A Comparative Case Study of Prescribing and Non-Prescribing Physiotherapists and Podiatrists

Nicola Carey (✉ n.carey@surrey.ac.uk)
University of Surrey  https://orcid.org/0000-0003-2841-1760

Judith Edwards
University of Surrey Faculty of Health and Medical Sciences

Simon Otter
University of Brighton Faculty of Health and Social Sciences

Heather Gage
University of Surrey Faculty of Health and Medical Sciences

Peter Williams
University of Surrey Faculty of Arts and Human Sciences

Molly Courtenay
Cardiff University

Ann Moore
University of Brighton

Karen Stenner
University of Surrey Faculty of Health and Medical Sciences

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Abstract

Background

Increasing numbers of nurses, pharmacists and allied health professionals across the world have prescribing rights: over 90,000 of the eligible United Kingdom workforce are qualified as non-doctor prescribers. In order to inform future developments, it is important to understand the benefits and impact of prescribing by allied health professionals including physiotherapists and podiatrists.

Aim: to compare outcomes of Physiotherapist and Podiatrist Independent Prescriber (PP-IP) patients with those of Physiotherapist and Podiatrist non-prescribers (PP-NPs). Outcome measures included patient satisfaction, ease of access to services, quality of life and cost implications.

Design: a mixed method comparative case study

Methods: Using mixed methods of data collection, outcomes were compared between 7 sites where care was provided from a PP-IP (3 podiatrist and 4 physiotherapist IPs) and 7 sites from a PP-NP (3 podiatrist and 4 physiotherapist NPs). Patients were followed up for 2 months (2015-2016).

Results: 488 patients were recruited: n=243 IP sites, and n=245 NP sites. Independent prescribing was found to be highly acceptable, and equivalent in terms of quality of life (p>0.05) and patient satisfaction (p≤0.05) compared to care provided by NPs. PP-IP care delivery was found to be more resource intensive than NP-PP, with longer consultation duration for IPs (around 6.5 mins), and a higher proportion of physiotherapy patients discussed with medical colleagues (around 9.5 minutes).

Conclusion

This study provides new knowledge that PP-IPs provide high levels of care. PP-IP care delivery was found to be more resource intensive. Further research is required to explore cost effectiveness. A more focussed exploration within each profession using targeted outcome measures would enable a more robust comparison, inform future developments around the world and help ensure non-doctor prescribing is recognised as an effective way to alleviate shortfalls in the global workforce.

Introduction

As life expectancy increases, and the world’s population continues to grow (1–3), many countries are shifting the focus of their health system from acute to chronic diseases, alongside managing increasing service demands (4). Global level predictions indicate > 2 billion people will be aged > 65 years by 2050, with the number > 80 years expected to double in the next decade, reaching 400 million by 2050 (1, 5). The implications for ensuring access to medicines are profound: 75% of the aging population in developed countries live with one or more chronic conditions (6), with many requiring multiple medications (5, 7). Recent data from the United Kingdom (UK), United States (US) and across Europe
confirms 25% of adults take three or more medicines each day (2, 8) and that by 2020 the world's population will receive 4.5 trillion doses of medicine each year (8–10).

There is however, a worldwide deficit of 18 million health workers (11), with a predicted 350,000 shortfall in the UK, and a third of the current workforce due to retire by 2030 (12).

With a 16% increase in workload since 2010, UK workforce deficits are magnified in primary care (13), where 90% of all health encounters occur (14), and there is shortage of 2,500 general practitioners. Given the unprecedented level of future demand it is crucial that sustainable solutions that alleviate shortfalls in the global health workforce are identified (11, 12). The nature of primary care has shifted, and an increasing number of appointments in UK general practice are provided by non-medical staff (12, 15). The recent NHS Long Term Plan proposes for example, a further 20,000 non-doctor roles for primary care (16). Inadequacies with traditional doctor-led care systems mean that in order to maintain patient access to prescription medicines, new approaches are urgently required (12, 17). Allied Health Professions i.e. therapeutic radiographers, paramedics, podiatrists and physiotherapists (AHP) have in particular been identified as having an integral role to the required transformational change (18).

Extending prescribing rights to nurses, pharmacists and allied health professions (19, 20) has been the focus of a UK policy drive to improve services and access to medicines by making better use of existing skills and support service innovation (18, 21–23). Of the 907,000 UK healthcare professionals entitled to undertake prescribing training (24), over 90,000 of the eligible workforce are now qualified as prescribers (24), placing the UK as a pioneer in the development of non-doctor prescribing worldwide.

In the UK Independent Prescribing (IP) and Supplementary Prescribing (SP) are two different forms of non-doctor prescribing. Training typically involves 27 classroom days and 12 days in practice under medical supervision (25, 26), a dual qualification in IP and SP being awarded to nurses, pharmacists, radiographers and paramedics, podiatrists and physiotherapists. Independent prescribers can make prescribing decisions without the need for a doctor, while supplementary prescribing is defined as dependent prescribing, as it is based on an initial diagnosis by a doctor and an agreed clinical management plan (CMP) detailing medicines that can be prescribed by the SP (27). SP prescribing rights were extended to some allied health professions in 2005, with further changes to legislation in 2013 permitting physiotherapists and podiatrists to prescribe medicines independently (28–30).

Although several other countries, including Australia, Ireland, and Netherlands, have seen similar developments in non-medical prescribing, approaches to training, accreditation and models of prescribing practice are varied (31–34). Physiotherapists have for example, authorisation to provide advice about and/or to administer or supply medicines in some states in Australia, New Zealand and Canada, but only those in the US military can prescribe (35, 36). Podiatrists have similar authority in Australia and some European countries but are only entitled to prescribe in some Canadian states (35, 37).

When used by nurses and pharmacists, SP and IP are reported as acceptable and beneficial to patients, with some evidence of enhanced clinical outcomes compared to those achieved by doctors (32, 38–40).
More recently a systematic review of non-doctor prescribing, also known as non-medical prescribing (NMP), reported that NMP has no adverse impact upon patient outcomes, patient satisfaction or resource utilisation (41). Reviews on the impact of extended physiotherapist roles reveal research hampered by small numbers of practitioners, role variation and poor role definition (42, 43), literature dominated by service descriptions and audit with positive reporting bias (35, 42, 43), and a lack of evidence regarding podiatric practice (35). Whilst PP-SP helps streamline service delivery (44, 45), IP is expected to bring additional benefits in line with nurse and pharmacist prescribing (46, 47). Exploration of clinical and cost effectiveness in this area is however limited and has to date lead to inconclusive findings (48–53). As most evidence relates to nurses and pharmacists, it is important to evaluate the impact of prescribing by allied health professionals (AHPs) in order to inform commissioning and implementation of NMP services where they are beneficial.

Six years after the introduction of current legislation enabling physiotherapists and podiatrists to prescribe independently, there has been nearly a fourfold increase in the number of physiotherapists and podiatrists with prescribing rights in England (54, 55). As of November 2019 there were 1,017 physiotherapists and 376 podiatrists with an annotation as independent prescriber, with a further 118 physiotherapists and 71 podiatrists with just supplementary prescribing (56). There is a lack of evidence of reporting on PP-IP practice, or the medicines they prescribe. Evidence from a national survey collected during preparation for the IP role indicated that PPs planned to prescribe on a regular basis, with an overall volume of prescribing suggestive of 1–2 items per day. Reflecting clinical specialities key areas of intended prescribing for physiotherapists were musculoskeletal (MSK) services, orthopaedics, respiratory and pain management, and for podiatrists’ skin, infections and MSK conditions (57).

There are additionally no studies available which quantify the impact of podiatrist and physiotherapist independent prescribing on patient satisfaction, access to services, quality of life or report cost-implications of care delivery. This is important given the increasing emphasis in the UK and around the world on extending prescribing rights to nurses, pharmacists and AHPS as a key strategy in addressing workforce deficits and ensuring patients have ongoing access to medicines (11, 12, 17, 58).

**Methods**

**Aim**

was to compare the outcomes of patients managed by Physiotherapist and Podiatrist Independent Prescribers (PP-IP) with those under the care of Physiotherapist and Podiatrist non-prescribers (PP-NPs). Outcome measures included patient satisfaction, ease of access to services, quality of life and costs.

**Study Design**

The study adopted a comparative case study methodology used in situations when no single outcome measure is available (59, 60). Outcomes were compared between 7 sites where patients received care from a PP-IP (3 podiatrist and 4 physiotherapist IPs) and 7 sites where care was provided by a PP-NP
without a prescribing qualification (3 podiatrist and 4 physiotherapist NPs) (61). Mixed methods (including interviews, structured observation of consultations, patient questionnaires) were used to collect data at each of the 14 sites during a 5-day period of observation of practice. Details of data collection tools, methods and piloting are shown in Table 1.
Table 1  
Summary of data collection arrangements and instruments

| Category of data            | Method of data collection | Timing of collection | Items and instruments | Piloting                                                                 |
|-----------------------------|---------------------------|----------------------|-----------------------|--------------------------------------------------------------------------|
| 1) Characteristics of PPs & sites | i) Structured interview and site visit | Prior to observation period | Setting and geographic location  
  *PPs profile*: Age, gender, highest educational qualification, salary/band, full/part time status, job title/role;  
  *Service Information*: service description & patient profile, single or multi-professional team, other NMPs in team | Interview schedules were reviewed by research team and project advisory group. Main interviewer (JE) was buddied by experienced team member (KS) for first two interviews in order to provide guidance and clarify and address any issues with the interview schedule. Following this, minor revisions were made to improve the flow of questions. |
| 2) Patient characteristics  | i) Patient questionnaire 1 & 2 | Post consultation and 2 months following |  
  *Socio-demographics*: age, gender, living arrangements; accommodation, employment; education; ethnicity |  
  **Q1**: Patients (n = 5) completed and commented on ease of comprehension, length and time. Based on comments no refinements were made.  
  **Q2**: piloted concurrently at first site (case-site 3). After first 10 completed, ease of use, consistency and question completion rate were discussed with no amendments or changes required. |
| 3) Patient reported outcomes | i) Patient questionnaire 1 | Post consultation |  
  *Patient satisfaction*: with consultation, | Formal piloting was undertaken in January 2015 |
| Category of data | Method of data collection | Timing of collection and instruments | Piloting |
|------------------|---------------------------|-------------------------------------|----------|
| ii) Patient questionnaire 1 and 2 | Post-consultation and 2 months following consultation (excluding 1st four sites) | advice and medicines information comprised subscales from several validated tools (total 24 items): i) Consultation Satisfaction Questionnaire i.e. ‘professional care’, ‘perceived time’ and ‘overall satisfaction’ and ii) Medical Interview Satisfaction Survey (MISS) (68, 69) ‘compliance intent’ (10 items) & for patients who received medicines information or advice questions from PP iii) Satisfaction with Information about Medicines (SIMS) Scale (63) e.g. dose schedule, how medicine works, side-effects, and medicines adherence) (63–65, 69) (14 items). Service Satisfaction: was measured by 7 items on ease of access to services from the outpatients’ opinion of quality of hospital departments questionnaire (70)–7 items. Attitudes towards PP-IP (64, 86)–4 | outpatient clinic (not designated as a site). Five completed questionnaires were returned with comments indicating that content, layout and design was comprehensive and completion time was of acceptable length, ranging from 9–15 minutes. Questionnaire 2 was implemented following data collection completion at the first four sites, and was piloted concurrently at the first site visited (site 3) after its approval. After the first 10 completed questionnaires, ease of use, consistency and question completion rate were discussed at team meetings; no amendments or changes were required. |
| Category of data | Method of data collection | Timing of collection | Items and instruments | Piloting |
|------------------|---------------------------|----------------------|-----------------------|----------|
|                  |                           |                      | 6 point Likert scales (strongly disagree to strongly agree) used for all items |          |
| Quality of life  |                           |                      | validated EQ-5D-5L (71) comprising 5 dimensions, from independent – dependent, with 5 weighted levels affording a single index value score. (i.e. mobility, self-care, usual activities, pain/discomfort and anxiety/depression) |          |
| 4) PPs activities|                           |                      |                       |          |
| i) Observation   |                           | Real-time service    | Using a Microsoft      | Details of 8 observed consultations were recorded and downloaded into Microsoft Excel©. Data were found to be comprehensive, and the template layout/design revised following team discussion data. |
| diary completed  |                           | delivery up to 5     | Access© custom built electronic diary based on previous validated tools (87–89), a researcher recorded details of the model of service provision and MMA (including outcome and prescribing actions) during each observed consultation. |          |
| by researcher    |                           | working days (37     |                       |          |
| ii) Prescriptions|                           | hours)               |                       |          |
|                  |                           |                      | Model of service       |          |
|                  |                           |                      | provision:             |          |
|                  |                           |                      | Consultation duration (in minutes); type of consultation (face to face, telephone, email) and appointment (initial, follow-up, |          |
| Category of data | Method of data collection | Timing of collection | Items and instruments | Piloting |
|------------------|---------------------------|----------------------|-----------------------|----------|

Emergency), service & referral source (e.g. NHS in/outpatient, community, GP, social enterprise, private). Other work activities in relation to care included referrals made (to whom and how), discussion with colleagues, time spent in discussions with colleagues and review arrangements.

**MMA**

i) **outcome**: whether a. new medication was required; decisions to alter, stop, or make no change to existing medications; or decision to repeat prescribe previous item(s);

ii) **prescribing actions**: decision to recommend OTC product; recommend to Dr, other prescriber or via hospital notes prescription is required; adjust dose/drug according to pre-agreed protocols; (i.e. PGD; PSD, exemptions); whether provided advice to patients about medicines (i.e. how it works, when to take and side-effects); medication details (i.e. name,
| Category of data | Method of data collection | Timing of collection | Items and instruments | Piloting |
|------------------|---------------------------|----------------------|----------------------|----------|
|                  |                           |                      | dose, duration, formulation) |          |
|                  |                           |                      | Questions were fixed option and/or free text. |          |
|                  |                           |                      | All prescriptions issued by PP-IPs during observed consultations were collected and assessed based on previous work (90–92) and guidelines for prescription writing in the BNF (93) (i.e. accuracy, legibility, correct use of terminology, whether medicines were prescribed generically, preparation details, dose, dose frequency, length of treatment, and instructions regarding frequency, location and application of topical treatments). |          |

5) Resource implications and costs  

i) Interviews with PPs  

Prior to baseline data collection  

Grade/ banding of each of the PPs in the study. (as reported above)
| Category of data | Method of data collection | Timing of collection | Items and instruments | Piloting |
|------------------|---------------------------|----------------------|-----------------------|----------|
| ii) Observation diary completed by researcher | Real-time service delivery up to 5 working days (37 hours) | Six items related to consultations with individual patients were also examined for differences between PP-IPs and NP-PP-NPs |
|                  |                           |                      | - number and duration of consultations |
|                  |                           |                      | - frequency & duration of discussions with colleague or other professional regarding patient’s medication |
|                  |                           |                      | - frequency of new medications |
|                  |                           |                      | - frequency of referrals and follow-up consultations |
|                  |                           |                      | (as reported above) |
| Category of data | Method of data collection | Timing of collection | Items and instruments | Piloting |
|------------------|---------------------------|----------------------|-----------------------|----------|
| iv) Patient record audit | Clinical records 2 months following consultation. | Requested investigations, tests (e.g. BP, bloods, x-ray, MRI scan, CT, urine, sputum etc.) and referrals and services used relevant to the presenting complaint (i.e. case site PP, consultant specialist, clinical nurse specialist, GP, GP based nurse/ nurse practitioner, community nurse pharmacists, social services, other healthcare professionals) other hospital outpatients, hospital admissions, and number of in-patient days, A&E visits etc. | Audit tool: was piloted on 8 sets of medical records. Concerns were raised about quality of available data and that retrospective data collection could present difficulties with potential incomplete data. Following data collection at first four sites an amendment to the study protocol, as previously described was made. |
### Sample size

Anticipating patient satisfaction and ease of access to services being best expressed as positive or negative responses, in order to detect an absolute underlying difference of 40% between PP-IP and NP-PP, with size = 5% and power = 80%, a minimum of 24 subjects were needed in each PP-IP and NP-PP site. Allowing for a dropout rate of 20%, to enable a statistically sound comparison to be made between any specific pair of PP-IP and NP-PP sites, a target recruitment of 30 patients per site (total n = 420), collected over a maximum of 5 working days, was set.

Initial sample estimates, based on information provided by physiotherapists and podiatrists in clinical practice, indicated that full-time PP-IPs/NP-PPs have up to 60 consultations, lasting approximately 20–40 minutes each, per week, generating data on potentially 840 patient care episodes across 14 sites,
indicated that, even allowing for repeat patient visits and inclusion criteria failures, such a recruitment was feasible.

**Case sites**

Sites with PP-IPs were purposively selected from an earlier study phase (61) to include diversity with respect to care setting, geographical location and patient demographics across England.

**Recruitment**

**Podiatrists and Physiotherapists**

Initial email/ telephone contact was made with PP-IPs who had completed an earlier survey whilst undertaking IP training (n = 70) and indicated willingness to participate in further research (61). Those who expressed an interest were provided with a participant information sheets and supplementary information on case site involvement and requested to ensure organisational and local Research and Development (R&D) support.

Matched NP-PP sites, based on professional role, care setting, geographical location and NHS Agenda for Change (Afc) banding, were either nominated by PP-IPs, identified through personal contacts of the project advisory group or enquiries from individual Research and Development departments via the National Institute of Health Research (NIHR) portfolio. These matched NP-PPs were, with consent, contacted by a member of the research team and recruited following the same process as for PP-IPs. Written informed consent was taken from PP-IPs and NP-PPs on the first day of each case site visit by JE, who assured on-going consent with each PP-IP or NP-PP at the beginning of each contact day.

**Patients**

At each case site a consecutive sample of patients who had scheduled appointments with PP-IPs/NP-PPs providing adult services during a 5-day (up to 37hrs) site visit by the study researcher (JE) were recruited in NHS sites by trained research nurses, and private sites by a second study researcher (EK) between March 2015 and February 2016. Informed written consent was obtained from those who were willing to participate.

A screening log of all patients approached for participation in the study (n = 563) was recorded; both those recruited to the study (n = 488, 86.7%) and those declining participation (n = 75, 13.3%), including hospital/unit medical record numbers, gender and the date of consent, by the local research nurse/ study researcher. Following the observed consultation (see Table 1) those who agreed to participate completed and posted Patient Questionnaire 1 into a box in the clinic area or returned using pre-paid envelopes.

**Data collection**

An initial telephone interview, informed by previous work in the area (62) was conducted with the PP from each site using semi-structured questions to gather information on site characteristics, and professional
role. Details of the data collection and instruments, informed by the study patient and public involvement (PPI) and advisory groups, are presented in Table 1. All data collection instruments were piloted in a non-study physiotherapist IP NHS outpatient clinic in January 2015, with only minor corrections to wording required (see Table 1).

Outcome measures

Baseline Questionnaire 1

Informed by previous work (62) and several validated tools (63–69) a patient questionnaire was constructed to ensure that the generic questionnaire developed to evaluate prescribing by nurses and midwives in the Republic of Ireland (64) was appropriately adapted.

Section 1 recorded patient satisfaction with services received at the time of consultation using 10 medical interview satisfaction questions (63, 64) and ‘ease of access’ to services using 7 additional questions (70).

Section 2 comprised 4 statements measuring patients’ attitudes to PP-IP (65, 68) and 14 statements about the advice/information they may have received from PP-IPs/PP-NPs during the consultation including side effects, action of use and dose schedule and medicines adherence (63–65, 69).

Section 3 employed the validated EQ-5D-5L quality of life profile measure of five dimensions (mobility, self-care, usual activities, pain, anxiety/ depression) rated on five levels (no problem to severe problem/ unable questionnaire (71). Although the standardized extended EQ-5D incorporates a vertical 20 cm visual analogue scale (VAS) rating scale, Patient and Public Involvement group members consistently reported difficulty indicating numerical values for how they felt at any one time point. It was therefore decided to exclude this from the questionnaire.

Section 4 comprised 7 items related to general demographics in order to describe respondent characteristics including age, living arrangements, employment, ethnic group and educational attainment.

Follow up Questionnaire 2

Comprised of 5 questions relating to health resource use in addition to a second completion of the EQ-5D-5L asked over telephone. Patients were asked if they had, in the 2-month period following consultation received medicines prescribed/recommended by the PP-IP/NP-PP, undergone diagnostic tests (e.g. radiology, blood tests), returned to the PP-IP/NP-PP for follow-up treatment, been referred to other services/professionals, or received unplanned treatment for the same condition following the initial consultation (list of 10 potential services) (see Table 1).

Data Analysis
Quantitative data were entered on to SPSS© Version 22. Descriptive statistics were used to summarise the data and reported where open text data (specifically in relation to medication details and requested tests from the observation diary) had been converted to numeric data. Patient satisfaction and ease of access to services were measured on a 5-point Likert scale or as Yes/No responses. The Likert scale responses were easily reducible to positive or negative responses.

When assessing change in a continuous outcome from Patient Questionnaire 1 to Questionnaire 2, a paired t-test was used.

When comparing 2 subgroups for normally distributed outcomes (notably change scores from Questionnaire 1 to Questionnaire 2, such as for overall EQ-5D-5L score), an unpaired t-test was utilised.

When comparing 2 subgroups (in particular prescribing and non-prescribing) for an ordinal outcome, a Mann-Whitney U test was utilised. When comparing 2 subgroups (notably Podiatry and Physiotherapy or prescribing and non-prescribing) for a categorical outcome, the Chi-Squared test was used, reverting to a Fisher’s Exact test in 2 × 2 cross tabulations if 1 or more expected cell count was found to be < 5.

Economic analysis:

Seven resource implications of IP compared to NP were originally considered: rates of new prescribing; tests ordered; referrals to other health professionals; frequency of follow up; consultation duration; time spent discussing the patient with other colleagues; unplanned consultations for the same condition within two months of the index consultation. Data were gathered through the observation diary, except for tests (from the retrospective audit) and unplanned consultations (from the patient follow up questionnaire). Group level comparisons of IP vs NP for PT and PO were undertaken separately for each of the seven variables.

The cost implications (British pounds 2015) of differences in consultation length and colleague’s time spent in discussion were examined by applying nationally valid unit costs (72). A comprehensive micro level costing analysis could not be conducted because data on tests and unplanned consultations were only gathered for a sample of patients and insufficient details were available on medications, referrals and planned follow up to enable costs to be reliably ascribed. Costs that could be estimated were considered in relation to outcomes (satisfaction with consultation, satisfaction with advice, changes in health-related quality of life (EQ-5D-5L) between baseline and follow up) in a simple cost consequences framework.

Results

Characteristics of participants

i) PPs and case sites
Seven matched pairs of sites, (3 podiatry and 4 physiotherapy) were recruited. Sites were based across 8 Academic Health Science Networks in England (https://www.ahsnnetwork.com/), provided adult services, a mixed range of settings, including private practice (n = 2), primary care (n = 6), secondary care (n = 6), social enterprise (n = 2) and were well matched by professional role, care setting and agenda for change banding (see Table 2). All PP-IPs had been qualified for at least 12 months prior to data collection. A total of 488 patients were recruited: 243 across the PP-IP sites with 245 across the NP-PP sites.

Nearly all consultations (n = 474), both PP-IPs and PP-NPS, were face to face (n = 473, 99.8%), duration 2-203 minutes. There was considerable variation in the location of services: 39.2% (n = 186) of consultations were provided in NHS hospital outpatients, 25.1% (n = 119) NHS community clinics, 20.3% (n = 96) private practice, 9.7% (n = 46) general practice, 4.4% (n = 21) social enterprise and 1.3% (n = 6) community service.
| Pair | Case study site | No. of Patients | Type of PP | Job Title | Setting | Location in England | Age | Salary Band | Full/part time | Education | Single or multi-professional team | Patient questionnaire | Follow up- Patient Questions | Prescriptions |
|------|----------------|----------------|------------|-----------|---------|---------------------|-----|--------------|----------------|-----------|-----------------------------|-------------------|--------------------------|--------------|
| 1    |                | 49             | PO-IP      | General/ | Private | London             | 71  | 8a           | Full time     | Doctoret   | single                      | 40                | N/A                      | 0            |
| 2    |                | 46             | PO-NP      | General/ | Private | London             | 47  | 12           | Full time     | Master     | single                      | 35                | N/A                      | n/a          |
| 2    |                | 33             | PO-IP      | Specialist | Secondary | Sussex             | 41  | 7            | Full time     | Master     | multi-professional           | 22                | 19                      | 6            |
| 8    |                | 37             | PO-NP      | Specialist | NHS primary & secondary (& private) | Kent, Surrey, Sussex | 39  | 6            | Full time     | Degree     | single                      | 25                | 22                      | n/a          |
| 3    |                | 51             | PO-IP      | NHS       | Oxford         | 59  | 9            | Full time     | Master     | multi-professional           | 32                | 38                      | 3            |
| No. | 6 | 42 | PO-NP | Surgeon/Consultant | NHS Secondary & North Cumbria | 47 | 9 | Part-time Masters | Multi-professional | 26 | 23 | n/a |
|-----|---|----|-------|---------------------|-----------------------------|----|---|-----------------|-------------------|----|----|-----|
| No. | 4 | 7 | 6 | PT-IP | Specialist Community | London | 31 | 7 | Part-time Masters | Multi-professional | 25 | N/A | 0 |
| No. | 4 | 11 | PT-NP | Specialist | NHS Primary, Community care | Kent, Surrey, Sussex | 47 | 8a | Full time Masters | Multi-professional | 25 | N/A | n/a |
| No. | 5 | 9 | 42 | PT-IP | Specialist | Primary, Community | Social enterprise | Ke / Tier 2 Westminster | Full time Diploma | Multi-professional | 2 | 2 | 3 |
| No. | 5 | 38 | PT-NP | Surgeon | Tier 2 Westminster | 42 | 8a | Part-time Doctor | Multi-disciplinary | 6 | 3 | n/a |
| No. | Time | Rate | Professional | Service | Trust | Primary & Community Care | Team | Company | E-mail | Phone |  |
|-----|------|------|--------------|---------|-------|--------------------------|------|---------|--------|-------|---|
| 6   | 11   | 41   | PT-IP        | Specialist | Acute Foundation Trust | North West Coast | 58   | 8a      | Full time Masters | Multi-professional | 27 | 29 | 0 |
| 12  | 35   | 48   | PT-NP        | Surgeon/Consultant | NHSSecondary Care | Kent, Surrey, Sussex | 48   | 8c      | Full time Masters | Multi-professional | 19 | 23 | n/a |
| 7   | 13   | 21   | PT-IP        | Specialist | NHSPrimary & Community Care | Kent, Surrey, Sussex | 52   | 8a      | Full time Masters | Multi-professional | 8  | 16 | 3 |
| 14  | 36   | 38   | PT-NP        | Specialist | Primary & Community Care | Kent, Surrey, Sussex | 38   | 8a      | Full time Masters | Multi-professional | 23 | 20 | n/a |
So\n\ncial\n\nent\n\nerp\n\nerise

| Totals |   48 |   | 31 |   19 |   15 |
|--------|------|---|----|------|------|
|        |      | 8 |    |      |      |

**Table 2**: Characteristics of the sites and Physiotherapists and Podiatrists

PO-IP: Podiatrist independent prescriber PO-NP: Podiatrist non-prescriber PT-IP: Physiotherapist independent prescriber PT-NP: Physiotherapist non-prescriber

Job title: **Surgeon/Consultant** (consultant physiotherapists, consultant podiatric surgeons)

**General/Private** (physiotherapists practitioners, physiotherapists, podiatrists)

**Specialist** (e.g. Clinical specialist physiotherapists, extended scope physiotherapist clinical specialist podiatrists, clinical lead or senior podiatrists)

**ii) Patients**

Demographic data (see Table 3) were collected from 315/468 (67.3%) patients who consented to and returned patient questionnaire 1: 49.5% (n = 156) were from prescribing and 50.5% (n = 159) from non-prescribing sites. A lack of benchmark data with which to compare the patient data means it is not possible to confirm how representative our sample is with respect to the larger population. However, the samples, from the prescribing and non-prescribing group in this study were similar in terms of age, employment status, level of formal education, and ethnic group (p > 0.05).
Table 3
Patient characteristics

|                          | Physiotherapy n (%) | Podiatry n (%) | Total n = number of responses | % of total sample |
|--------------------------|---------------------|----------------|-----------------------------|------------------|
| **Professional group**   |                     |                |                             |                  |
| Which professional consulted | 135 (42.86%)        | 180 (57.14%)   | 315                         | 100%             |
| **Gender**               |                     |                |                             |                  |
| Male                     | 34 (30.4%)          | 55 (38.7%)     | 89                          | 35%              |
| Female                   | 78 (69.6%)          | 87 (61.3%)     | 165                         | 65%              |
| **Age**                  |                     |                |                             |                  |
| Physiotherapy group      | n = 111, mean 59.7, SD 16.6, (range 17.6-100.98) |               |                             |                  |
| Podiatry group           | n = 139, mean 67.1, SD 16.16, (range 16.17–94.32) |               |                             |                  |
| Total                    | n = 250, mean 63.8, SD 16.7 |               |                             |                  |
| **Living arrangements**  |                     |                |                             |                  |
| Live alone               | 19 (17.4%)          | 32 (21.6%)     | 51                          | 19.8%            |
| Live with other adult(s) | 90 (82.6%)          | 94 (63.5%)     | 184                         | 71.6%            |
| Care home resident       | 0                   | 22 (14.9%)     | 22                          | 8.6%             |
| **Type of accommodation**|                     |                |                             |                  |
| Owner occupied house/flat| 97 (82.2%)          | 104 (65.8%)    | 201                         | 72.8%            |
| Privately rented house/flat| 12 (1.02%)         | 12 (7.6%)      | 24                          | 8.7%             |
| Local authority/housing association/cooperative | 9 (7.6%) | 13 (8.2%) | 22 | 8% |
| Residential or care home, hospice | 0 | 29 (18.4%) | 29 | 1.05% |
### Follow up questionnaire 2

A response rate of 73.7% (197/267) was obtained for questionnaire 2. This sample excluded the 175 participants from the first 4 sites (Sites 1, 2, 4, 7) (see Table 2). Of the remaining 313 participants, 285 consented to follow-up, however contact details were incorrect or missing for 18 participants, leaving 267 eligible to participate.

#### iii) Patient outcomes

1. **Satisfaction and access to services**

The majority of patients (75.9%, n = 239) agreed that PP’s should be able to prescribe medicines for patients, however 23.2% (n = 73) would prefer a doctor to prescribe. Levels of satisfaction for the sample as a total were high, with over 60% positive agreement on all items other than ability to contact the service in an emergency (n = 144, 44.4%). Satisfaction with 17 specified aspects of the consultation and services provided by PPs indicated a significantly higher level of satisfaction among the patients of PP-IPs than those of NP-PPs in 8 instances (Table 4).
| Patient views and experience of consultation with physiotherapist or podiatrist | Physiotherapist | Physiotherapist | Podiatrist | Podiatrist | Total |
|---|---|---|---|---|---|
| Independent | Non-prescriber | (n = 73) | Independent | Non-prescriber | (n = 94) |
| Prescriber | (n = 62) | Prescriber | (n = 86) | | n = 315 |
| | | | | | |
| Strongly Agree/Agree | (compared with strongly disagree/disagree/no opinion) | Strongly Agree/Agree | (compared with strongly disagree/disagree/no opinion) | | |
| | | | | | |
| n | % sample | n | % | p* | n | % | n | % | P* | n | % | |
| sa | response | res | po | nse |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) — all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
1. Overall I was satisfied with the consultation from this physiotherapist or podiatrist

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
|   | 59 | 95.1% | 67 | 91.2% | 80 | 90.4% | 80 | 93.0% | 29 | 92.4% |

*p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
The physiotherapist was very careful to check everything when carrying out my care.

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2.T | 60 | 96.8% | 69 | 94.0% | 0.0 | 82 | 87.2% | 77 | 89.5% | 0.3 | 28 | 91.4% |

*p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
3.I will follow the advice of this physiotherapist or podiatrist because I think she/he is right.

|          | 59 | 95.1% | 64 | 87.7% | 81 | 86.2% | 75 | 87.2% | 21 | 88.6% | 27 | 88.2% |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
4. The time I was able to spend with the physiotherapist or podiatrist was a bit too short (R)

| Item | 46 | 74.2% | 61 | 83.6% | 0.8 | 68 | 81.0% | 59 | 68.6% | 0.3 | 23 | 74.3% |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
5. The physiotherapist or podiatrist explained the reasons for the advice given.

| Item | Yes (%) | No (%) | Yes (%) | No (%) | Yes (%) | No (%) | Yes (%) | No (%) |
|------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5.T  | 90.3%  | 0.1%   | 94.0%  | 0.7%   | 83.7%  | 11%    | 79%    | 4%     |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) — all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
Some things about the consultation with the physiotherapist or podiatrist could have been better (R)

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
|   | 46 | 74.2% | 53 | 63 | 0.1 | 68 | 72.3% | 60 | 69.8% | 22 | 72.1% |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R) ) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
The physiotherapist or podiatrist listened very carefully to what I had to say.

| Item | Agreed | % | Disagreed | % |
|------|--------|---|-----------|---|
| 74   | 57     | 91.2% | 38        | 68.8% |
| 79   | 93     | 0.3%  | 44        | 99.7% |
| 74   | 86     | 0%    | 30        | 99%   |

*p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
| 8.I | 54 | 87.1% | 54 | 74.00% | 25 | 68 | 72.3% | 61 | 70.9% | 64 | 23 | 75.2% |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R) ) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
9. The physiotherapist or podiatrist was interested in me as a person not just my illness

| Patient views and experience of consultation with physiotherapist or podiatrist (compared with strongly disagree/disagree/no opinion) | Physiotherapist Independent Prescriber (n = 62) | Physiotherapist Non-prescriber (n = 73) | Mann-Whitney U-test | Total |
|---|---|---|---|---|
| Strongly Agree/Agree | 50 | 80.1% | 56 | 76.7% | 0.0 | 33 | 81.9% | 65 | 75.6% | 0.1 | 24 | 78.8% |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R) ) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
*p based on Mann Whitney U test using 5 point Likert Scale: for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)). All corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
10. I am NOT completely satisfied with the advice received from this physiotherapist (R)  

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | 46 | 74 | 61 | 83 | 0.0 | 75 | 79 | 67 | 78 | 0.4 | 24 | 79 |   |   |   |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
11. It was easy to make an appointment with the physiotherapist or podiatrist

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
|   | 35 | 56. | 49 | 67. | 0.9 | 74 | 78. | 60 | 69. | **0.0** | 21 |
|   | 5% | 1% |   |    | 00 |   | 7% |    | 8% | **28** | 8  |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) — all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.

12. There was an acceptable time lapse to obtain an appointment

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
|   | 30 | 48. | 43 | 58. | 0.7 | 67 | 71. | 57 | 66. | 0.3 | 19 |
|   | 4% | 9% |   |    | 59 |   | 3% |    | 3% | 78  | 7  |

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
|   | 60 | 69. | 8% |   |    | 0.0 | 21 |
|   | 2% |   |    | 0.0 | 28  | 8  |   |    | 69. |   |   |
13. It was possible to obtain an appointment on a convenient day or hour

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| 40 | 64 | 49 | 67 | 0.6 | 70 | 74 | 62 | 72 | 0.0 |
| 5% | 1% | 95 | 5% | 1% | 67 | 1 |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
14. I can contact someone in the service by phone for help or advice in case of problem

|    | 38 | 61. | 47 | 64. | 0.8 | 70 | 74. | 56 | 65. | 0.0 | 21 | 67. |
|----|----|-----|----|-----|-----|----|-----|----|-----|-----|----|-----|
|    | 2% | 4%  | 81 | 5%  | 1%  |    |     |    |     | 20  | 1  | 0%  |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.
15. In an emergency I can get a quick appointment/consultation at this service

| 15 | 19 | 30.25 | 34 | 0.1 | 60 | 63 | 36 | 41 | 0.0 | 14 | 44 |
|----|----|-------|----|-----|----|----|----|----|-----|----|----|
|    | 6% | 2%    | 8% | 9%  |    |    |    |    |     |    | 4% |

* p based on Mann Whitney U test using 5-point Likert Scale; for ease of interpretation, the table only displays for each item the number of patients who indicated a positive response (i.e. Strongly Agree/Agree or Strongly Disagree/Disagree for negatively paraphrased items (R)) – all corresponding percentages relate to the entire subgroup at the top of the column i.e. interpreting no response to the specific item as a lack of a positive response.

16. I saw the physiotherapist or podiatrist at the appointed time

| 16 | 42 | 67 | 62 | 84 | 0.1 | 74 | 78 | 73 | 84 | 0.9 | 25 | 79 |
|----|----|----|----|----|-----|----|----|----|----|-----|----|----|
|    | 7% | 9% | 11 | 7% | 9%  |    |    |    |    | 52  | 1  | 7% |
With respect to service access, patients of PO-IPs were more satisfied with ‘the ease of making an appointment’ and ‘the ability to contact the service by phone or in times of emergency’ (see Table 4) than NP-PO patients, with no notable difference evident in patients attending PT-IPs compared to NP-PTs.

There was no effect on the remaining four items reporting on ease of access on the acceptability of: i) waiting time to obtain an appointment; ii) obtaining an appointment on a convenient day or hour; iii) waiting time or iv) seeing the PT or PO at the appointed time between patients attending a PP-IPs when compared to those attending a NP-PP.

*Insert Table 4 here*

Patients of PP-IPs were more likely to receive medicines information or advice during the consultation (58 out of 146 (39.7%) vs 37 out of 151 PP-NP patients (24.5%); p = 0.005), with varying levels of satisfaction reported (see Table 5). Compared to PT-NPs patients, PT-IP patients were significantly more likely to: ‘be told when’ and ‘how often’ to take their medicine, ‘intend to take their medicines’ and ‘find it easier to follow the PT advice’ (p ≤ 0.05).
Table 5
Patient views and experience of medicines management advice and information provided by physiotherapist or podiatrist

| Patient views and experience of medicines management advice and information provided by physiotherapist or podiatrist | Physiotherapist Independent Prescriber (n = 27) | Physiotherapist Non-prescriber (n = 24) | Podiatrist Independent Prescriber (n = 31) | Podiatrist Non-prescriber (n = 13) | Total |
|---|---|---|---|---|---|
| | Physiotherapist Independent Prescriber | Physiotherapist Non-prescriber | Podiatrist Independent Prescriber | Podiatrist Non-prescriber | Total |
| Strongly Agree/Agree | Strongly Agree/Agree | Strongly Agree/Agree | Strongly Agree/Agree | Strongly Agree/Agree | Strongly Agree/Agree |
| N | n | % | n | % | p* | n | % | n | % | p* | n | % |
| (excluding not applicable*) | | | | | | | | | | | | |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s)?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
1. The physiotherapist or podiatrist gave me time to clarify questions I may have had about my medicine.

| 2 | 84 | 24 | 96.0% | 19 | 86.4% | 0.6 | 21 | 84.0% | 11 | 91.7% | 0.9 | 75 | 89.3% |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s)”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
2. The physiotherapist or podiatrist told me when to take my medicine

|   |   |   |   |   | 19 | 82. | 9 | 81. | 0.7 | 45 | 70. |
|---|---|---|---|---|----|-----|---|----|----|----|----|
| 64 | 11 | 73. | 6 | 40. | 0.0 | 30 | 6% | 8% | 19 | 3% |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s) ?”.

3. The physiotherapist or podiatrist told me how often I should take my medicine

|   |   |   |   |   | 19 | 86. | 9 | 81. | 0.8 | 43 | 70. |
|---|---|---|---|---|----|-----|---|----|----|----|----|
| 61 | 12 | 85. | 5 | 35. | 0.0 | 02 | 4% | 8% | 35 | 5% |

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
4. The physiotherapist or podiatrist provided me with information on the purpose of my medicine.

|   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|
| 75 | 16 | 73 | 14 | 70 | 0.5 | 19 | 82 | 11 | 84 | 0.5 |
| 7% | 0% | 47 | 6% | 6% | 49 | 0% |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s)”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
5. The physiotherapist or podiatrist provided me with information on how to use my medicine.

| Item | Yes | No | Strongly Agree | Agree | Strongly Disagree | Disagree | Strongly Agree | Agree | Strongly Disagree | Disagree | Strongly Agree | Agree | Strongly Disagree | Disagree |
|------|-----|----|----------------|-------|-------------------|----------|----------------|-------|-------------------|----------|----------------|-------|-------------------|----------|
| 5.   | 59  | 11 | 73.3%          | 5.0%  | 45.0%             | 0.0%     | 16.0%          | 80.0% | 10.0%             | 91.0%    | 0.6%            | 0.8%  | 42.0%             | 71.2%    |

* Those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s)?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
6. I expect that it will be easy to follow the physiotherapist's or podiatrist's advice about my medicine.

|       | 68 | 12 | 75 | 10 | 66 | 0.1 | 22 | 91 | 11 | 84 | 0.3 | 57 | 83 |
|-------|----|----|----|----|----|-----|----|----|----|----|-----|----|----|
| 0%    | 7% | 81 | 7% | 6% | 46 | 8%  |    |    |    |    |     |    |    |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s) ?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
7. The physiotherapist or podiatrist told me the name of my medicine.

| Patient views and experience of medicines management advice and information provided by | Physiotherapist | Podiatrist |
|----------------------------------------------------------------------------------------|-----------------|------------|
| Physiotherapist Independent Non-prescriber | Podiatrist Independent Prescriber | Podiatrist Non-prescriber |
| Strongly Agree/Agree | Strongly Agree/Agree | Strongly Agree/Agree |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s)?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
| N (excluding not applicable*) | n  | %  | n  | %  | p* | n  | %  | n  | %  | p* | n  | %  |
|-------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|
| 8. The physiotherapist or podiatrist explained the side effects of my medicine | 63 | 11 | 68.8% | 12 | 70.6% | 0.5 | 13 | 59.1% | 5 | 50.0% | 0.4 | 43 | 65.0% |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s) ?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
9. I would have liked to have received more information about my medicine from the physiotherapist or podiatrist.

|   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|
| 73 | 3 | 13 | 0.4 | 0 | 3 | 25 | 0.2 | 9 | 12 |
| 6% | 6% | 38 | 0% | 0% | 88 | 0% | 3% |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s)?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
10. The physiotherapist or podiatrist provided me with information on what to do if I missed a dose of my medicine.

|   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|
|   | 48 | 3 | 25. | 3 | 27. | 0.7 | 3 | 21. | 1 | 9.1 |
|   | 0%  | 3% | 95  | 4% | 1%  | 74  | 10 | 20. | 8% |   |

*Those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s) ?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
11. It may be difficult for me to do exactly what the physiotherapist or podiatrist told me to do in relation to my medicine.

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
|   | 56 | 0 | 0.0 | 1 | 9.1 | **0.0** | 5 | 23.1 | 9.1 | 0.8 | 7 | 12.5 |
| % |   |   |   |   |   |   |   |   |   |   |   |   |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s)?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
12. I'm not sure it will be worth the trouble to take the medicine advised by the physiotherapist or podiatrist #

| Item | 62 | 2 | 13 | 1 | 8.3 | 0.2 | 1 | 6.7 | 1 | 8.3 | 0.5 | 5 | 8.1 |
|------|----|---|----|---|-----|-----|---|-----|---|-----|-----|---|-----|
| %    | 3% | % | 98 | % | 70  | 70  |% | 70  |% | 70  | 70  |% | 70  |

* Those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s) ?”.

*P-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
13. Receiving a prescription for medicine from my physiotherapist or podiatrist reduced my waiting time today

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 4 | 30 | 1 | 16 | 0.9 | 6 | 46 | 6 | 75 | 0.4 | 17 | 42 |
| 8% | 6% | 19 | 1% | 0% | 46 | 5% |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s)?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.
14. I am likely to take the medicine prescribed for me today

|        | 47 | 7  | 36. | 2  | 28. | 0.0 | 13  | 72. | 11  | 100 | 0.2 | 33  | 70. |
|--------|----|----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|        | 8% | 5% | 2%  | .0%| 2%  | .0% | 0%  | 4%  | .2% | 0%  | 0%  | 2%  |

^ those patients who did not respond “Yes” to the preceding question “During the consultation today, did the physiotherapist or podiatrist prescribe and/or give you advice and information about medicines(s) ?”.

*p-value based on Mann Whitney U test utilising the original 5 point Likert scale; for ease of interpretation, the table only displays for each item the number of patients who responded Strongly Agree/Agree.

Note that for items labelled # this may not be regarded as a positive response.

Insert Table 5 here

1. Quality of life- EQ-5D-L

Indications at baseline were that patients who saw PT-IP had lower generic quality of life than those seeing the PT-NP, due to lower scores on the mobility dimension. However, there was no statistically significant difference between PP-IP and PP-NP groups on either individual items or overall EQ-5D-5L score (p ≥ 0.05) (Table 6, individual dimension scores not shown).

Quality of life overall scores in both PP-IP and PP-NP groups improved significantly between baseline and follow-up. Differences in change scores between the PP-IP and PP-NP group, however, were not statistically significant (Table 6). The sample for which data at both time points were available was limited (n = 116).
### Table 6
Overall EQ5D index score: baseline and follow-up

| From the 129 completers | Baseline for 116 with EQ5D in BOTH data sets only | Follow-Up for 116 with EQ5D in BOTH data sets only |
|-------------------------|-----------------------------------------------|-----------------------------------------------|
| Number of patients completing BOTH sets of EQ5D questions | EQ5D-5L Mean (SD) | EQ5D-5L Mean (SD) | Change from Baseline (95% CI)* | Paired t-test p-value |
| PT IP | 25 | 0.56 (0.31) | 0.64 (0.27) | 0.08 (-0.04 to 0.19) | 0.194 |
| PT NP | 28 | 0.73 (0.19) | 0.73 (0.22) | 0.001 (-0.07 to 0.07) | 0.973 |
| PO IP | 33 | 0.70 (0.26) | 0.78 (0.20) | 0.08 (0.003 to 0.16) | 0.042 |
| PO NP | 30 | 0.66 (0.26) | 0.76 (0.28) | 0.10 (0.03 to 0.16) | 0.004 |
| All IP | 58 | 0.64 (0.29) | 0.72 (0.24) | 0.08 (0.01 to 0.14) | 0.019 |
| All NP | 58 | 0.69 (0.23) | 0.75 (0.25) | 0.05 (0.003 to 0.10) | 0.036 |
| All PT | 53 | 0.65 (0.26) | 0.69 (0.25) | 0.04 (-0.03 to 0.10) | 0.266 |
| All PO | 63 | 0.68 (0.26) | 0.77 (0.24) | 0.09 (0.04 to 0.14) | 0.001 |

*Positive change indicates mean improvement in health at Follow-Up*

### iv. Economic analysis

Amongst physiotherapists, the IPs had significantly longer consultation duration than NPs (27.6 vs 20.8 minutes) (Table 7). Amongst podiatrists, the frequency with which new medications and tests were ordered were significantly higher in IP than NP (Table 7). There was a trend for consultation duration to be longer for IP (23.4 vs 19.9 minutes) (Table 7).

Comparing physiotherapists and podiatrists, planning of follow up consultations was higher by podiatrist IPs than physiotherapist IPs, but no significant differences were found between IP and NP within the professions. After removing unplanned consultations in the two months after the original consultation that were considered (by two independent reviewers) to be unamenable to treatment delivered in the index
consultation, only four items of unplanned service utilisation remained across the whole sample of patients of PT and PO, all of which were related to pain relief (Table 7).

**Costs of consultations**

Difference in costs of consultation duration of IP v NP for physiotherapist and podiatrist groups were based on Agenda for Change (AfC) band 8a, which was the most frequent grade of PP-IPs in the study, i.e. £70 per hour (72). Compared to the cost of a NP consultation, the IP consultation was, on average, more costly by £7.95 for PT (£24.30 vs £32.25) and £8.62 (£19.69 vs £28.31) for PO. The salary of a grade 9 professional is twice that of grade 8a, so at that higher level, the differences in the cost of consultations between IP and NP would be doubled. Use of grade 7 instead of grade 8a would reduce the differences between IP and NP by about £1.20 per consultation. Amongst the POs, the IPs were at band 7 (advanced / team leader), 8a (principal) and 9 (consultant); two of the NPs were band 9 and the third was band 6 (specialist). Participating physiotherapists were all band 8a, except one NP (grade 8c), and one IP (grade 7).

Costs could not be estimated for the other elements of activity that might differ between IP and NP due to data availability problems. Information on tests ordered were drawn from a small sample of records (n = max 15 per site) in each site (the audit); reporting of the type and dose of new medications, referrals and frequency of planned follow up was incomplete.
Table 7
Comparison of independent prescribers and non-prescribers, by profession, on variables used in the cost analysis

| Professional group | Prescribing status | Number of new medications required (Observation Q6) | Number of tests requested/patient (Sample audit) | Consultation time in minutes/patient (Observation Q1) | Discussion with colleagues in minutes/patient (Observation Q9,10) | x | Patients receiving referral (not for tests) (Observation Q11) | Patients with planned follow up (Observation Q15) | Patients reporting verified unplanned consultations within 2 months (Patient questionnaire) |
|--------------------|-------------------|--------------------------------------------------|-----------------------------------------------|--------------------------------------------------|----------------------------------------------------------|---|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------|
| PHYSIO- THERAPY    | Indepen dent prescriber (IP) | N 107 | 42 | 107 | 107 | N | 107 | 107 | 47 |
| Missing | 9 | 74 | 9 | 9 | Yes | N | 32 | 54 (8 by phone) | 1 |
| N, % of zeros | 75, 70.1% | 32, 76.2% | 0 | 88, 82.2% | Yes | % | 29.9% | 50.5% | 2.1% |
| Mean | 0.327 | 0.262 | 27.64 | 1.802 |
| SD | 0.546 | 0.497 | 14.10 | 5.585 |
| Median | 0 | 0 | 24 | 0 |
| IQR | 0 to 1 | 0 to 0.25 | 18 to 34 | 0 to 0 |
| N | 115 | 44 | 115 | 115 | N | 115 | 115 | 46 |
| Missing | 7 | 78 | 7 | 7 | Yes | N | 34 | 51 (1 by phone) | 2 |
| N, % of zeros | 87, 75.7% | 33, 75.0% | 0 | 114, 99.1% | Yes | % | 29.6% | 44.3% | 4.3% |
| Mean | 0.252 | 0.250 | 20.83 | 0~ |
| SD  | Medi an | IQR   | Significant difference (p) | PODI ATRY | Independen t prescriber (IP) | Non prescriber (NP) |
|-----|---------|-------|-----------------------------|-----------|------------------------------|---------------------|
| 0.456 | 0.438 | 10.46 | 0~                          | N         | 128                          | N                   |
| 0    | 0       | 19    | 0                           | 24        | 128                          | 128                 |
| 0 to 0 | 0 to 0.75 | 14 to 28 | 0 to 0                     | 128       | 128                          | 128                 |
| MWU 0.336 | MWU 0.949 | MWU < 0.000 5 | MWU < 0.000 5 | Yes N | 17 (0 by phone) | 17 (7 by phone) |
| 0, 72.7% | 17, 70.8% | 0, 85.2% | Yes % | 13.3% | 85.9% | 0% |
| Mean 0.328 | 0.375 | 24.27 | 0.976                       | Mean 0.105 | 0 | 16.88 |
| SD 0.616 | 0.647 | 24.32 | 2.682                       | SD 0.379 | 0 | 9.86 |
| Median 0 | 0 | 16 | 0                           | Median 0 | 0 | 16 |
| IQR 0 to 1 | 0 to 1 | 11 to 27.75 | 0 to 0                   | IQR 0 to 0 | 0 to 0 | 10 to 23 |
| 114, 91.9% | 32, 100% | 111, 89.5% | Yes % | 4.8% | 89.5% | 2.1% |
| Yes N 6 | 111 (7 by phone) | 1 | Non prescriber (NP) | N 124 | 32 | 123 |
| 3 | 95 | 4 | 3 | Mean 0.105 | 0 | 16.88 |
| SD 0.379 | 0 | 9.86 | 2.867                       | SD 0.379 | 0 | 9.86 |
| Median 0 | 0 | 16 | 0                           | Median 0 | 0 | 16 |
| IQR 0 to 0 | 0 to 0 | 10 to 23 | 0 to 0                   | IQR 0 to 0 | 0 to 0 | 10 to 23 |
| 114, 91.9% | 32, 100% | 111, 89.5% | Yes % | 4.8% | 89.5% | 2.1% |
**Discussions with colleagues**

The IPs in the PT group consulted colleagues about patients significantly more often than the NPs (17.8% vs 0.9% of consultations), and most discussions were with medical colleagues, averaging 9.5 minutes per discussion (Table 8).

POs held discussions with colleagues for > 10% of consultations (14.8% IPs, 10.5% NPs, (Table 8)), for around 7 minutes. IPs discussed a higher proportion of patients with medical colleagues, than a colleague from the same profession, thereby likely to be incurring higher costs. However, information on colleagues consulted was not precise, so calculations were indicative only. Some POs were band 9 (consultant), so reporting discussions with 'same' professional would imply higher costs than are indicated in the table, which are based on AfC band 8a.
Table 8
Discussion with colleagues about patient

| Professional group | Prescribing status | Number and % of all patients seen for whom discussion occurred with colleague | Mean (SD) minutes in discussions with colleague per patient | Discussion with same professional n, mean (SD) minutes | Same colleague cost / discussion* (£, 2015) | Discussion with medical professional n, mean(SD) minutes | Medical colleague cost / discussion* (£, 2015) |
|--------------------|--------------------|--------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------|------------------------------------------|-----------------------------------------------|---------------------------------------------|
| PHYSIOTHERAPY      | Independent prescriber | 19 (17.8%)                                                                                                                                 | 10.61 (9.68)                                              | 3, 19.5 (14.8)                                      | £22.75                                   | 16, 9.5 (8.9)                                          | £21.69                                      |
|                    | Non prescriber      | 1 (0.9%)                                                                                                                                 | 0 (n/a)                                                   | 1, time missing                                     | Not known                                | 0, n/a                                           | 0                                           |
|                    | Significance difference | p < 0.0005#                                                                            | n/a                                                       |                                                      |                                          |                                                |                                              |
| PODIATRY           | Independent prescriber | 19 (14.8%)                                                                                                                                 | 6.89 (3.20)                                              | 11, 6.8 (3.6)                                       | £7.93                                    | 8, 7.0 (2.8)                                          | £15.98                                      |
|                    | Non prescriber      | 13 (10.5%)                                                                                                                                 | 6.92 (6.14)                                              | 12, 7.3 (6.3)                                       | £8.52                                    | 1, 3.0 (0.0)                                          | £6.85                                       |
|                    | Significance difference | p = 0.299~                                                                            | p = 0.493^                                               |                                                      |                                          |                                                |                                              |

* # Fishers Exact test; ~ Chi squared test; ^ Mann Whitney U test

* Unit costs of health and social care 2015 (Curtis and Burns 2015), pro rata based on £70/hour for same professional i.e. AfC band 8a, as in Ec2 above, and £137/hour for medical consultant

Cost implications

The available data suggest that for both PT and PO in this study, care delivery by IP is more resource intensive and costly than NP due to longer consultations for PTs, and taking more time of colleagues to discuss patients. Whilst not costed, PO-IPs had higher frequency of ordering medications and tests than PO-NPs. Analysis of the changes in self-reported health status between baseline and 2 months follow up
using EQ-5D-5L found no difference in change scores of IP and NP for either PT or PO, but these data were only available for a small sample of participants.

**Discussion**

This is the only known national evaluation of PP-IP in the UK or the world, and the first to adopt a comparative case study design to compare outcomes and costs for patients managed by PP-IPs and NP-PPs. Unlike nurses and pharmacists, where prescribing has been explored in some detail using self-reported outcomes (32, 53, 62), there is a dearth of equivalent information in the allied health professions, including either physiotherapy and/ or podiatry (35, 41) and/ or studies adopting direct observation of outcomes (32). Our study demonstrates that care provided by PP-IPs is equivalent, in terms of quality of life and patient satisfaction, to care provided by NP-PPs with prescribing undertaken by doctors. IP by PPs was found to be highly acceptable, with higher levels of patient satisfaction in some aspects of medicines information also reported than for NPs.

Importantly, it appears that PP-IP is developing in line with original policy intention to improve access and quality of care in across a range of settings (73–75). The evidence generated in this study demonstrates that PP-IPs can provide a high standard of care. Extending non-medical staff, such as physiotherapists’ and podiatrists’, scope of practice to include independent prescribing is key to supporting effective delivering of the NHS Long Term Plan (12, 58, 76), and in creating a step change in developing the capacity and capability of the workforce to deliver innovative models of service delivery (4, 12). The severity of the workforce deficit makes changes, such as the increased level of clinical autonomy, associated with independent prescribing an attractive option to commissioners who seek to address gaps in service delivery. As the world leader in extending prescribing rights to nurses, pharmacists and allied health professions the findings are of significant importance to international policy makers who seek to learn from the pioneering advancement of prescribing rights in UK (31, 34) to inform their own approach to addressing the workforce deficit.

Internationally it is now common for physiotherapists, nurse practitioners, pharmacists, social workers, and psychiatric nurses to be located within extended primary care teams (77) with plans to extend this further recently announced (12, 18). Nearly 50% of appointments in UK general practice are for example, already provided by non-medical staff, i.e. nurses, pharmacists and allied health professionals (12, 15). This is important as the current deficit in primary care looks set to continue (78), with a recent proposal for home visits to be removed from the GP contract, and a government pledge to create 50 million more GP appointments year by 2024/25 (78, 79). As the third largest workforce in health and care in England, AHPs have great potential to contribute to transforming care, and ensuring ongoing access to medicines in these challenging times (18). Having a robust economic evaluation of PP-IP is particularly important, given that identifying a sustainable solution that improves the worldwide deficit of health workers and makes best use of limited resources is imperative in ensuring ongoing access to medicines (12, 18). Our cost appraisal from the case sites suggest that PP-IP care delivery is more resource intensive than NP-PP. This arises through longer consultation duration, more ordering of medicines and tests (PO) and more
discussions with colleagues (PTs). These costs, however, need to be considered in relation to benefits, many of which could not be measured in this study. Only a limited economic analysis was possible meaning that the findings should be treated with caution. Whilst the original intention had been to undertake a patient level micro costing analysis, data deficiencies limited what could be included. Further research is required to understand how team configurations affect care delivery, patient outcomes and costs.

The most complete data were available for consultation duration, and the calculation of associated costs showed IPs to incur slightly higher consultation costs than NP in both the PO and PT groups (£8.62 and £7.95 respectively). It is important to note however that consultation duration and associated costs may simply be driven by professional differences and clinic practices. The complexity of these arrangements means that the differences in cost could equally reflect service differences which would exist regardless of IP status. Furthermore, the time spent in discussion with colleagues may reflect the multi-professional service that many case sites provided. Multi-professional, or team-working is a fundamental component of health care delivery in the UK and central to current government policy (80–82). There is increasing emphasis on establishing systems, rather than single episodes of care, that dissolve traditional boundaries (83, 84) to support the increasing number of people with long-term conditions.

There is limited evidence available with which to compare our study findings (32, 41, 51, 52, 85). Despite positive findings that NMP is safe, and provides beneficial clinical outcomes (32, 34, 62), the impact on the health economy, as reported in two recent systematic reviews examining clinical and cost effectiveness, remains unclear (51, 52, 85). The authors, as in this study, highlight the difficulty in separating NMP effects from the contributions of healthcare team members, and a lack of adequately powered randomised controlled trials examining NMP across clinical specialities, professions and settings (31, 51). Given that extended prescribing rights to nurses, pharmacists and AHPs offers a sustainable approach to improving the global workforce deficit, there is an urgent need to establish economic benefits, or otherwise of non-medical prescribing to inform future international policy developments. A different approach, involving highly targeted specific outcomes, and or longitudinal studies is therefore required. The development of a minimum data set of important outcome measures for NMP assessment would as Noblet et al. suggests (51), be highly beneficial, and generate the required evidence to evaluate the overall benefit of NMP and inform future developments in the UK and around the world.

**Strengths and limitations**

In the first study to explore AHP prescribing, the 14 case sites supported an in-depth evaluation and comparison of PP-IP to PP-NPs in a range of care settings. Use of multiple methods of data collection, including an observational component, strengthens the trustworthiness of the findings. PP-IP participants were selected from a larger sample (n = 70) who completed a trainee PP-IP survey and indicated that they would be willing to be involved in further research (61).
Despite challenges in matching sites, given the diversity of service settings, roles, and patient needs, between and within the two professions, patient characteristics indicated good matching on most factors. However, there are limitations and methodological challenges associated with using the same evaluation measures on two different professional groups for whom separate measures might have been more appropriate. The economic analysis was constrained as described above. An analysis of effectiveness was not possible because it was not feasible to collect data on specific indicators for change across the wide variety of conditions treated within PP consultations. Our ability to link each of the various aspect of patient data (i.e. observation, questionnaires, record audit) was also very limited as patients, in line with good ethical practice, had the option to select which aspects of data collection they agreed to. As a result, it was not possible to match patients across the different data sets, or to complete some of the intended analysis.

**Conclusions**

This study provides new knowledge about physiotherapist and podiatrist independent prescribing, the high level of care and patient satisfaction they provide. Given that extending prescribing responsibilities to nurses, pharmacists, and allied health professionals is increasingly being recognised as effective way to alleviate shortfalls in the global health workforce and ensure ongoing access to prescription medicines around the world this is important. PP-IP care delivery was found to be more resource intensive than NP-PP. However, this study is limited, and findings needs to be verified through further research, including a full economic analysis. A more focussed longitudinal exploration within each profession with targeted outcome measures would enable a more robust comparison of the impact of PP-IP across the United Kingdom and inform further developments around the world.

**Abbreviations**

A&E: Accident and Emergency

BP: Blood pressure

BNF: British National Formulary

CT: Computerised tomography

EQ5-D: EuroQol 5-D

GP: General Practitioner

MMA: Medicines Management Activities

MRI: Magnetic Resonance Imaging

NMP: non- medical prescriber
OTC: Over the counter

PGD: Patient Group Direction

PP: Physiotherapist & Podiatrist

PP-IP: Physiotherapist & Podiatrist Independent Prescriber

PSD: Patient Specific Direction

NP-PP: Non-prescribing Physiotherapist & Podiatrist

Declarations

Ethics approval and consent to participate

NHS Research Ethics approval from London – Surrey Borders Research Ethics Committee was (REC Ref No 14/LO/1874) and the University was obtained. R&D approval was obtained from each National Health Service (NHS) trust and private healthcare providers. All participants provided written informed consent form for the various aspects of data collection.

Consent for publication

Not applicable

Availability of data and materials

The study did not receive ethics approval, or participant consent, to place a study dataset in the public domain. The data, and tools used for its collection in this study can be made accessible to qualified researchers upon reasonable request pursuant to any restrictions required to ensure the privacy of human subjects involved. Access to data will be subject to a data sharing agreement approved by University of Surrey. Researchers interested in accessing USEFUL data should send their request to the Director of Research, Professor Emma Ream (e.ream@surrey.ac.uk).

Competing interests

The authors declare that they have no competing interests.

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