary care as follows: 'Many patients present with MSK problems that do not fit a MSK diagnosis, and even the question of whether this is a significant illness cannot be answered. This occurs because patients are seen too early in the course of their disease, they present with symptoms that have not been recognized in a diagnostic category or they may have multiple pathologies'.

The competencies that require more discussion are the skills that are characteristically 'medical', such as the physical examination of other systems. However, if the competence of a reasonably competent doctor is the benchmark by which the courts will judge an ESP (Buttress & Marangon, 2008), then these skills are essential and one has to question why ESPs' core examination and history-taking skills should be any different from those of doctors. Whether or not training should be the prerogative of the professional group who delegate tasks to ESPs, as suggested by (Eddy, 2008), is uncertain. This study has not been able to answer these questions but it has highlighted the issue, and one hopes that it will encourage other researchers to seek some answers. However, if certain 'medical' skills were to be included within the competency set for MSK ESPs then it would seem eminently sensible to ensure that the medical profession is involved in ESP training and education.

There are a number of implications for ESP practice arising from the results of this study. A set of core clinical competencies has been identified that should underpin the future development of a MSK ESP competency framework. Although establishing a competency and curriculum framework for ESP practice is a pressing concern for the physiotherapy profession and a necessary part of future workforce planning, one has to consider if enforcing such a competency framework would destabilize current ESP practice. The blurring of professional boundaries that accompanies role extension can create tension and competition between the professions, and even within a profession. Creating a competency framework for ESP practice means that the whole career structure for postgraduate physiotherapy may need reviewing; in particular, the relationship between advanced, specialist, and extended practice roles will need clarifying. The ESP role also overlaps to a certain degree with that of the consultant MSK physiotherapist. Physiotherapists who undertake extended practice roles run the risk of losing their professional identities and the core skills of their discipline. This could affect the profession as a whole because other health-care roles may start to extend their practice to include certain aspects of physiotherapy. It could also have a more personal effect on ESPs themselves; feelings of stress, burnout or dissatisfaction with the remunerative aspect of the role may prove difficult to handle. Ultimately, these posts may not be sustainable.

One also has to consider the issues surrounding the argument for separate regulation, the accountability and governance arrangements within employing NHS organizations, and the medico-legal implications of extending practice; non-medical prescribing provides an example of such legislative change. These are all matters that concern health-care providers and commissioners, and professional managers. Education institutions have a crucial role to play in the development of a MSK ESP-specific competency and curriculum framework, and it is likely that formal accredited training programmes will replace much of the experiential and in-house learning. Furthermore, education institutions and the professional body may need to rethink undergraduate physiotherapy programmes. Perhaps we will see more interdisciplinary learning between doctors and non-medical health-care professionals in the future.

ESPs have much to offer; they complement rather than replace doctors. However, developing specific standards in this field is essential work for the CSP to protect its members and the public, and to protect the future of physiotherapy in today's competitive health-care environment. The results of this study take us a step further along the path to a national MSK ESP competency and curriculum framework, but more work is needed, which will require collaborative working between HEIs, the physiotherapy and medical professions, the regulatory bodies, employers, individuals, patients, and commissioners of health care.

Appendices

Appendix I Email to Key Person/s

Dear *(name of key person)*

I hope you do not mind my contacting you. I am writing to ask if the *(name of professional body)* could help me to recruit five of its members into a small-scale research study that I am conducting as part of a professional doctorate. The study comprises a three-stage online Delphi survey, investigating the core clinical competencies required of musculoskeletal physiotherapists working in extended and advanced practice roles. I am a consultant physiotherapist and registered osteopath working full-time for NHS Manchester and Central Manchester University Hospitals NHS Foundation Trust. I have ethical approval from NRES and the University of Salford, and research governance approval from Manchester Primary Care Trust.

If you feel you could help me, then I would be guided by you as to how potential research participants are identified and contacted. However, I had envisaged that an initial email contact with members would be made by the *(name of professional body)* on my behalf. With this in mind, I have taken the liberty of attaching an invitation letter together with further information about the study. Potential research participants need to be comfortable with completing a questionnaire online and should be involved in MSK education, or have experience of working physiotherapists working in extended or advanced practice roles.

Thank you for reading this email. I should like to thank you in advance for your time. If you require further information or have any queries, then please do not hesitate to contact me.

Yours sincerely

Janet Suckley

Consultant Physiotherapist & Registered Osteopath
NHS Manchester and Central Manchester University Hospitals NHS Foundation Trust
Mobile: 07968475718

Appendix II Study Information for Prospective Expert Panellists

NHS Manchester

University of Salford
A Greater Manchester University

Manchester Community Health

Alexandra Park Health Centre
2 Whitswood Close
Alexandra Park
Manchester M16 7AP
janet.suckley@nhs.net
Tel: 0161 226 0101
Mob: 07968475718
Fax No: 0161 226 1077

Dear Sir/Madam

I am a consultant physiotherapist and registered osteopath working for NHS Manchester and Central Manchester University Hospitals NHS Foundation Trust. As part of a professional doctorate, I am conducting a small-scale research study (n=35) investigating the core clinical competencies required for extended and advanced physiotherapy practice. I am seeking the opinion of a range of medical experts and expert physiotherapists working in the field of musculoskeletal medicine. The study has full ethical approval from the National Research Ethics Service and the University of Salford, and research governance approval from Manchester Primary Care Trust. I am writing to ask if you would be willing to take part in this research. Participation would involve completing a three-round online Delphi survey, although there will be an option to complete the surveys on paper, in the traditional manner. The first questionnaire will ask you to list what clinical competencies you feel are essential for extended and advanced musculoskeletal physiotherapy practice. The next two questionnaires will ask you to rate the competency statements generated in the first questionnaire. As the principal investigator, I will be able to identify you through a unique identification code, but the responses you provide will be kept confidential and anonymous. Further details about the study can be found attached to this letter. If you require any further information, or if you have any queries about the study, please do not hesitate to contact me. I am keen to finish recruitment by the end of October/early November 2009.

If you feel you would be willing to participate in the research then please email me at janet.suckley@nhs.net to express your interest. I would be grateful if you could you indicate whether you would be happy to complete the questionnaire online, or if you would prefer to complete a paper-based questionnaire. **I must reiterate that your responses will be kept confidential and neither the fact of your participation, nor the information you provide will be revealed to a third party.**

I should like to take this opportunity to thank you in advance for your time.

Yours faithfully

Janet Suckley
Consultant Physiotherapist & Registered Osteopath
NHS Manchester and Central Manchester University Hospitals NHS Foundation Trust

Further information

Title of the study

Core clinical competencies for extended-scope physiotherapists working in musculoskeletal (MSK) interface clinics based in primary care: A Delphi consensus study.

Why is this study being done?

The development of advanced and extended practice roles in nursing and allied health professions has been a key part of the *NHS Plan*, *The European Working Time Directive* (focused on reducing doctors' hours) and the Government's promise to secure a maximum 18-week wait from GP referral to the start of treatment. Your expertise is being sought to assist with a study of the core clinical competencies required of physiotherapists working in extended and advanced practice roles (ESPs) in the field of musculoskeletal (MSK) medicine.

MSK ESPs have been extending their practice for over 10 years, but there is still no nationally agreed competency framework and no accredited training programme leading to a recognized qualification. A MSK ESP will typically undertake some work traditionally done by a medical specialist, e.g., orthopaedic surgeon and subconsultant-grade surgeons. ESPs are not medically qualified, but often practise independently and autonomously in doctor-substitute roles. ESPs are assessing and managing patients with undifferentiated or undiagnosed MSK complaints, often without recourse to a medical practitioner. Examples of such practice might include seeing patients who would normally see an orthopaedic surgeon, listing for surgery, requesting investigations and using test result to assist clinical diagnosis, and referring to other medical and paramedical professionals.

This small-scale study (n=35) is seeking the opinion of a range of medical experts and expert MSK ESPs regarding the core clinical competencies (knowledge, skills and behaviours or attitudes) for extended-scope physiotherapy practice. Its focus will be the MSK ESP role in primary and community care settings (Tier 2 or CATS services) where MSK problems are often more undifferentiated, and where ESPs may be working without the support of a medical practitioner. It is envisaged that these essential competencies will be transferrable to secondary-care settings where ESPs may be working in multidisciplinary teams alongside medical specialists (although it is likely that additional bespoke competencies may be required, according to the specific nature of the ESP role).

The study is being undertaken as part of a professional doctorate at the University of Salford, and a copy of the final report will be forwarded to each participant.

What is a Delphi survey?

Delphi technique is a consensus-building methodology that was originally developed by the US military in the 1950s to estimate bombing requirements for a hypothetical Soviet attack on US soil. The definitive paper on the methodology remained unpublished for 10 years, because the original work contained data relating to national security. Delphi methodology has been systematically reviewed, and has been used extensively in health-care research over the last twenty years. It focuses not only on areas of agreement among experts, but also on areas of disagreement. It is a way of consulting experts anonymously through a series of questionnaires. Feedback is provided in the form of summaries of experts' responses, and experts are then asked to re-evaluate their responses in light of this information. The first questionnaire typically collects qualitative data that provides the foundation for more quantitative data collection in subsequent rounds. The process usually continues until a consensus is reached, but this study will stop after three rounds. A key feature of the methodology is that experts never meet face-to-face. Their identity remains secret and their responses remain anonymous.

What are the expected benefits of the study?

Defining a set of core clinical competencies for MSK ESPs may assist higher education providers in developing MSK ESP-specific postgraduate programmes. It may help to reassure commissioners, providers of health care and patients about the standard of care they can reasonably expect from MSK ESPs. It may also raise awareness in the medical profession of the need for a competency and curriculum framework for extended and advanced MSK physiotherapy practice, and lead to further collaborative work with the relevant medical Royal Colleges.

Who will be participating in the study?
Experts will be recruited from the following professional groups:

- consultant orthopaedic surgeons (n=5)
- consultant rheumatologists (n=5)
- consultant neurologists (n=5)
- consultant neurosurgeons (n=5)
- consultants in rehabilitation medicine (n=5)
- general practitioners with a specialist interest in MSK medicine (n=5)
- extended-scope physiotherapists (n=5)

What will I have to do, and how much time will I have to commit to the study?
You will be required to take part in an online Delphi survey consisting of three questionnaire rounds. The first questionnaire round will comprise approximately five open-ended questions, but the second and third questionnaire rounds will be more structured, and will be asking you to rate each competency statement. Each of the three online Delphi questionnaires will be administered by embedding a hyperlink in an email from the principal investigator to each individual participant. Clicking on this hyperlink will take the participant to a secure survey website (www.SurveyMonkey.com). There will also be an option to complete the survey using the traditional postal method.

How will the results of the Delphi survey be used?
The Delphi survey results will be used to construct a list of core clinical competencies for MSK extended physiotherapy practice. This list may then be incorporated into an online questionnaire (using the secure survey website: www.SurveyMonkey.com) and sent to all MSK ESPs in the UK. ESPs would then be able to complete the online questionnaire anonymously, and rate their own competence. The principal investigator would then compare the results of the Delphi survey with this (anonymous) self-evaluation exercise.

Do I fulfil the inclusion criteria for the study?
There are two essential criteria, and two desirable criteria. You need to fulfil both essential criteria, and one of the desirable criteria.

The essential criteria are as follows:

- being comfortable with completing a questionnaire online
- being committed to the project for its duration

The desirable criteria are as follows:

- being involved in MSK education and teaching

- having experience of working with an extended or advanced scope physiotherapist

How much time will I have to commit to the study?
Three online Delphi questionnaires will be sent to participants over a period of approximately six months. The first questionnaire should take no longer than 40 to 45 minutes to complete, and rounds two and three should take approximately 20 to 30 minutes.

Will my taking part in this study be kept confidential?
Yes. Although the principal investigator will be able to identify you through a unique code number, the responses you provide will be kept confidential and anonymous. This means that neither the fact of your participation nor the information you provide will be revealed to a third party.

Who has reviewed this study?
The University of Salford Ethics Committee.
Trust R&D, Manchester Primary Care Trust.
NRES

Whom can I contact for further information?
Janet Suckley (Principal Investigator)
Consultant Physiotherapist & Registered Osteopath
Manchester PCT & Central Manchester University Hospitals NHS Foundation Trust

Thank you for taking the time to read this information sheet.

Appendix III Neurologists' Newsletter

University of Salford
A Greater Manchester University

NHS
Manchester

Are you frustrated?

Do you sometimes wish your musculoskeletal colleagues had a better knowledge and understanding of neurology? Do you see the occasional referral from a physiotherapist and wish you could show them how a neurological examination should be done?
If so, please read on.

I am a consultant physiotherapist and registered osteopath looking for five neurologists to take part in a three-stage online Delphi survey, which forms part of a professional doctorate.

My aim is to seek the opinion of a group of experts (n=35) regarding the core clinical competencies required of physiotherapists working in extended practice roles in the field of musculoskeletal medicine. These physiotherapists typically undertake work traditionally done by doctors, e.g., requesting diagnostic tests or referring to other medical professionals.

The Delphi expert panel will comprise orthopaedic surgeons (n=5), general practitioners with a specialist interest in musculoskeletal medicine (n=5), rheumatologists (n=5), extended-scope physiotherapists (n=5) and neurologists (n=5), consultant neurosurgeons (n=5) and consultants in rehabilitation medicine (n=5). Experts' responses will be kept confidential and anonymous.

The study has NRES, University Ethics Committee, and R&D approval.

Please email me at janet.suckley@nhs.net if you feel you are willing to help.

Thank you for your time.

Janet Suckley
Consultant Physiotherapist & Registered Osteopath
NHS Manchester
Alexandra Park Health Centre
2 Whitswood Close
Manchester M16 7AP
Mobile: 07968475718

Appendix IV Rheumatologists' Newsletter

Are you frustrated?

Do you sometimes wish your colleagues had a better knowledge and understanding of rheumatology? Do you see the occasional referral from a physiotherapist and wish you could show them how a physician would approach a patient with musculoskeletal pain? If so, please read on.

I am a consultant physiotherapist and registered osteopath looking for 5 rheumatologists to take part in a 3-stage online Delphi survey, which forms part of a professional doctorate.

My aim is to seek the opinion of a group of experts (n=25) regarding the core clinical competencies required of physiotherapists working in extended practice roles in the field of musculoskeletal medicine. These physiotherapists typically undertake work traditionally done by doctors, e.g., requesting diagnostic tests or referring to other medical professionals.

The Delphi expert panel will comprise orthopaedic surgeons (n=5), general practitioners with a specialist interest in musculoskeletal medicine (n=5), rheumatologists (n=5), extended-scope physiotherapists (n=5) and neurologists (n=5). Experts' responses will be kept confidential and anonymous.

The study has NRES, University Ethics Committee, and R&D approval.

Please email me at janet.suckley@nhs.net if you feel you are willing to help.

Thank you for your time.

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Appendix V First Delphi Questionnaire

Delphi round one

1. What history-taking skills do you feel ESPs need to manage competently the range of MSK presentations encountered in community-based specialist MSK interface services?
Examples of the types of MSK presentations seen may include the following:

a) common MSK presentations i.e. mechanical or structural, and local or regional conditions e.g. 'frozen shoulder', osteoarthritis of the knee, carpal tunnel syndrome.

b) more complex MSK presentations that require a medical opinion. For example: a non-MSK condition masquerading as a MSK problem (e.g. a gynaecological condition presenting with back pain), or MSK signs and symptoms associated with an underlying pathology or systemic disease (e.g. multiple sclerosis, diabetes, thyroid disease).

c) chronic spinal or more widespread/generalised MSK pain presentations e.g. fibromyalgia.

d) 'red flag' MSK presentations that require urgent, or very early referral to secondary care specialists e.g. suspicion of cancer,

joint infection, possible fracture or suspicion of early inflammatory arthritis.

Please list history-taking skills in the box below:

2. Please add any comments relating to history-taking skills in the box below e.g. how these skills should be taught and assessed, or potential barriers to skill acquisition.

Delphi round one
3. What physical examination skills do you feel ESPs need to manage competently the range of MSK presentations encountered in community-based specialist MSK interface services? **Examples of the types of MSK presentations seen may include the following:** **a) common MSK presentations i.e. mechanical or structural, and local or regional conditions e.g. 'frozen shoulder', osteoarthritis of the knee, carpal tunnel syndrome.** **b) more complex MSK presentations that require a medical opinion. For example: a non-MSK condition masquerading as a MSK problem (e.g. a gynaecological condition presenting with back pain), or MSK signs and symptoms associated with an underlying pathology or systemic disease (e.g. multiple sclerosis, diabetes, thyroid disease).** **c) chronic spinal or more widespread/generalised MSK pain presentations e.g. fibromyalgia.** **d) 'red flag' MSK presentations that require urgent, or very early referral to secondary care specialists e.g. suspicion of cancer, joint infection, possible fracture or**

Delphi round one

suspicion of early inflammatory arthritis.

Please list physical examination skills in the box below:

4. Please add any comments relating to physical examination skills in the box below
e.g. how these skills should be taught and assessed, or potential barriers to skill acquisition.

Delphi round one

5. What underpinning knowledge do you feel ESPs need to manage competently the range of MSK presentations encountered in community-based specialist MSK interface services? For example:

a) anatomy and pathophysiology

b) awareness of management strategies for chronic and acute disorders, including clinically urgent conditions.

c) knowledge relating to imaging and other relevant investigations.

Please list underpinning knowledge in the box below:

Delphi round one

6. Please add any comments relating to underpinning knowledge in the box below
e.g. how this knowledge should be acquired, or potential barriers to knowledge acquisition.

7. Please add any additional comments relating to ESP role in the box below
e.g. important personal attributes such as attitudes and behaviours.

Delphi round one

8. What is your professional title?

Please tick the relevant box:

- ◯ Consultant in Rehabilitation Medicine
- ◯ Consultant Orthopaedic Surgeon
- ◯ General Practitioner
- ◯ Consultant Neurologist
- ◯ Consultant Neurosurgeon
- ◯ Consultant Rheumatologist
- ◯ Physiotherapist

9. Do you have any experience of working with an ESP?

Please tick one box:

- ☐ Yes
- ☐ No

10. If yes, please provide details in the box below:

11. Where do you work? Please give name of town or City. For example, Manchester.

Please provide details in the box below:

Delphi round one

12. What type or organisation do you work for? For example, Primary Care Trust.

Please provide details in the box below:

13. Are you involved in MSK education?

Please tick one box:

- ☐ Yes
- ☐ No

14. If yes, please provide details in the box below:

15. What is your specialist field, or specialist interest? For example, 'fibromyalgia', 'shoulder surgery', 'back pain', 'movement disorders'.

Please provide details in the box below:

16. How long have you held this post?

Please give your numerical answer in years in the box below:

17. Do you consent to being contacted by telephone if further clarification of any points you have raised is needed?

Please tick one box:

☐ Yes

☐ No

18. If yes, please enter your name and daytime telephone number in the boxes below:

Name

Telephone number

Appendix VI Email Accompanying Round One Questionnaire

Dear *(name of expert)*

Thank you for taking part in this three-round online Delphi survey investigating the core clinical competencies required of extended-scope physiotherapists (ESPs) working in the field of musculoskeletal (MSK) medicine.

The focus of the survey is the ESP role in community-based specialist MSK interface services treating adults with MSK conditions. These CATS (Clinical Assessment and Treatment Services) are designed to provide more care in the community and release capacity in secondary care. A wide variety of MSK conditions present in these services and ESPs may find themselves practising quite independently, often without the support of a multidisciplinary team.

There are numerous examples of extended physiotherapy practice: history-taking and clinical examination; requesting and interpreting investigations, e.g., X-rays, MRI and ultrasound scans, nerve conduction studies and blood tests; performing joint injections; supplementary prescribing; and making appropriate onward referrals to other services, e.g., rheumatology, orthopaedic surgery, vascular surgery, A&E, neurology, neurosurgery, metabolic medicine, and pain management.

This first questionnaire seeks your opinion regarding the core clinical competencies, and rounds 2 and 3 will then attempt to identify if a consensus view can be reached among the expert groups.

The survey can be accessed by clicking on the URL link at the end of this email. It should take no longer than 30 minutes to complete. **I should be most grateful if you could complete the survey by 14 December 2009.** A reminder email will be sent in 2 weeks' time, and there will be one further email reminder a few days before the due date.

Your responses will be kept confidential and neither the fact of your participation nor the information you provide will be revealed to a third party.

If you have any queries or encounter problems opening the link below, please do not hesitate to contact me.

Click on the link below to access the survey.

(URL link)

Appendix VII Demographic Data for the 72 Volunteer Experts

Gender	Town/city	PCT/Acute Trust	Specialist field	Responded in rounds:
ESPs (n=19)				
Female	Cambridge	PCT	Spinal and lower limb	1, 2 & 3
Male	Liverpool	Acute Trust	Spinal	1, 2 & 3
Female	Cambridge	Acute Trust	Spinal	1, 2 & 3
Female	Kent	Acute Trust	Knee	1, 2 & 3
Female	Bury	Acute Trust	General MSK and spinal	1, 2 & 3
Female	Rotherham	PCT	General MSK	1, 2 & 3
Female	Oxford	Acute Trust	Spinal	1, 2 & 3
Female	London	PCT	Shoulder/upper limb	1, 2 & 3
Female	Oxford	Acute Trust	Spinal	1, 2 & 3
Female	Stockport	PCT	Spinal	1, 2 & 3
Female	Basingstoke & Southampton	Acute Trust	Rheumatology	1, 2 & 3
Female	London	Acute Trust	Spinal	1, 2 & 3
Female	Leeds	Both	General MSK and spinal	1, 2 & 3
Female	Stockport	PCT	Spinal	1, 2 & 3
Female	Stockport	PCT	General MSK	1, 2 & 3
Male	Eastbourne & Lewes	PCT	Shoulder and spinal	1, 2 & 3
Female	Norwich	Both	Shoulder	1, 2 & 3
Female	London	Both	General MSK	1, 2 & 3
Female	Liverpool	Acute Trust	MSK trauma	1, 2 & 3
GPswSI (n=11)				
Male	Manchester	PCT	General MSK	1, 2 & 3
Female	Bangor, N. Wales	PCT	General MSK	1, 2 & 3
Female	Isle of White	PCT	Pain management	1, 2 & 3
Male	Cumbria	PCT	Sports medicine	1, 2 & 3
Male	South Tyneside	PCT	General	1, 2 & 3
Male	Middlesborough	Both	Rheumatology	1, 2 & 3
Female	Telford	PCT	Rheumatology	1, 2 & 3
Female	Durham	PCT	General MSK	1, 2 & 3
Male	Wakefield district	PCT	Sport & Exercise Medicine	1, 2 & 3
Male	Middlesbrough	PCT	General MSK	1, 2 & 3
Male	Devon	PCT	Rheumatology	1, 2 & 3

Gender	Town/city	PCT/Acute Trust	Specialist field	Responded in rounds:
Consultant neurologists (n=4)				
Male	Manchester	Acute Trust	General neurology	1, 2 & 3
Male	Salford	Acute Trust	Stroke medicine	1, 2 & 3
Male	Salford	Acute Trust	Neuro-MSK disorders	1, 2 & 3
Male	Manchester	Acute Trust	Not specified	No response
Consultant neurosurgeon (n=8)				
Male	Liverpool	Acute Trust	Spinal surgery	1, 2 & 3

Male	Liverpool	Acute Trust	General spinal/neurosurgery	1
Male	Liverpool	Acute Trust	Spinal surgery	1
Male	Liverpool	Acute Trust	Spinal surgery	1
Male	Liverpool	Acute Trust	Unknown	No response
Male	Liverpool	Acute Trust	Unknown	No response
Male	Liverpool	Acute Trust	Unknown	No response
Male	Liverpool	Acute Trust	Unknown	No response
Consultant rheumatologists (n=12)				
Female	Manchester	Acute Trust	Chronic pain	1, 2 & 3
Male	Salford	Acute Trust	Muscle disease, inflammatory joint disease	1, 2 & 3
Male	Nottingham	Acute Trust	General rheumatology, general medicine, chronic pain and back pain	1, 2 & 3
Female	Blackpool	Acute Trust	General rheumatology	1, 2 & 3
Female	Ashton-U-Lyne	Acute Trust	General rheumatology, spinal and chronic pain	1, 2 & 3
Female	Bolton	PCT	Multi-system inflammatory and connective tissue disorders, rheumatological conditions in pregnancy	1, 2 & 3
Male	Bolton	PCT	General rheumatology with special interest in osteoporosis, fibromyalgia, Paget's disease of bone	1, 2 & 3
Male	Bangor, North Wales	Acute Trust	Fibromyalgia, chronic pain, spinal pain and general rheumatology	1, 2 & 3
Male	Oldham and Bury	Both	General rheumatology, but special interest in immunological diseases, inflammatory arthritis and fibromyalgia/ psychosomatic illness	1, 2 & 3
Female	North Wales	Acute Trust	Inflammatory arthritis and connective tissue diseases	1, 2 & 3
Female	London	Acute Trust	Inflammatory arthritis	1, 2 & 3
Female	Unknown	Unknown	Not stated	2

Gender	**Town/city**	**PCT/Acute Trust**	**Specialist field**	**Responded in rounds:**
Consultant orthopaedic surgeons (n=17)				
Male	Manchester	Acute Trust	General orthopaedics, special interest in tumours, knee and upper limb surgery.	1, 2 & 3
Male	Bangor, North Wales	Acute Trust	Hip surgery	1, 2 & 3
Male	Norwich	Acute Trust	General orthopaedics	1, 2 & 3
Male	Sheffield	Acute Trust	Hip and knee arthroplasty,	1, 2 & 3

			and revision joint replacement	
Male	Manchester	Acute Trust	Children’s orthopaedics and neuromuscular tumours,	1, 2 & 3
Male	Manchester and Wrightington	Acute Trust	Shoulder and elbow surgery	1, 2 & 3
Male	Manchester	Acute Trust	Knee surgery	1, 2 & 3
Male	Weston-super-Mare and Bristol	Acute Trust	General orthopaedics (with a special interest in hip surgery)	1, 2 & 3
Male	Sheffield	Acute Trust	Hip and knee surgery	1, 2 & 3
Female	Ipswich	Acute Trust	Lower limb arthroplasty	1, 2 & 3
Male	Bristol	Acute Trust	General orthopaedics and adult joint replacement	1, 2 & 3
Male	Manchester	Acute Trust	Shoulder surgery	1 & 2
Male	Manchester	Acute Trust	Hip and knee disorders	1 & 2
Male	Unknown	Acute Trust	Unknown	2
Male	Manchester	Acute Trust	Hip and knee surgery	No response
Male	Salford	Acute Trust	Spinal surgery	No response
Male	Devon	Acute Trust	Unknown	No response
Consultant in rehabilitation medicine (n=1)				
Female	Manchester	Acute Trust	Unknown	No response

Appendix VIII Round One Verbatim Statements

'The history-taking skills are essentially the same as those required by doctors'.	**GPwSI**
'Specific systems examination e.g. abdominal should be the remit of physicians'.	**GPwSI**
'I would not expect an ESP to examine other parts of the body'.	**GPwSI**
'ESPs should be able to triage complex conditions presenting in community clinics, including those with multiple pathologies or systemic pathology'.	**GPwSI**
'ESPs should have advanced level MSK examination techniques, equivalent to that of an orthopaedic surgeon'.	**GPwSI**
'Accept not all patients can be help 100% so need discharging back to GP - not onward to secondary care for someone else to make that decision'.	GPwSI
'For non-MSK conditions masquerading as a MSK problem, examination should be limited to identifying that there is a non-MSK cause, but further examination/investigations should be outside an ESP's remit'.	GPwSI
'Again, a basic orthopaedic examination is necessary; a higher level of skills is required than for GP registrars; perhaps training undergone by GPwSI or Orthopaedic specialist trainees would be suitable'.	GPwSI
'Full musculoskeletal examination skills required. Specific systems examination e.g. abdominal, internal - should be the remit of physicians'.	GPwSI
'ESPs should be able to differentiate MSK from non-MSK causes for MSK presentations but do not specifically need to be able to identify the non-MSK cause'.	**GPwSI**
'An ordinary physiotherapist and an ESP have a very different role. A physiotherapist approaches a patient with a view to applying therapy; the role of the ESP is very different and this requires a completely different approach to history-taking'.	**Rheum**
'A physiotherapist approaches the patient using a dynamic biomechanical model with a view to applying biomechanical therapy. Wearing this hat, every ache or pain has a potential physiotherapeutic response. The role of an ESP is very different'.	Rheum
'ESPs should be able to examine cardiovascular, respiratory and abdominal systems as well as MSK'.	**Rheum**
You can debate whether they should be able to lay hand on abdomen, listen to heart and lungs, etc. My feeling would be that they should not perform a partial superficial examination because what if they miss something? Far better to draw the boundary here, and refer on to doctor'.	**Rheum**
We cannot expect them to be medics - if they think they have a medical problem, they should ask a medic for help'.	Rheum
'Taught (and assessed) mainly by doctors as need the broad medical background to pick out serious and/or systemic problems'.	Rheum
'Need to ask what the patient is expecting from the consultation. A physiotherapist expects to treat all or almost all of their patients with the expectation of making them better and often have a feeling of inadequacy if they cannot (and feel they should refer on)'.	Rheum

'In my view the major potential barrier to skill acquisition is the difficulty many therapists have in accepting that an ordinary physiotherapist (if there is such a thing) and an ESP have a different role. A physiotherapist approaches the patient using a dynamic biomechanical model with a view to applying biomechanical therapy. Wearing this hat, every ache or pain has a potential physiotherapeutic response. The role of an ESP is very different'.	Rheum
'Awareness of general physical examination should be high'.	Rheum
'ESPs need to know when they are dealing with cases beyond their experience and need to know when to ask for help or advice ESPs are not physicians and need to understand their limitations and boundaries especially when there may be external pressures that may try to obscure this fine line'.	Rheum
'Physiotherapy and medical training, as ideally need to be able to know what a doctor is looking out for, but also need the depth that a MSK physiotherapist can provide'.	Rheum
'A typical physiotherapist's examination will take 20 minutes or so. This is too long for a diagnostic clinic where patients are often booked into 20 minutes slots. Another difficulty is that physiotherapists are taught to believe that every MSK problem has to have an answer and will respond to therapy. If it doesn't respond the therapist feels it she who has failed rather than the problem being insoluble, so more and more futile treatments are applied and referrals are made to other clinicians who will not have the answer. So the ESP needs to accept that lots of MSK complaints do not have a cure. Once they have done this, the concept of encouraging self-management becomes a practical proposition. Another problem is that many of these cases have unexplained symptoms. This is another concept which physiotherapists find very hard to accept. Without acceptance there will be lots and lots of futile tests and referrals and delay until someone starts to deliver the self-management message'.	Rheum
'ESPs should be able to perform a general physical examination e.g. skin, lymph nodes, temperature, chest, breast and abdomen'.	**Rheum**
'Some physiotherapists become frustrated with the lack of ability to cure or deal with chronicity and the bio-psychosocial aspects of disease, and often seek further tests or surgery when it is not appropriate'.	**Rheum**
'Not all physiotherapists (though some do, usually those working in rheumatology or chronic pain) handle the limits of dealing with the chronicity and bio-psychosocial aspects of disease as well as they could i.e. frustrated with lack of ability to cure or resolve issues, and often seek further tests or surgery when not appropriate'.	Rheum
'I don't think that an ESP can be trained through protocols to recognize mimickers of disease without a comprehensive medical training background'.	Rheum
'In view of the difficulties of differential diagnosis where pains may be referred from non-MSK origin the ESP will need to examine systems other than just locomotor system'.	**Ortho**
'Specialist community-based or Tier 2 services provide a substantial triage function, deciding whether patients should be managed in Tier 2 services or referred onwards to secondary care. Accordingly, physiotherapists will need to be able to take adequate histories from effectively all MSK presentations'.	**Ortho**

'Red flags are a "no brainer"; failure to identify these should lead to mandatory re-training'.	Ortho
'Tier 2 services provide a substantial triage function, deciding whether patients should be managed in the Tier 2 service or referred onwards to secondary care. This presupposes that the clinicians seeing the patient in a Tier 2 service are able to triage patients effectively, and hence they need to be able to take an adequate history from all patients presenting. Accordingly, it is unavoidable that physiotherapists will need to be able to take adequate histories from effectively all MSK presentations. It follows from this that they will need to take both an MSK history and an adequate general medical history, past medical history, surgical history and drug history'.	Ortho
'There will need to be a basic knowledge of general clinical examination in addition to the overall musculoskeletal examination. In view of the difficulties of differential diagnosis where pains may be referred or from non-MSK origin the examination process will need to potentially cover systems other than just MSK'.	Ortho
'They should have some idea of examining the abdomen, the chest and heart as well'.	Ortho
'ESPs should have the same diagnostic MSK examination skills as an orthopaedic trainee or senior SpR level (ST5)'.	**Ortho**
'ESPs should not be expected to learn general medical examination skills, which might be required to diagnose more complex medical conditions that require a medical opinion'.	Ortho
'History-taking skills need to approach the level obtained by junior doctors'.	**Ortho**
'They should be capable of performing a thorough neurological examination'.	Ortho
'The level of knowledge required relates to an awareness of clinical features of disease. The ESP should be able to order and assess imaging relevant to the conditions, which they would be expected to manage, and not necessarily those that they should be expected to triage. Those requiring imaging to make an accurate assessment should be triaged to clinicians who do have this knowledge'.	Ortho
'ESPs in this role will have to be able to accept the level of uncertainty which is frequently attached to obtaining and acting upon a diagnosis. They would have to accept that there is some uncertainty in reaching a diagnosis and hence some associated risk. They would have to be able to act both individually and as a team member to minimise the risk, but at the same time to maximise the effectiveness of the organisation in which they work. Essentially, services of this sort must be seen to deliver a sensible amount of both assessment and treatment, in addition to simply triaging large numbers of patients onwards to secondary care'.	Ortho
'*Unfortunately without a working knowledge of operative surgery then a complete assessment of many patients is impossible from the point of view being able to correctly stratify patients for surgery. Therefore, the only assessment possible is whether they are suitable for physiotherapeutic treatment. Generally, physiotherapists are very poor at making specific diagnoses, even those with a prolonged triage practice. My view is that to be able to perform triage adequately to screen patients for orthopaedics needs a formal apprenticeship with orthopaedic consultants for at least 1 year*'.	Ortho

'They should be able to take a competent history about the presenting complaint and relate it to the MSK system as well as recognize that symptoms may be referred from other systems such as the abdomen. They should also be able to take a cardiovascular and respiratory history to assess the risks of anaesthesia'.	Ortho
'Essentially if the role involves screening patients for specialists then knowledge at that specialist level is mandatory; without it the mistakes are inevitable, either missing serious diagnoses or over-investigating and over-referring'.	**Ortho**
'Awareness of management strategies can be broad and is important only in so far as they affect referral decisions'.	**Ortho**
'Whilst it is not realistic to expect this [knowledge] to be at the level of a very experienced doctor such as a consultant the level of knowledge required would certainly be that of an early years registrar in both orthopaedics and rheumatology'.	**Ortho**
'Having an ESP as an independent practitioner is a mistake – community ESPs don't work – they need to be in secondary care, working alongside secondary care consultants'.	**Ortho**
'ESPs tend to produce a list of symptoms rather than diagnoses'.	**Ortho**
'Looking for other clues of medical problems elsewhere e.g. noting excessive breathless on exertion or poor peripheral circulation'.	Neuro
'ESPs need to be able to take a full medical history'.	**Neuro**
'Recognize symptoms masquerading as musculoskeletal pathology but arising from other symptoms, e.g. cardiovascular, neurological, respiratory, genitourinary and psychogenic'.	ESP
'ESPs need appropriate mechanisms and processes in place for the non-MSK cases to be managed effectively'.	ESP
'All medical examination skills need to be taught and assessed ideally by the relevant specialist e.g. neurological examination by a neurologist and not a spinal surgeon, shoulder examination by a shoulder surgeon rather than someone more generic'.	**ESP**

Appendix IX Second Delphi Questionnaire

Delphi Round 2

This section deals with history-taking skills.

Please indicate whether you feel the following case-history skills are essential, desirable or not relevant.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Cardiovascular system review	◯	◯	◯
2. Respiratory system review	◯	◯	◯
3. Gastrointestinal system review	◯	◯	◯
4. Neurological system review	◯	◯	◯
5. Genitourinary system review	◯	◯	◯

Comments (please add any additional competencies or comments in this box)

Please indicate whether you feel the following case-history skills are essential, desirable or not relevant.
You may need to scroll down the page to see all the data.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Determining the history of the presenting complaint	◯	◯	◯
2. Obtaining the medical and surgical history	◯	◯	◯
3. Obtaining the social and family history	◯	◯	◯
4. Obtaining a drug history	◯	◯	◯
5. Determining any factors, medical or otherwise, that could influence treatment outcomes or prognosis	◯	◯	◯
6. Determining the impact of the presenting complaint on the patient	◯	◯	◯
7. Ability to make an initial diagnosis after the history taking	◯	◯	◯

Comments (please add any additional competencies or comments in this box)

Delphi Round 2

Please indicate whether you feel it is essential, desirable or not relevant for ESPs to be able to use history-taking skills to identify the following MSK presentations. You may need to scroll down the page to see all the data.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Common MSK conditions	○	○	○
2. More complex MSK presentations that require a medical opinion	○	○	○
3. Chronic widespread pain	○	○	○
4. Inflammatory versus non-inflammatory conditions	○	○	○
5. 'Red flags' or possible serious underlying pathology	○	○	○
6. Symptoms emanating from the nervous system	○	○	○
7. When the features do not fit a MSK problem i.e. a possible non-MSK cause of a MSK presentation	○	○	○
8. Use the history-taking to direct an appropriate physical examination	○	○	○

Comments (please add any additional competencies or comments in this box)

Delphi Round 2

Please indicate your level of agreement with the following statements, which are direct quotations from round 1.
You may need to scroll down the page to view all the data.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Agree strongly	Agree	Disagree	Disagree strongly
1. 'History-taking skills need to approach the level obtained by junior doctors'	◯	◯	◯	◯
2. 'The history-taking skills are essentially the same as those required by doctors'	◯	◯	◯	◯
3. 'ESPs need to be able to take a full medical history'	◯	◯	◯	◯
4. 'Specialist community-based services provide a substantial triage function, deciding whether patients should be managed in the community or referred to secondary care. Accordingly, ESPs will need to be able to take adequate histories from effectively all MSK presentations'	◯	◯	◯	◯
5. 'An ordinary physio and an ESP have a very different role. A physio approaches a patient with a view to applying therapy; the role of the ESP is very different and this requires a completely different approach to history-taking'	◯	◯	◯	◯

Comments

Delphi Round 2

This section deals with physical examination skills.

Please indicate whether you feel it is essential, desirable or not relevant for ESPs to be able to identify the following MSK presentations during the physical examination.
You may need to scroll down the page to see all the data.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Common MSK presentations	○	○	○
2. More complex MSK presentations that require a medical opinion	○	○	○
3. Chronic widespread pain	○	○	○
4. 'Red flags' or features suggesting serious pathology	○	○	○
5. Signs of neurological disease localised to the correct neuraxis level	○	○	○

Comments (please add any additional competencies or comments in this box)

Please indicate whether you feel the following physical examination skills are essential, desirable or not relevant.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Advanced skills in physical examination of the locomotor system: hip, knee, foot & ankle, shoulder, elbow, wrist & hand, spine and pelvis	○	○	○
2. Relevant special tests for each joint or region	○	○	○
3. GALS regional MSK examination screening	○	○	○
4. Screening for yellow flags	○	○	○

Comments (please add any additional competencies or comments in this box)

Delphi Round 2

Please indicate whether you feel the following physical examination skills (where indicated clinically) are essential, desirable or not relevant.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
Abdominal examination	○	○	○
Cardiovascular examination	○	○	○
Respiratory examination	○	○	○
Neurological examination	○	○	○

Comments (please add any additional competencies or comments in this box)

Delphi Round 2

Please indicate your level of agreement with the following statements, which are direct quotations from round 1.
You may need to scroll down the page to view all the data.

	Agree strongly	Agree	Disagree	Disagree strongly
1. 'In view of the difficulties of differential diagnosis, where pain may be non-MSK in origin, the ESP will need to examine systems other than the locomotor system'	◯	◯	◯	◯
2. 'Specific systems examination e.g. abdominal should be the remit of physicians'	◯	◯	◯	◯
3.' ESPs should be able to examine other systems: cardiovascular, respiratory and abdominal'	◯	◯	◯	◯
4. 'You can debate whether ESPs should be able to lay hand on abdomen, listen to heart and lungs etc., but my feeling is: far better to refer on to a doctor'	◯	◯	◯	◯
5. 'I would not expect an ESP to examine other parts of the body'	◯	◯	◯	◯
6. 'ESPs should have the same diagnostic MSK examination skills as orthopaedic tranees or ST5s (senior SpR)'	◯	◯	◯	◯
7. 'ESPs should be able to triage complex conditions presenting in community clinics, including those with multiple pathologies or systemic pathology'	◯	◯	◯	◯
8. 'ESPs should have advanced level MSK examination skills, equivalent to those of an orthopaedic surgeon'	◯	◯	◯	◯
9. 'ESPs should be able to perform a general physical examination e.g. lymph nodes, skin, temperature, breast and abdomen'	◯	◯	◯	◯
10. 'ESPs should be able to differentiate MSK from non-MSK causes of MSK presentations but not specifically need to be able to identify the non-MSK cause'	◯	◯	◯	◯

Comments

Delphi Round 2

This section deals with how history-taking and physical examination skills should be acquired, or taught.

Please indicate whether you feel the following methods of skills acquisition are essential, desirable or not relevant.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Observing in Consultants' clinics	○	○	○
2. Observing experienced ESP/other advanced practitioner clinics	○	○	○
3. Observing orthopaedic operations	○	○	○

Comments (please add any additional competencies or comments in this box)

Delphi Round 2

Please indicate whether you feel the following methods of skills acquisition are essential, desirable or not relevant. You may need to scroll down the page to view all the data.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Completing an accredited course	○	○	○
2. Obtaining a relevant postgraduate qualification	○	○	○
3. Attending relevant postgraduate courses	○	○	○
4. Attending conferences	○	○	○
5. Ad hoc on-the-job learning by working alongside a medical consultant, having the opportunity to be observed and also discuss cases	○	○	○
6. Attending multi-disciplinary departmental meetings and in-service training sessions	○	○	○
7. Use of video analysis with real patients	○	○	○
8. Role play using actors or healthy volunteers	○	○	○
9. Case-based discussions and review of difficult cases with medical consultant/senior colleague	○	○	○
10. Mentorship	○	○	○
11. Completing a formal apprenticeship with a medical consultant (rheumatologist and orthopaedic surgeon)	○	○	○

Comments (please add any additional competencies or comments in this box)

Delphi Round 2

This section deals with how history-taking and physical examination skills should be assessed.

Please indicate whether you feel the following methods of assessing competencies are essential, desirable or not relevant.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. OSCE (Objective Structured Clinical Examination)	○	○	○
2. DOPS (Direct Observation of Procedural Skills)	○	○	○
3. Mini-CEX (Mini Clinical Examination Exercise)	○	○	○
4. Medical consultants' assessment of competencies against an agreed competency framework	○	○	○

Comments (please add any additional competencies or comments in this box)

Please indicate your level of agreement with the following statements, which is a direct quotation from round 1.

	Agree strongly	Agree	Disagree	Disagree strongly
'All medical examination skills need to be taught and assessed ideally by the relevant specialist e.g. neurological examination by a neurologist, shoulder examination by a shoulder surgeon - rather than by someone more generic'	○	○	○	○

Comments

Delphi Round 2

This section deals with underpinning knowledge.

Please indicate whether you feel the following knowledge is essential, desirable or not relevant.
You may need to scroll down the page to view all the data.
Questions 1-11

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Local referral pathways	○	○	○
2. How to write a good referral letter	○	○	○
3. Know what, when and how to refer on to the most appropriate specialist or service	○	○	○
4. NICE and other guidelines	○	○	○
5. Current treatment and management options - both surgical and conservative	○	○	○
6. The evidence base underlying treatment and management options	○	○	○
7. Working knowledge of operative procedures, including benefits and risks	○	○	○
8. The epidemiology and natural history of common MSK conditions	○	○	○
9. Physiology, pathology and pathophysiology of the MSK system	○	○	○
10. Anatomy of the MSK system	○	○	○
11. A working knowledge of clinical neuroanatomy and neuraxis levels	○	○	○

Comments (please add any additional competencies or comments in this box)

Delphi Round 2

Questions 12-21
You may need to scroll down the page to see all the data.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
12. Basic pharmacology as it relates to MSK conditions	○	○	○
13. Recognise normal patterns of MSK presentations and normal variants, and abnormal patterns i.e. recognise when features 'do not fit'	○	○	○
14. Systemic disease/medical conditions that can masquerade as a MSK problem e.g. metabolic disorders, referred pain etc.	○	○	○
15. Acute and chronic pain management principles	○	○	○
16. Biopsychosocial model of disease	○	○	○
17. Common rheumatology conditions	○	○	○
18. Indications for a range of diagnostic investigations (XR, MR, blood tests, NOUS, neurophysiology etc) to confirm the clinical diagnosis	○	○	○
19. ESPs should be able to interpret the results of any diagnostic investigations they request in order to facilitate appropriate patient management	○	○	○
20. Sensitivity and specificity of clinical tests used in the physical examination	○	○	○
21. Triage knowledge i.e. know which patients would benefit from investigations in community settings and which need to be referred to secondary care for further investigations and a specialist opinion	○	○	○

Comments (please add any additional competencies or comments in this box)

Delphi Round 2

Please indicate whether you feel knowledge relating to the recognition of the following MSK presentations is essential, desirable or not relevant.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Common MSK problems that can be managed in the community	○	○	○
2. More complex MSK problems that require a medical opinion	○	○	○
3. 'Red flag' or serious underlying pathology	○	○	○
4. Chronic widespread pain	○	○	○

Comments (please add any additional competencies or comments in this box)

Please indicate your level of agreement with the following statements, which are direct quotations from round 1.

	Agree strongly	Agree	Disagree	Disagree strongly
1. 'Essentially, if the role involves screening patients for specialists then knowledge at that specialist level is mandatory; without it, mistakes are inevitable - either missing serious diagnoses or over-investigating and over-referring'	○	○	○	○
2. 'Awareness of management strategies can be broad in so far as it only really affects referral decisions'	○	○	○	○
3. 'Whilst it is not realistic to expect knowledge to be at the level of a very experienced doctor, such as a consultant, the level of knowledge required would certainly be that of an early years registrar in both orthopaedics and rheumatology'	○	○	○	○

Comments

Delphi Round 2

This section deals with how knowledge should be acquired or taught, and methods of assessing knowledge acquisition.

Please indicate whether you feel the following methods of skill acquisition are essential, desirable or not relevant. You may need to scroll down the page to view all the data.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Formal tutorials and lectures	◯	◯	◯
2. Teaching from a range of individual experts	◯	◯	◯
3. Online modules / e-learning	◯	◯	◯
4. Clinical experience / patient mileage	◯	◯	◯
5. Self-appraisal of ongoing CPD	◯	◯	◯
6. Video/DVD educational material	◯	◯	◯
7. Core medical texts and journal articles	◯	◯	◯
8. Critical review of the literature	◯	◯	◯
9. Independent study	◯	◯	◯

Comments (please add any additional competencies or comments in this box)

Please indicate your level of agreement with the following statements, which are direct quotations from round 1.

	Agree strongly	Agree	Disagree	Disagree strongly
1. 'Having an ESP as an independent practitioner is a mistake - community ESPs don't work - they need to be in secondary care, working alongside secondary care consultants'	◯	◯	◯	◯
2. 'ESPs tend to produce a list of symptoms rather than diagnoses'	◯	◯	◯	◯
3. 'Some physios become frustrated with the lack of ability to cure or deal with chronicity and the bio-psychosocial aspects of disease, and often seek further tests or surgery when it is not appropriate'	◯	◯	◯	◯

Comments

Delphi Round 2

This section deals with attributes, attitudes and behaviours.

Please indicate whether you feel the following attributes, attitudes and behaviours are essential, desirable or not relevant.
You may need to scroll down the page to view all of the questions.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Advanced communication and inter-personal skills	◯	◯	◯
2. Reflective and self-critical	◯	◯	◯
3. Able to assess gaps in one's own knowledge and act on learning needs	◯	◯	◯
4. Motivated to learn and acquire knowledge	◯	◯	◯
5. Commitment to life-long learning	◯	◯	◯
5. Willing to keep abreast of emerging evidence and challenge practice	◯	◯	◯
6. Know where their limitations and boundaries are i.e. when they need to seek advice/help	◯	◯	◯
7. Professionalism, trust and integrity	◯	◯	◯
8. Appreciate the need for good record-keeping	◯	◯	◯
9. Interest in chronic disease management	◯	◯	◯
10. Willing to learn new skills and apply them in practice	◯	◯	◯
11. Team-player	◯	◯	◯
12. Time management skills	◯	◯	◯
13. Able to make independent decisions	◯	◯	◯

Comments (please add any additional competencies or comments in this box)

Appendix X Round Two Additional Verbatim Statements

'If the ESP is seeing undifferentiated problems they need to be able to identify cases that are more complex or atypical and refer on for another opinion'.	GPwSI
'I think that history-taking skills should be superior to that obtained by junior doctors'.	GPwSI
'I personally regard ESPs should have history skills at level of registrars if not higher, as they become more experienced'	GPwSI
'CVS/respiratory/abdominal examination needs to be done by a practitioner with experience, who is regularly doing these examinations and fully understands implications of normal/abnormal findings and potential further investigations/management. Delegating this role to an ESP is changing a specialist to a generalist, possibly diluting their skills overall'.	GPwSI
'ESPs are physiotherapists not doctors. It is potentially very harmful for the patient to have a physiotherapist examine their abdomen, tell them it is normal and miss an ovarian cancer. Litigation will inevitably follow if this line is pursued. ESP should focus on extending the musculoskeletal expertise they have been trained for and not allow their professional integrity to be compromised as being "cheap" doctors'.	GPwSI
'I would not expect them to be able to examine all systems as thoroughly as a physician, and I don't think auscultation skills for heart and chest are particularly helpful. An ESP working in community setting seeing varied MSK presentations would not be expected to have as advanced shoulder examination skills as an ESP who works in hospital in a shoulder clinic'.	GPwSI
'The important thing is that they know that something is wrong or likely to be wrong and to know when to seek the help of others. It is this knowledge of their boundaries not of what lies beyond which is so important'.	Rheum
'An ESP with MSK experience will have more than enough specialised MSK examination experience. Indeed, in my view they go over the top and examine MSK in too much biomechanical detail. This is because they are using the techniques they use to plan a biomechanical treatment programme not to make a diagnosis. This is the main reason ESPs take so long to see their patients'.	Rheum
'Neurology is most important; I think it would be helpful in some cases for the ESP to lay hands on an abdomen to check it is not pulsating (although suggesting this implies that if they do not or if the miss something they have been negligent). Opening a bit of a 'can of worms' here perhaps it would be simpler to say no'.	Rheum
'If ESPs are expected to examine the other systems then they will lay themselves open to charges of negligence if they miss something; far better to define the boundaries closely and let others have responsibility for these fringe areas'.	Rheum
'I think ESPs function best when they are part of a MSK team consisting of orthopaedic surgeons, rheumatologists, chronic pain specialists, orthotists, podiatrists, nurses, occupational therapists and GPwSI not crashing about in isolation in primary care. The isolated practitioner is potentially dangerous - whether it be a GP, a consultant or an ESP. It is vital an ESP has peers with whom to discuss problems etc'.	Rheum
'Courses are all very well (and the academic work clearly has to be done), but there's nothing like learning on the job'.	Rheum
'Independent (in the sense of isolated) practice is often a mistake for	Rheum

doctors, nurses, physiotherapists or whoever. Services need to work in an integrated way so that problems can be easily shared, discussed, escalated'.	
'I think it would be difficult for an ESP working in isolation in the community, better if there are strong links with secondary care services. Ideally the musculoskeletal team would be seamless across primary and secondary care'.	Rheum
'There needs to be an effective way of continuous communication between community ESPs and secondary care consultants for both to work effectively, i.e., have access for advice (email)'.	Rheum
'Although respiratory and neurological skills are essential, they do not need to be comprehensive. A screening type examination should be sufficient'.	Rheum
'ESPs are variable in knowledge skills and behaviour. Over-investigation and referral is more likely if they are working independently'.	Rheum
'ESPs should be able to take a MSK history much better than a junior doctor. It should be the level of a senior registrar (ST5)'.	Ortho
'Whilst abdominal/cardiovascular/respiratory problems might be highlighted in the history, it would be unreasonable to expose an ESP to the risks of misdiagnosis of an unconnected medical condition on the basis of missing a physical sign in an area outside the musculoskeletal system'.	Ortho
'The lumbar spine is palpable through the abdomen and aortic aneurysm may present as back pain. Chest movements are part of thoracic spine examination. The peripheral vascular system is an essential examination'.	Ortho
'They should be able to employ pattern recognition to exclude MSK disease then seek help'.	Ortho
'The fundamental issue is that these practitioners will be responsible for ensuring that cases which present to them are NOT dealt with in the community as MSK problems if they actually have an underlying serious condition, which could be made worse by waiting, and in particular not to miss or ignore the occasional malignancy masquerading as a simple MSK problem'.	Ortho
'If the ESP is able to place cases on the waiting list for surgery, or acts as a triage service, and therefore is able to deny patients access to secondary care then in either event they need to have knowledge and skills at, or very near to, the level of a consultant in that speciality'.	Ortho
'The ideal model is to have an ESP working independently in a clinic with access to a consultant orthopaedic surgeon for advice as necessary. This could be in the community or in secondary care'.	Ortho
'ESPs should have more advanced MSK examination skills than an ordinary physiotherapist, perhaps equivalent to a CT2 (Clinical Fellow) in orthopaedics, and core skills in systemic examination equivalent to FY2 (Foundation Year 2) - from my experience, physiotherapists are able to pick up breast lumps, lymph nodes and abnormal skin, but may be hesitant about CVS, respiratory and abdominal exam. The exact training depends on what the role of the ESP is. Some assume that they decide who will be operated on and who not. In this circumstance, they will need extensive orthopaedic knowledge and know details and outcomes of operations (i.e., have orthopaedic training). The other extreme is to act as a filter. In this case they just need to screen out "normals" and patients who definitely do not need an operation'.	Ortho
'The point is that an ESP is not a registrar in orthopaedics or rheumatology. They are something in-between, yet on a different plane. They need bits of rheumatology and bits of orthopaedics'.	Neuro

'History-taking should be at the level of a registrar/consultant, as the ESP is expected to examine and formulate a coherent MSK diagnosis and direct or recommend further management in primary or secondary care'.	ESP
'Skills need to exceed junior doctors as need to encompass traditional medical skills and include relevant questions to rehabilitation'.	ESP
'To say you have examined someone's abdomen you would have to be confident that this was done to a medical level. You can pass a comment over what you have found or demonstrate that you have done a modified examination at a basic level. If you suspect something is not musculoskeletal then you are going to be referring it on anyway and a half-baked examination done by a physiotherapist will not remotely help a consultant and won't be taken seriously. I would say the same of a respiratory assessment. Taking a blood pressure or checking pulses is relevant for a number of MSK reasons. Anything more isn't'.	ESP
'Other than the neurological system, basic screening only - full examination should be conducted by specialists in respective fields'.	ESP
'Have an awareness of examination procedures sufficient enough to refer them on to the appropriate speciality'.	ESP
'For the non-MSK patients it is useful to be able to identify which system is the cause of symptoms for onward referral'.	ESP

Appendix XI Third Delphi Questionnaire

Delphi round three

This is the 3rd and final round of the Delphi survey, and it is in the same format as Round 2. However, competency statements that reached consensus in Round 2 (70% or more agreement amongst experts that a statement was either 'Essential' or 'Desirable', and 25% or more agreement that a statement was 'Not relevant') have been removed from this round; they will be included in the final competency framework. An additional 5 new competencies have also been included, following comments made in Round 2.

In each section, you will be presented with your own rating from Round 2, together with the overall majority group rating of the expert panel. You will then be asked to re-rate each statement in light of this knowledge about other experts' views. If you disagree with the majority position, you will be invited to provide your reasons in a comments box.

Some qualitative data (comments received in Round 2) have been included at the end of the survey, but you are not required to rate them.

This study is primarily concerned with the core clincial competencies needed by ESPs working in (adult) MSK clinics 'in the community' i.e. MSK clinics, based in community settings, that operate independently of secondary/specialist care.

This section deals with history-taking skills.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate these case-history skills as essential, desirable or not relevant in light of this information.

If any of your responses differ from the majority vote of the other experts, please give your reasons in the comments box.

	Essential	Desirable	Not relevant
1. Cardiovascular system review (expert group rating = desirable (59.3%); your rating =)	○	○	○
2. Respiratory system review (expert group rating = desirable (59.3%); your rating =)	○	○	○
3. Gastrointestinal system review (expert group rating (57.6%) = desirable; your rating =)	○	○	○
4. Genitourinary system review (expert group rating = desirable (55.9%); your rating =)	○	○	○
5. Ability to make a working diagnosis after the history taking (expert group rating = essential (52.5%); your rating =)	○	○	○

Comments

Delphi round three

These are new competencies i.e. they have been added following suggestions in Round 2.

Please indicate whether you feel these skills are essential, desirable or not relevant.

If you choose 'not relevant' for any questions, please give your reasons in the comments box (together with the corresponding question number).

	Essential	Desirable	Not relevant
1. Understand a patient's beliefs, wishes and expectations	○	○	○
2. Assess the impact of the presenting complaint on the patient, as well as their family	○	○	○
3. Be able to pick up on MSK and psychiatric/psychological problems e.g. depression, sleep problems etc.	○	○	○
4. Knowledge of a wide range of treatment/management options available, and different experts involved in delivery of care e.g. occupational therapy, surgery, psychology, podiatry, pharmacology, injections etc.	○	○	○
5. Knowledge of return to work programmes i.e. rehabilitation for work	○	○	○

Comments

Delphi round three

This section asks you to consider how important it is for ESPs to be able to identify the following MSK presentations during case history-taking.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate these skills as essential, desirable or not relevant in light of this information.

If any of your responses differ from the majority vote of the other experts, please give your reasons in the comments box.

	Essential	Desirable	Not relevant
1. More complex MSK presentations that require a medical opinion (expert group rating = essential (52.5%); your rating =)	◯	◯	◯
2. Chronic widespread pain (expert group rating = essential (67.8%); your rating =)	◯	◯	◯
3. Inflammatory versus non-inflammatory conditions (expert group rating = essential (66.1%); your rating =)	◯	◯	◯
4. Symptoms emanating from the nervous system (expert group rating = essential (66.1%); you rating =)	◯	◯	◯
5. When the features do not fit a MSK problem i.e. a possible non-MSK cause of a MSK presentation (expert group rating = desirable (50.8%); your rating =)	◯	◯	◯

Comments

Delphi round three

This section deals with physical examination skills.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate these skills as essential, desirable or not-relevant, in light of this information.

If any of your responses differ from the majority vote of the other experts, please give your reasons in the comments box.

	Essential	Desirable	Not relevant
1. More complex MSK presentations that require a medical opinion (expert group rating = essential (54.2%); your rating =)	○	○	○
2. Chronic widespread pain (expert group rating = essential (59.3%); your rating =)	○	○	○
3. Signs of neurological disease localised to the correct neuraxis level i.e. signs should be localised to the correct part of the nervous system/myotomal level. For example, cerebellar involvement or L5 root level (expert group rating = essential (61.0%); your rating =)	○	○	○

Comments

Questions 4-6

	Essential	Desirable	Not relevant
4. Relevant special tests for each joint or region (expert group rating = essential (69.5%); your rating =)	○	○	○
5. GALS regional MSK examination screening. [This is a basic screening assessment to detect locomotor abnormalities and functional disability relating to gait, arms, legs and the spine: Doherty et al (1992)"The 'GALS' locomotor screen". Ann Rheum Dis. 51 (10): 1165–9](expert group rating = essential (45.8%); your rating =).	○	○	○
6. Screening for yellow flags (expert group rating = essential (64.4%); your rating =)	○	○	○

Comments

Delphi round three

Questions 7-9

	Essential	Desirable	Not relevant
7. Abdominal examination (expert group rating = desirable (66.1%); your rating =)	◯	◯	◯
8. Cardiovascular examination (expert group rating = desirable (62.7%); your rating =)	◯	◯	◯
9. Respiratory examination (expert group rating = desirable (57.6%); your rating =)	◯	◯	◯

Comments

This section deals with how history-taking and physical examination skills should be acquired, or taught.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate these statements as essential, desirable or not relevant in light of this information.

If any of your responses differ from the majority vote of the other experts, please give your reasons in the comments box.

	Essential	Desirable	Not relevant
Observing experienced ESP/other advanced practitioner clinics (expert group rating = essential (69.5%); your rating =)	◯	◯	◯

Comments

Delphi round three

This section concerns methods of skills acquisition.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate the statements as essential, desirable or not relevant, in light of this information.

If any of your responses differ from the majority vote of the other experts, please give your reasons in the comments box.

	Essential	Desirable	Not relevant
1. Completing an accredited course (expert group rating = essential (52.5%); your rating =)	○	○	○
2. Obtaining a relevant postgraduate qualification (expert group rating = desirable (50.8%); your rating =)	○	○	○
3. Attending relevant postgraduate courses (expert group rating = essential (62.7%); your rating =)	○	○	○
4. Attending conferences (expert group rating = desirable (64.4%); your rating =)	○	○	○
5. Ad hoc on-the-job learning by working alongside a medical consultant, having the opportunity to be observed and also discuss cases (expert group rating = essential (69.5%); your rating =)	○	○	○
6. Attending multi-disciplinary departmental meetings and in-service training sessions (expert group rating = essential (69.5%); your rating =)	○	○	○
7. Use of video analysis with real patients (expert group rating = desirable (67.8%); your rating =)	○	○	○
8. Completing a formal apprenticeship with a medical consultant - rheumatologist and orthopaedic surgeon (expert group rating = desirable (49.2%); your rating =)	○	○	○

Comments

Delphi round three

This section deals with how history-taking and physical examination skills should be assessed.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate these statements as essential, desirable or not-relevant, in light of this information.

If any of the responses differ from the majority vote of the other experts, please give reasons in the comments box.

	Essential	Desirable	Not relevant
1. OSCE i.e. Objective Structured Clinical Examination (expert group rating = desirable (47.5%); your rating =)	○	○	○
2. DOPS i.e. Direct Observation of Procedural Skills (expert group rating = essential (61.0%); your rating =)	○	○	○
3. Mini-CEX i.e. Mini Clinical Evaluation. This is a 15-20 minute observation of a trainee/patient interaction that focuses on core skills (expert group rating = essential (47.5%); your rating =)	○	○	○
4. Medical consultants' assessment of competencies against an agreed competency framework (expert group rating = essential (61.0%); your rating =)	○	○	○

Comments

Delphi round three

This section deals with underpinning knowledge.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate these statements as essential, desirable or not-relevant, in light of this knowledge.

If any of your responses differ from the majority vote of the other experts, please give your reasons in the comments box.

	Essential	Desirable	Not relevant
1. NICE and other guidelines (expert group rating = essential (54.2%); your rating =)	○	○	○
2. The evidence base underlying treatment and management options (expert group rating = essential (54.2%); your rating =)	○	○	○
3. Working knowledge of operative procedures, including benefits and risks (expert group rating = desirable (54.2%); your rating =)	○	○	○
4. The epidemiology and natural history of common MSK conditions (expert group rating = essential (69.5%); your rating =)	○	○	○
5. A working knowledge of clinical neuroanatomy and neuraxis levels (expert group rating = essential (67.8%); your rating =)	○	○	○

Comments

Delphi round three

Questions 6-11

You may need to scroll down the page to see all the statements.

	Essential	Desirable	Not relevant
6. Basic pharmacology as it relates to MSK conditions (expert group rating = desirable (62.7%); your rating =)	○	○	○
7. Systemic disease/medical conditions that can masquerade as a MSK problem e.g. metabolic disorders, referred pain etc. (expert group rating = essential (67.8%); your rating =)	○	○	○
8. Acute and chronic pain management principles (expert group rating = essential (67.8%); your rating =)	○	○	○
9. Biopsychosocial model of disease (expert group rating = essential (66.1%); your rating =)	○	○	○
10. ESPs should be able to interpret the results of any diagnostic investigations they request in order to facilitate appropriate patient management (expert group rating = essential (55.9%); your rating = desirable)	○	○	○
11. Sensitivity and specificity of clinical tests used in the physical examination (expert group rating = essential (54.2%); your rating =)	○	○	○

Comments

This statement relates to whether or not knowledge relating to this MSK presentation is essential, desirable or not relevant.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate the statement as essential, desirable or not relevant, in light of this information.

If your response differs from the majority vote of the other experts, please give your reason in the comments box.

	Essential	Desirable	Not relevant
Chronic widespread pain (expert group response = essential (55.9%); your response =)	○	○	○

Comments

Delphi round three

This section deals with how knowledge should be acquired or taught, and methods of assessing knowledge acquisition.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate these statements, in light of this information.

If any of your responses dffer from the majority vote of the other experts, please give your reasons in the comments box.

	Essential	Desirable	Not relevant
1. Formal tutorials and lectures (expert group rating = desirable (66.1%); your rating =)	◯	◯	◯
2. Teaching from a range of individual experts (expert group rating = essential (62.7%); your rating =)	◯	◯	◯
3. Self-appraisal of ongoing CPD (expert group rating = essential (67.8%); your rating =)	◯	◯	◯
4. Core medical texts and journal articles (expert group rating = desirable (57.6%); your rating =)	◯	◯	◯
5. Critical review of the literature (expert group rating = desirable (57.6%); your rating =)	◯	◯	◯
6. Independent study (expert group rating = essential (69.5%); your rating =)	◯	◯	◯

Comments

Delphi round three

This section deals with attributes, attitudes and behaviours.

You are provided with your own rating from the last round, and the overall rating of the expert group.

Please re-rate these statements as essential, desirable or not relevant in light of this information.

If any of your responses differ from the majority vote of the other experts, please give your reasons in the comments box.

	Essential	Desirable	Not relevant
1. Interest in chronic disease management (expert group rating = desirable (50.8%); your rating =)	○	○	○
2. Time management skills (expert group rating = essential (59.3%); your rating =)	○	○	○

Comments

The following section contains some of the comments received in Round 2. They are not for rating, but I thought they might be of interest. But if you do not wish to read them, please scroll down the page and click 'DONE'.

Delphi round three

If the ESP is seeing undifferentiated problems they need to be able to identify cases that are more complex or atypical and refer on for another opinion

The important thing is that they know that something is wrong or likely to be wrong and to know when to seek the help of others. It is this knowledge of their boundaries not of what lies beyond which is so important.

ESPs should be able to take an MSK history much better than a junior doctor. It should be the level of a senior registrar (ST5)

History-taking should be at the level of a registrar/consultant, as the ESP is expected to examine and formulate a coherent MSKA diagnosis and direct or recommend further management in primary or secondary care.

Skills need to exceed junior doctors as need to encompass traditional medical skills and include relevant questions to rehab.

I think that history-taking skills should be superior to that obtained by junior doctors

I personally regard ESPs should have history skills at level of Registrars if not higher, as they become more experienced.

An ESP with MSK experience will have more than enough specialised MSK examination experience. Indeed in my view they go over the top and examine MSK in too much biomechanical detail. This is because they are using the techniques they use to plan a biomechanical treatment programme not to make a diagnosis. This is the main reason ESPs take so long to see their patients.

CVS/resp/abdominal examination needs to be done by practitioner with experience who is regularly doing these examinations and fully understands implications of normal/abnormal findings and potential further investigations/management.
Delegating this role to ESP is changing a specialist to a generalist and possibly diluting their skills overall

Although respiratory and neurological skills are essential, they do not need to be comprehensive. A screening type examination should be sufficient.

To say you have examined somebody' abdomen you would have to be confident that this was done to a medical level. You can pass a comment over what you have found or demonstrate that you have done a modified examination at a basic level. If you suspect something is not musculoskeletal then you are going to be referring it on anyway a half-baked examination done by a physio will not remotely help a consultant and will not be taken seriously. I would say the same of a respiratory assessment. Taking a blood pressure or checking pulses is relevant for a number of MSK reasons. Anything more isn't.

Whilst abdo/CVS/respiratory problems might be highlighted in the history, it would be unreasonable to expose an ESP to the risks of misdiagnosis of an unconnected medical condition on the basis of missing a physical sign in an area outside the musculoskeletal system.

Other than neurological system, basic screening only - full examination should be conducted by specialists in respective fields

The lumbar spine is palpable through the abdomen and aortic aneurysm may present as back pain. Chest movements are part of thoracic spine examination. The peripheral vascular system is an essential examination.

Neuro is most important; I think it would be helpful in some cases for the ESP to lay hands on an abdo to check it is not pulsating (although suggesting this implies that if they do not or if the miss something they have been negligent. Opening a bit of a can of worms here perhaps it would be simpler to say no).

ESP are physiotherapists not doctors. It is potentially very harmful for the patient to have a physiotherapist examine their abdomen tell them it is normal to a physiotherapist and miss an ovarian cancer. Litigation will inevitably follow if this line is pursued. ESP should focus on extending the musculoskeletal expertise they have been trained for and not allow their professional integrity to be compromised as being "cheap" doctors.

Delphi round three

If ESPs are expected to examine the other systems then they will lay themselves open to charges of negligence if they miss something. Far better to define the boundaries closely and let others have responsibility for these fringe areas.

My feeling would be to have an awareness of examination procedures sufficient enough to refer them on to the appropriate speciality.

For the non-MSK patients it is useful to be able to identify which system is the cause of symptoms for onward referral

They should be able to employ pattern recognition to exclude MSK disease then seek help

I would not expect them to be able to examine all systems as thoroughly as a physician, don't think auscultation skills for heart and chest are particularly helpful. An ESP working in community setting seeing varied MSK presentations would not be expected to have as advanced shoulder examination skills as an ESP who works in hospital in a shoulder clinic.

The fundamental issue is that these practitioners will be responsible for ensuring that cases which present to them are NOT dealt with in the community as MSK problems if they actually have an underlying serious condition which could be made worse by waiting, and in particular not to miss or ignore the occasional malignancy masquerading as a simple MSK problem.

ESPs should have more advanced MSK examination skills than an ordinary physiotherapist, perhaps equivalent to a CT2 (Clinical Fellow) in Orthopaedics, and core skills in systemic examination equivalent to FY2 (Foundation Year 2) - from my experience, physios are able to pick up breast lumps, lymph nodes and abnormal skin, but may be hesitant about CVS, respiratory and abdominal exam
The exact training depends on what the role of the ESP is. Some assume that they decide who will be operated on and who not. In this circumstance they will need extensive orthopaedic knowledge and know details and outcomes of operations (i.e. have orthopaedic training). The other extreme is to act as a filter. In this case they just need to screen out "normals" and patients who definitely do not need an operation.

Courses are all very well (and the academic work clearly has to be done), but there's nothing like learning on the job.

The point is that an ESP is not a registrar in orthopaedics or rheumatology. They are something in-between, yet on a different plane. They need bits of rheumatology and bits of orthopaedics.

If the ESP is able to place cases on the waiting list for surgery, or acts as a triage service and therefore is able to deny patients access to secondary care, then in either event they need to have knowledge and skills at, or very near to, the level of a consultant in that speciality.

I think ESPs function best when they are part of a MSK team consisting of orthopods, rheum, chronic pain, orthotists/podiatrists, nurses OTs GPwiSI not crashing about in isolation in primary care. The isolated practitioner is potentially dangerous whether it be a GP, a consultant or an ESP. It is vital an ESP has peers with whom to discuss problems, etc

The ideal model is to have an ESP working independently in a clinic with access to a Consultant Orthopaedic Surgeon for advice as necessary. This could be in the community or in secondary care.

Independent (in the sense of isolated) practice is often a mistake for doctors, nurses, physios or whoever. Services need to work in an integrated way so that problems can be easily shared, discussed, escalated

I think it would be difficult for an ESP working in isolation in the community, better if there are strong links with secondary care services. Ideally musculoskeletal team would be seamless across primary and secondary care.

There needs to be an effective way of continuous communication between community ESPs and secondary care consultants for both to work effectively. i.e have access for advice (email)

ESPs are variable in knowledge skills and behaviour. Over-investigation

If you have any further comments, please record them here.

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