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# 1 Physiotherapy as a first point of contact 2 in general practice: a solution to a 3 growing problem?

Q1 4 **Rob W. Goodwin**<sup>1</sup> and **Paul A. Hendrick**<sup>2</sup>

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7 **Aim:** To evaluate the clinical effectiveness, patient satisfaction and economic efficacy  
8 of a physiotherapy service providing musculoskeletal care, as an alternative to GP care.

9 **Background:** There is a growing demand on general practice resources. A novel  
10 '1st Line Physiotherapy Service' was evaluated in two GP practices (inner city practice,  
11 university practice). Physiotherapy, as a first point of contact, was provided as an  
12 alternative to GP care for patients with musculoskeletal complaints. **Participants:**  
13 A convenience cohort sample of over 500 patients with a musculoskeletal complaint was  
14 assessed within the physiotherapy service. For the economic evaluation a cohort of 100  
15 GP patients was retrospectively reviewed. **Method:** Clinical outcome measures were  
16 collected at assessment, one and six months following assessment. Patient satisfaction  
17 was collected at assessment. An economic evaluation was undertaken on the  
18 physiotherapy cohort of patients and compared to a retrospective cohort of patients  
19 ( $n = 100$ ) seen by a GP. This evaluation considered only the health care perspective  
20 (primary and secondary care). Societal issues such as absence from employment were not  
21 considered. **Results:** There were no adverse events associated with the physiotherapy  
22 service. Patients reported high levels of satisfaction with the physiotherapy service.  
23 Patients managed within the 1st Line Physiotherapy Service demonstrated clinical  
24 improvements (EQ-5D-5L, Global Rating of Change) at the six-month point. There was  
25 a statistically significant difference in favour of the physiotherapy groups using a non-  
26 parametric bootstrap test; inner city practice, mean difference in costs = £538.01  
27 ( $P = 0.006$ ; 95% CI; £865.678, £226.98), university practice mean difference in costs =  
28 £295.83 ( $P = 0.044$ ; 95% CI; £585.16, £83.69). **Conclusion:** The limitations of this  
29 pragmatic service evaluation are acknowledged. Nevertheless, the physiotherapy  
30 service appears to provide a safe and efficacious service. The service is well received by  
31 patients. There appear to be potential financial implications to the health economy.  
32 Physiotherapists, as a first point of contact for patients with musculoskeletal-related  
33 complaints, could contribute to the current challenges faced in primary care.

34 **Key words:** NHS costs; physiotherapy; primary care

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## 36 Introduction

37 A number of factors are currently aligning and  
38 potentially drawing general practice to the edge of

a perfect storm. These factors include an ageing  
population, the subsequent increase in age-related  
health problems, the almost epidemic increases  
seen in what are essentially lifestyle-related

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43 health complaints and the challenges in the  
44 training, recruitment and retention of general  
45 practitioners (GPs).

46 Currently, the percentage of the UK population  
47 over the age of 65 is over 17%. This is compared with  
48 15% in 1985 (Office for National Statistics, 2012).  
49 The prediction is that by 2035 this will have risen  
50 again to 23% (Office for National Statistics, 2012).

51 As a consequence of this rise in population  
52 there is an anticipated rise in health conditions  
53 associated with old age. In particular arthritis and  
54 degenerative joint pains can be expected to  
55 increase significantly (Department of Health,  
56 2006) as can a range of common musculoskeletal  
57 (MSK) disorders including back pain, shoulder  
58 pain and knee pain (Urwin *et al.*, 2011; Picavet and  
Q2 59 Schouten, 2003). Currently, the primary burden  
60 for the first point of management of these condi-  
61 tions is shouldered by GPs. The prevalence of  
62 patients with musculoskeletal complaints within  
63 a GPs workload has been estimated to range from  
64 18 to 33% (Mallen *et al.*, 2007; Jordan *et al.*, 2010;  
Q3 65 Margham, 2011). For a general practice with  
66 a patient population of 10 000 patients this equates  
67 to a full-time equivalent caseload.

68 Running in parallel to these changes in the  
69 anticipated MSK health of the nation are the  
70 acknowledged work force issues within general  
71 practice. The training and recruitment of GPs is  
72 recognised as a significant current challenge to the  
73 efficacy of general practice provision. The Royal  
74 College of General Practitioners (RCGP) predicted  
75 that up to 600 practices could face closure in 2015  
76 because of the deepening crisis in GP recruitment  
77 and retention (Royal College of General  
Q4 78 Practitioners, 2014). These challenges to general  
79 practice, in its current guise, make it almost  
80 untenable moving further into the 21st century.

81 A number of potential solutions have been  
82 proposed to ensure the survival of a free-at-point-  
83 of-contact primary care service which forms the  
84 bedrock of the National Health Service (NHS).  
85 These include developing training pathways for  
86 GPs with a special interest in MSK conditions  
87 or the transfer of first-contact care to alternative  
88 health care providers.

89 The arguments for the re-development of  
90 primary care services have been debated and the  
91 increased role of physiotherapy in the first  
92 line management of MSK conditions previously  
93 advocated (Foster *et al.*, 2012). Such a move would

align the primary care management of MSK 94  
problems with the core competencies of the 95  
physiotherapy profession. Furthermore, physio- 96  
therapists have demonstrated competence in 97  
extended roles (McClellan *et al.*, 2006; Stanhope 98  
*et al.*, 2012; Sutton *et al.*, 2015). Good patient 99  
satisfaction has also been demonstrated where 100  
these initiatives have been implemented (Reeve 101  
and May, 2009; Kennedy *et al.*, 2010). However, 102  
this evidence has been predominantly generated in 103  
secondary care environments. 104

Ludvigsson and Enthoven (2012) undertook an 105  
evaluation of physiotherapists as primary assessors 106  
of patients with MSK problems in a GP practice in 107  
Sweden. They found that the service was safe and 108  
almost all patients (85%) could be managed solely 109  
by the physiotherapist. They reported good 110  
patient satisfaction and of those patients managed 111  
by the physiotherapists the majority did not return 112  
to see their GP in the following three-months with 113  
the same complaint. This compared favourably to 114  
GP care. In summary the authors reported that the 115  
use of physiotherapists as primary assessors for 116  
patients with musculoskeletal disorders was 117  
a viable alternative to GP care. 118

At a time when this topic is growing ever more 119  
relevant this investigation attempts to further 120  
the work of Ludvigsson and Enthoven (2012) 121  
within the NHS. This evaluation explores the 122  
implementation of a '1st Line Physiotherapy 123  
Service' which delivers first point of contact care, 124  
in a general practice setting, to patients with MSK 125  
complaints. Funding for this service evaluation 126  
was provided by the Nottingham City Clinical 127  
Commissioning Group (CCG). This funding 128  
extended to the clinical provision of the service 129  
and research time for the lead researcher and 130  
a project assistant (PA). 131

## 132 Methods

A prospective, evaluative design was applied to 133  
the clinical evaluation of the 1st Line Physio- 134  
therapy Service with a convenience, cohort sample 135  
recruited during the 12-months that the service 136  
was delivered. 137

For the economic evaluation of the physio- 138  
therapy service this same cohort was used. For the 139  
economic evaluation a retrospective, GP sample 140  
was selected at random, from the 12 months 141

142 between January 2013 and December 2013,  
 143 preceding the introduction of the 1st Line  
 144 Physiotherapy Service. The patients were selected  
 145 by searching under a MSK filter on the electronic  
 146 records system (EMIS Web). This was undertaken  
 147 by GP practice administration staff who then  
 148 passed on the unique identification numbers of  
 149 the cohort to the PA.

150 All data were collected via standardised  
 151 questionnaires (physiotherapy sample) or from  
 152 clinical records (GP sample). The PA role  
 153 included the data collection and collation and the  
 154 development of excel spread sheets for data  
 155 storage and manipulation. The PA was not blinded  
 156 during the data collection process.

157 **Context**

158 Physiotherapists, working at an advanced level  
 159 and employed at band 7 level, were placed in two  
 160 general practices within Nottingham City. This  
 161 advanced role allowed the Physiotherapists to  
 162 refer for diagnostic tests (x-ray and magnetic  
 163 resonance imaging (MRI) scan) and refer to  
 164 secondary care. The two physiotherapists both  
 165 had over 10-years clinical experience and had  
 166 undertaken Masters level modules in advanced  
 167 practice skills.

168 The two practices differed in their patient  
 169 population in that one was a traditional inner city  
 170 practice and the other a university practice. Each  
 171 physiotherapist provided two half-day clinics  
 172 per week in their respective practice. The initial  
 173 trial of the service was for a period of one-year  
 174 from April 2014 to April 2015.

175 On contacting the practice to book an appoint-  
 176 ment, patients were offered the choice of seeing  
 177 the physiotherapist, as an alternative to a GP, by  
 178 the receptionist staff, if they were experiencing  
 179 a MSK-related complaint. The reception staff  
 180 undertook no triage duties but instead  
 181 showed patients a list of ‘common MSK related  
 182 complaints’ to highlight the type of conditions  
 183 suitable for physiotherapy assessment. If patients  
 184 chose to see the physiotherapist they were offered  
 185 an appointment. There was an expectation, based  
 186 on capacity: demand modelling before the launch  
 187 of the service, that the demand for physiotherapy  
 188 would exceed the capacity. As such the decision  
 189 was taken to set the maximum wait for  
 190 a physiotherapy appointment at 10 days.

This acknowledged the limited capacity of the  
 service and ensured patients were seen in a timely  
 manner, matching, as far as possible, existing GP  
 waiting times.

Appointments were 20-min in length and  
 patients were limited to two appointments with the  
 physiotherapist. This was aimed at replicating  
 normal GP care as closely as possible. If patients  
 were felt to require on-going physiotherapy input  
 they were referred to the main primary care  
 physiotherapy provider at their second appoint-  
 ment. Within the physiotherapy assessment  
 patients were screened for non-MSK pathology  
 and, where appropriate, offered advice and any  
 relevant interventions, primarily based within  
 a self-management paradigm.

207 **Analysis**

208 **Safety and governance**

209 The safety of the 1st Line Physiotherapy Service  
 210 was analysed retrospectively by review of incidents  
 211 reported by either the physiotherapists or the  
 212 general practices themselves. This was done  
 213 through subjective, monthly reporting and review  
 214 of electronic incident reporting systems.

215 **Descriptive outcomes**

216 The following descriptive measures were taken;  
 217 the region and the chronicity of the complaint.  
 218 Interventions provided by the physiotherapists,  
 219 which included exercise prescription and advice,  
 220 and any onward referrals, for diagnostic investi-  
 221 gations or secondary care, were recorded. The  
 222 outcome of the assessment, and any subsequent  
 223 follow-up appointment, was also recorded. For  
 224 consistency a standardised excel spread sheet  
 225 for recording the data was used. Codes used for  
 226 collating the descriptive data are described in  
 227 Table 1. This data were collected by the PA.

228 **Quantitative outcomes**

229 At assessment patients were issued with a self-  
 230 complete questionnaire booklet with outcome  
 231 measures as detailed below. This was completed  
 232 independently outside the consultation room. The  
 233 completion of the questionnaire booklet was  
 234 voluntary. As this was a service evaluation no  
 235 information was collected from those patients who

**Table 1** Descriptive coding options for; region of pain, chronicity, intervention provided, referral/s made, and intervention outcome

Region of pain	Chronicity	Intervention	Referral/s made	Intervention outcome
Low back pain	Less than four weeks	Self-management advice	GP – prescription	Discharged
Neck pain	More than four weeks	Exercise prescription	GP – non-MSK problem	Follow-up appointment booked
Shoulder pain			GP – red flag	Open appointment offered
Hip pain			Diagnostics – x-ray	Referred to physiotherapy
Knee pain			Diagnostics – MRI	Referred to secondary care
Upper limb other			Secondary care	Referred to GP – non-MSK problem
Lower limb other				Referred to GP – medical management
				Referred to GP – red flag

236 did not agree to complete the questionnaire  
 237 booklet. Clinical outcome measures were only  
 238 taken for the patients managed within the 1st Line  
 239 Physiotherapy Service; there was no GP clinical  
 240 comparison group.

241 For the follow-up data (one, six months) the  
 242 plan was for patients to be contacted by the PA via  
 243 either telephone or email. It was immediately  
 244 apparent that patients were not responding to the  
 245 email system and as such this was abandoned. As  
 246 a result, patients completed the questionnaires  
 247 verbally, in conversation with the PA, over the  
 248 telephone. No other method of contact was  
 249 attempted. A period of five working days was  
 250 accepted either side of the scheduled data  
 251 collection points. Beyond this the data was  
 252 accepted as lost to the evaluation and as such  
 253 a degree of attrition was anticipated.

#### 254 Patient satisfaction

255 Following liaison with the authors of the original  
 256 Swedish study (Ludvigsson and Enthoven, 2012)  
 257 an English translation of their patient satisfaction  
 258 questionnaire was used.

#### 259 Outcome of intervention

260 Two clinical outcome measures were used:  
 261 The EQ-5D-5L descriptive system (EuroQol  
 262 Group, 1990) was used as a standardised measure  
 263 of health status. Percentage of patients demon-  
 264 strating improvement between the two time points  
 265 was reported. Effect size was calculated for the

change in median score for the EQ-5D-5L index. 266  
 In order to determine the percentage of patients 267  
 whose EQ-5D index score changed from baseline 268  
 to six months (improved or deteriorated) a change 269  
 score of >0.1 was chosen. This figure was based on 270  
 the reported minimally important difference 271  
 for the EQ-5D of 0.074 (range -0.011 to 0.140) 272  
 (Walters and Brazier, 2005). 273

The Global Rating of Change (GROC) 274  
 questionnaire (Kamper *et al.*, 2009) is a scale 275  
 designed to quantify a patient's improvement 276  
 or deterioration over time. The scale asks that 277  
 a person assess his or her current health status, 278  
 recall that status at a previous time point, and then 279  
 calculate the difference between the two. 280

All data were inputted onto excel spread sheets. 281  
 An EQ-5D-5L excel calculator was used for the 282  
 EQ-5D-5L data. This enables the EQ-5D data to 283  
 be easily translated into simple utility scores. 284  
 These scores can be further used to demonstrate 285  
 the change in an individual's quality of life, due 286  
 to physiotherapy intervention. This can also be 287  
 collated to show the change for a whole service 288  
 or a specified population. 289

#### Cost data 290

Although there was no clinical comparison 291  
 group costs were calculated for a GP group 292  
 of patients. A retrospective cohort of 100 patients 293  
 (50 from each practice) who were randomly 294  
 selected from GP records and who had been seen 295  
 for a primary MSK complaint were selected. These 296  
 patients were selected from the 12 months 297

**Table 2** Descriptive demographic data of patients

	Inner city practice – physiotherapy	Inner city practice – GP	University practice – physiotherapy	University practice – GP
Number of patients	219	50	336	50
Average age	49.6	54.7	24.8	23.7
Male:female	89:130	20:30	176:158	26:24
Chronicity				
Less than 4 weeks	79 (36.1%)		126 (37.5%)	
More than 4 weeks	140 (63.9%)		210 (62.5%)	
Region				
Hip	21 (10%)	2 (4%)	12 (4%)	0 (0%)
Knee	33 (15%)	8 (16%)	80 (24%)	17 (34%)
Low back pain	66 (30%)	18 (36%)	70 (21%)	16 (32%)
Lower limb – other	19 (10%)	1 (2%)	69 (21%)	2 (4%)
Neck	21 (10%)	5 (10%)	40 (12%)	5 (10%)
Shoulder	37 (15%)	7 (14%)	41 (12%)	3 (6%)
Upper limb – other	22 (10%)	9 (18%)	24 (6%)	7 (14%)
Average number of appointments	1.22	2.22	1.09	1.66

298 between January 2013 and December 2013,  
 299 preceding the introduction of the 1st Line  
 300 Physiotherapy Service. The patients were selected  
 301 by searching under a MSK filter on the electronic  
 302 records system (EMIS Web). This was undertaken  
 303 by GP practice administration staff who then  
 304 passed on the unique identification numbers of  
 305 the cohort to the PA who subsequently reviewed  
 306 the records and retrieved the descriptive data, as  
 307 per the physiotherapy cohort, with the exception  
 308 of the chronicity of the complaint.

309 **Economic analysis**

310 Advice was sought, throughout, from a health  
 311 economist. Despite the fact that equivalence has  
 312 been demonstrated in interventions by GP and  
 313 physiotherapy, when comparing outcome to  
 314 treatment (Scholten-Peeters *et al.*, 2006), as this  
 315 had not been proved formally within this evaluation  
 316 it was not felt appropriate to undertake a cost  
 317 minimisation evaluation. As such the average cost  
 318 per episode of care was calculated for each group.  
 319 This approach has been used elsewhere in similar  
 320 cohorts of patients (Holdsworth *et al.*, 2007). Costs  
 321 per case were calculated using key data relating  
 322 costs acquired from sources (Table 2). Where  
 323 possible, costs were taken from 2014 figures for  
 324 unit costs of health and social care (Curtis, 2014).  
 325 When this document did not provide specific costs  
 326 the CCG provided up to date costs for procured

services. Specifically, this included an average cost  
 per case for a secondary care referral to trauma  
 and orthopaedic surgery based on data from 2014/  
 2015. This included new outpatient activity, follow-  
 up activity and procedures undertaken; both day  
 case and inpatient. This subsequent value did not  
 include any diagnostic referrals made in secondary  
 care. The number of new outpatient appointments  
 was used as a proxy measure for unique episodes  
 of care. As a result of this calculation the average  
 cost for a secondary care referral to trauma and  
 orthopaedics was £3085/patient.

The CCG also provided the costs figures  
 for direct access MRI scan, direct access x-ray,  
 average cost per episode of care podiatry, average  
 cost per episode of care acupuncture, primary  
 care cost for blood test, primary care cost for  
 musculoskeletal diagnostic ultrasound scan.

Physiotherapy costs were based on appointment  
 lengths of 20 min at mid-point band 7 level. Any  
 additional expenditure associated with onward  
 referral from physiotherapy was calculated using  
 the above figures. All key data relating costs are  
 shown in Table 3.

Costs for GP care and physiotherapy care were  
 calculated as an average cost per patient. This was  
 based on the retrieved data around new appoint-  
 ment: follow-up appointment ratios for each ser-  
 vice, within each practice. On average a GP at the  
 inner city practice saw a patient 2.22 times and in  
 the university practice 1.66 times.

**Table 3** Key data relating costs

Cost element	Cost
GP consultation ( <i>including all on-costs</i> )	£46
Physiotherapy consultation ( <i>including all on-costs</i> )	Mid-point band 7–20 min appointment including all non-pay and overheads: £9.04 on a 43-week service
Direct access MRI scan	£143
Direct access x-ray	£31
Prescription costs	No cost attributed. Actual numbers reported
Secondary care referral	£3085/episode of care
Podiatry	£65.19/episode of care
Acupuncture	£305/episode of care
Blood test	£3.03
Ultrasound scan	£45.70
GP episode of care	Inner city practice; £102.12 University practice; £76.36
Inner city practice – based on average of 2.22 consultations per patient at £46/consultation	
University practice – based on average of 1.66 consultations per patient at £46/consultation	
MSK Physiotherapy episode of care – based on existing contractual assessment to follow-up ration of 1:1.8	MSK Physiotherapy episode of care; £75.94

358 Costs for any onward physiotherapy input were  
359 based on existing contractual assessment: follow-  
360 up ratio of 1:1.8 for the main physiotherapy service  
361 at a cost of £75.94.

362 Of importance, and relevance, is the issue of  
363 medication prescription. It was initially intended  
364 that this data would be collected and included  
365 in the economic evaluation. However, accurate  
366 prescription data was not available from the GP  
367 records to attribute costs to. Furthermore, the  
368 national average ‘cost-per-GP-prescription’ was  
369 felt likely to exaggerate the costs as most MSK  
370 prescription costs would be less expensive than this  
371 figure. As such the decision was made to exclude  
372 prescription costs from the economic evaluation  
373 but to report of the actual number of times  
374 prescriptions were issued for the two groups.

375 Costs per case were calculated, as described.  
376 Total costs for the four patient cohorts (inner city  
377 physiotherapy, inner city GP, university phy-  
378 siotherapy, university GP) were then calculated  
379 and the average cost per episode of care was  
380 calculated by dividing this total by the number of  
381 patients in the cohort.

382 Furthermore, a non-parametric bootstrap was  
383 used to obtain confidence intervals for the mean  
384 differences in cost. The mean of each of these  
385 samples was calculated, and the bias-corrected  
386 bootstrap method used to calculate 95% con-  
387 fidence intervals for the mean differences in cost.

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## Results

### Descriptive outcomes

The demographic information collected from the two practices is presented in Table 4. It was clear from these demographics that the cohort of patients differed between the inner city and the university practice. As a result all outcomes will be considered separately. However, based on the data obtained the physiotherapy and GP groups of patients, at the respective practices, appear to be similar in terms of age, gender and region of MSK complaint.

The 1st Line Physiotherapy Service appears to have been safe with no adverse events reported by either of the physiotherapists or, subsequently, by either of the practices.

The physiotherapist based at the inner city practice assessed 219 patients, assessment outcome measures were obtained for 140 patients. One-month outcome measures were obtained for 108 patients and at six-months outcome measures were obtained for 71 patients. At the university practice the figures were; assessed 336, assessment outcome measures 208, one-month outcome measures 75, six-month outcome measures 59. The majority of patients attended for a single physiotherapy consultation. In the inner city practice 78% of patients were seen once and in the university practice 92% of patients were seen once.

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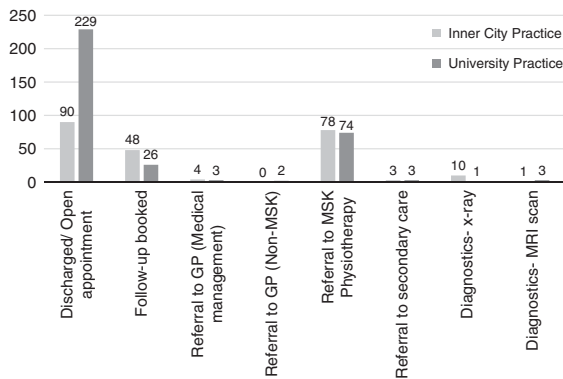
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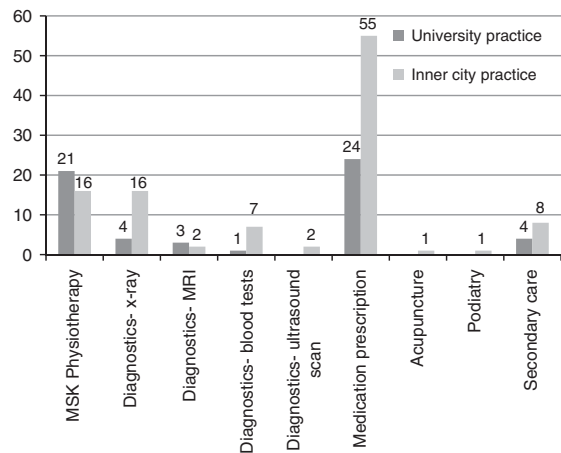
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**Table 4** Change in EQ-5D-5L at the patients attending physiotherapy from initial consultation to six-month follow-up

Practice	Inner city practice	University practice
	Post-pre treatment change Change in EQ-5D-5L Index	Post-pre treatment change
Median	0.10	0.08
Mean	0.13	0.10
Standard deviation of mean	0.27	0.14
No. of patients	64	59
% Patients improved	72	73
% Patients not improved	28	27
Effect size	0.45	1.19



**Figure 1** Resource utilisation and referral pattern of 1st Line Physiotherapy Service within inner city practice (n = 219) and university practice (n = 336)



**Figure 2** Resource utilisation and referral pattern of GPs within inner city practice and university practice (inner city GP n = 50, university GP n = 50)

417 Almost all patients, regardless of practice, were  
 418 offered both advice on self-management and  
 419 exercise prescription on their initial assessment  
 420 with the physiotherapist. Advice was provided  
 421 verbally and, where necessary, patients were  
 422 provided with written resources, for example  
 423 exercise sheets.

424 Resource utilisation is reported graphically  
 425 as follows (Figures 1 and 2):

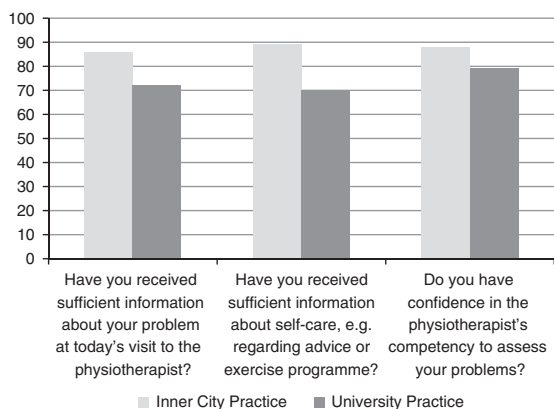
426 In both practices the physiotherapists managed  
 427 almost all of the patients independently, without  
 428 recourse to a GP (university practice 99%, inner  
 429 city practice 98%). This was to some extent  
 430 facilitated by the extended roles they held with  
 431 access to referral for diagnostics and secondary  
 432 care available.

433 A proportion of patients were offered a follow-  
 434 up appointment for review with the Physiothera-  
 435 pist within the 1st Line Service. In the inner

city practice there were 48 (21%) follow-up  
 436 appointments with 11 subsequently referred  
 437 onwards to the MSK Physiotherapy Service  
 438 and the remainder discharged. In the university  
 439 practice there were 26 (7.7%) follow-up appoint-  
 440 ments with seven patients subsequently referred  
 441 onwards to the MSK Physiotherapy Service  
 442 and the remainder discharged. In the university  
 443 practice one patient was also referred for a MRI  
 444 scan at follow-up.  
 445

446 Within the 1st Line Physiotherapy Service  
 447 onwards referrals, excluding the MSK Physio-  
 448 therapy Service, were low. Within the inner  
 449 city practice onward resource utilisation was 6.4%  
 450 and within the university practice onward resource  
 451 utilisation was 2%.





**Figure 3** Patient satisfaction; percentage reporting complete satisfaction/confidence with 1st Line Physiotherapy Service

452 Less than 2% of patients assessed by the  
453 physiotherapist, within either practice, were  
454 referred back to see the GP for either a medical  
455 review or because they were not felt to be  
456 presenting with a MSK-related problem.

## 457 Quantitative outcomes

### 458 Patient satisfaction

459 The patient satisfaction questionnaire was  
460 translated into English from the original research  
461 by Ludvigsson and Enthoven (2012). Patients were  
462 asked, following their assessment with the  
463 physiotherapist, to score their response on a Likert  
464 scale, range 0–5. There were three questions and  
465 the scores for the two practices are represented  
466 in Figure 3.

### 467 Clinical outcomes

468 As stated, these results are only available for the  
469 1st Line Physiotherapy Service.

### 470 Global Rating of Change (GROC)

471 The GROC is designed to quantify a patient's  
472 improvement or deterioration over time. The scale  
473 asks that a person assess his or her current health  
474 status, recall that status at a previous time point,  
475 and then calculate the difference between the  
476 two. Patients at the inner city practice reported  
477 a median GROC of 0 (no different) at one-month  
478 and at the university practice the median score for

the GROC was 5 (quite a bit better). Patients at  
the inner city practice reported a median GROC  
of 3 (somewhat better) at the six-month time point  
and at the university practice the median score  
for the GROC was 5 (quite a bit better).

### EQ-5D-5L

EQ-5D-5L is a standardised measure of health  
status developed by the EuroQol Group (1990) in  
order to provide a generic measure of health for  
clinical and economic appraisal. Table 4 shows  
change in EQ-5D-5L, percentage of patients  
improved and effect size for patients attending  
physiotherapy at the two practices from initial  
consultation to six-month follow-up. As the  
EQ-5D-5L describes a change only patients with  
both pre and post scores were included in the  
analysis. As such the numbers are as follows; inner  
city practice,  $n = 64$ , university practice,  $n = 59$ .  
Effect sizes were calculated using the formula;  
 $ES = (M1-M2)/SD$  where M1 is the assessment  
median score and M2 the six-month median score  
and SD is the standard deviation of the median  
assessment score (Maher and Kilmartin, 2012).

### Cost per average episode of care calculation

Using the previously described key data relating  
to costs the following cost per average episode of  
care calculations were made for the two practices  
(Table 5). The average cost per episode of care are  
shown in Table 5.

The overall costs per average episode of care  
were significantly different between both GP  
practices and their respective 1st Line Physio-  
therapy Service equivalent. In the inner city  
practice the GP costs were £647.16/patient and  
the physiotherapy costs were £84.26/patient.  
In the university practice the GP costs were  
£366.44/ patient and the physiotherapy costs were  
£56.51/patient.

There was a statistically significant difference in  
favour of the physiotherapy groups within both  
practices using a non-parametric bootstrap test;  
inner city practice, mean difference in costs =  
£538.01 ( $P = 0.006$ ; 95% CI; £865.678, £226.98),  
university practice mean difference in costs =  
£295.83 ( $P = 0.044$ ; 95% CI; £585.16, £83.69).

The greatest difference between the two  
services arose due to the differences in actual  
consultation costs between the two professions.  
With respect to resource utilisation; referrals to

**Table 5** Cost per average episode of care for service offered (GP care or 1st Line Physiotherapy care) and practice (inner city practice or university practice)

Unit	University practice – physiotherapy (n = 336)	University practice – GP (n = 50)	Inner city practice – physiotherapy (n = 219)	Inner city practice – GP (n = 50)
Clinical cost (GP consultation, physio consultation)	3272.48	3818.00	2413.68	5106.00
MRI	429.00	429.00	143.00	286.00
X-ray	31.00	124.00	310.00	496.00
Secondary care	9,255.00	123,40.00	9,255.00	246,80.00
Podiatry	0	0	0	65.19
Blood test	0	16.23	0	113.61
Ultrasound	0	0	0	91.40
Acupuncture	0	0	0	305.00
Physiotherapy	5,619.56	1,594.74	5,923.32	1,215.04
GP care	381.80	0	408.48	0
Total cost	189,88.84	183,21.97	184,53.48	323,58.24
Standard deviation	290.75	902.93	357.88	1151.96
Average cost per episode of care	56.51	366.44	84.26	647.16

528 secondary care demonstrate a two-and-a-half fold  
 529 increase seen in the inner city practice and an,  
 530 almost, six-fold difference seen in the university  
 531 practice. As previously noted costs for prescrip-  
 532 tions was excluded from the cost calculations.  
 533 Actual prescription activity for each practice were  
 534 as follows; inner city practice (GP 55 prescrip-  
 535 tions: physiotherapy 0 prescriptions), university  
 536 practice (GP 24 prescriptions: physiotherapy  
 537 0 prescriptions).

538 **Discussion**

539 **Summary of main findings**

540 This service evaluation found that the 1st Line  
 541 Physiotherapy Service was safe, with no adverse  
 542 incidents recorded at either of the two practices.  
 543 Additionally, the service appears to be well  
 544 received by patients. Furthermore, within the  
 545 limitations of this service evaluation, significant  
 546 costs per average episode of care differences were  
 547 demonstrated between usual GP care and the  
 548 1st Line Physiotherapy Service.

549 In the study by Ludvigsson and Enthoven  
 550 (2012), of the cohort of patients who saw the  
 551 physiotherapist over 80% reported complete  
 552 satisfaction with the information they received  
 553 from the physiotherapist and their confidence in

the physiotherapists' competency to assess their  
 problem. Both practices within this evaluation  
 reported over 70% complete satisfaction with the  
 same questions. This is comparable to the Swedish  
 study generally and compares favourably to the  
 Swedish GP cohort where satisfaction levels were  
 closer to 50%.

The number of patients that the physiothera-  
 pists managed independently compared positively  
 to the Swedish study. Ludvigsson and Enthoven  
 (2012) reported that, in their study, 85% of the  
 patients did not need to be seen by a GP. Similar  
 figures were reported in a study of physiotherapy  
 self-referral (Holdsworth *et al.*, 2007) in Scotland  
 where 85% of patients needed no further referral  
 beyond physiotherapy. The physiotherapist in the  
 inner city practice and the university practice  
 managed 63% and 75% of patients independently,  
 respectively. However, this does include those,  
 relatively few, patients who were able to make use  
 of the physiotherapists advanced roles (x-ray,  
 MRI scans).

Additionally, the above figures do not include  
 those patients referred to the main MSK  
 physiotherapy service (university practice 22%,  
 inner city practice 36%). The criteria for manage-  
 ment within the 1<sup>st</sup> Line Physiotherapy Service  
 was restricted to two appointments. It is not  
 unreasonable to think that those patients referred

583 to the main physiotherapy service could, if  
584 resources allowed, have been managed satisfacto-  
585 rily by those physiotherapists based in the practice  
586 itself. Certainly the figures given in the Swedish  
587 study extend beyond the two-session allowance  
588 in this evaluation to allow for management to  
589 completion of care.


590 The numbers referred on for either a diagnostic  
591 procedure or a secondary care opinion were 6.4%  
592 (inner city practice) and 2% (university practice).  
593 This compares favourably where, even discounting  
594 referrals to the MSK Physiotherapy Service, the  
595 rate of onward resource utilisation for the GP  
596 cohort was 33% at the inner city practice and  
597 14% at the university practice.

598 The number of patients who represented with  
599 the same complaint appears to also correlate well  
600 with the work of Ludvigsson and Enthoven (2012).  
601 For the inner city practice 25% of patients  
602 re-presented in the following six months and in  
603 the university practice this figure was just  
604 9%. The Swedish Physiotherapy Service had  
605 a re-presentation rate of 12%. However, this was  
606 in a three-month period and it would be reason-  
607 able to expect this to rise over a further three  
608 months. Furthermore, they reported 48% of  
609 patients seen by a GP as representing in the sub-  
610 sequent three months. This would seem to allude  
611 to greater improvements in clinical outcome  
612 for the cohort of patients managed by the  
613 physiotherapists.

614 Clinically the 1<sup>st</sup> Line Physiotherapy Service  
615 appears to demonstrate good efficacy. There are  
616 self-reported improvements in both the GROC  
617 and the EQ-5D-5L.

618 Patients at the inner city practice reported a  
619 median GROC of 0 (no different) at one-month  
620 and at the university practice the median score for  
621 the GROC was 5 (quite a bit better). Patients at the  
622 inner city practice reported a median GROC of 3  
623 (somewhat better) at the six-month time point and  
624 at the university practice the median score for the  
625 GROC was 5 (quite a bit better). Both these  
626 six-month scores and the rate of change in score  
627 probably reinforce the difference between the two  
628 cohorts of patients with the demographic informa-  
629 tion suggesting a younger patient population with  
630 a greater proportion of peripheral musculoskeletal  
631 complaints in the university practice.

632 In hypothesising about the lack of change in  
the inner city practice at one-month, the

633 physiotherapists anecdotally, reported a greater  
634 degree of chronicity in the inner city practice  
635 cohort of patients. This is not reflected in the data  
636 collected (inner city practice; <4 weeks 36.1%,  
637 >4 weeks 63.9%), (university practice; <4 weeks  
638 37.5%, >4 weeks 62.5%). Nevertheless, this  
639 may be due more to the limited parameters of  
640 measurement. Certainly, three months is often  
641 used as a  measuring chronicity of MSK complaints.  
642 If this had been used it may be that the data would  
643 have reflected the clinical impression and as such  
644 accounted for the slower improvement, as might  
645 be expected for a chronic complaint, described  
646 by the GROC.

647 The results for the EQ-5D-5L demonstrate, of  
648 those patients providing data at baseline and six  
649 months' ( $n = 123$ ), over 70% reported an  
650 improvement. Previous work in musculoskeletal  
651 health, albeit in surgery, have suggested effect  
652 sizes between 0.2 and <0.5 are considered small,  
653 0.5 to <0.8 considered moderate and >0.8 con-  
654 sidered large (Maher and Kilmartin, 2012). Using  
655 these parameters the effect size in the inner city  
656 practice is just below moderate (0.45) and in the  
657 university practice large (1.19).

658 In summary, from a clinical perspective, this  
659 evaluation appears to corroborate the work of  
660 Ludvigsson and Enthoven (2012) in that  
661 physiotherapists can safely and effectively act  
662 as first line practitioners for patients with muscu-  
663 loskeletal complaints.

## 664 Economic evaluation

665 Of particular relevance and topicality is the cost  
666 efficiency of health services. Within the limitations  
667 of a pragmatic service evaluation, this piece of  
668 work appears to intimate financial incentives  
669 for the implementation of a service providing  
670 physiotherapists as a first point of contact for  
671 patients with musculoskeletal complaints.

672 The cheapest of the physiotherapy services was  
673 the university practice with an average cost per  
674 episode of care of £56.51/patient. This is compared  
675 to £366.44/patient for the GP cohort in the same  
676 practice. The costs for the inner city practice  
677 were £84.26/patient and £647.16/patient for  
678 the physiotherapy package and GP package,  
679 respectively.

680 Clearly, a significant proportion of these savings  
681 arose due to the difference in salary between the

682 physiotherapists and GPs. This saving was  
 683 demonstrated despite the fact that the  
 684 physiotherapy appointment time was double that  
 685 of the GP time. However, this does not account  
 686 for the whole picture. There were also differences  
 687 demonstrated in the difference in rates of referrals  
 688 for diagnostic procedures and secondary care.  
 689 GP onward resource utilisation exceeded that of  
 690 the physiotherapists. Of most note was the use  
 691 of secondary care referrals. Over six-months GPs  
 692 in the inner city practice spent £493.60/ patient  
 693 on secondary care compared to £42.26/ patient by  
 694 the physiotherapist and in the university practice  
 695 GPs spent £246.80/ patient on secondary care  
 696 compared to £27.54/ patient by the physio-  
 697 therapist. It is tempting, and perhaps not  
 698 inappropriate, to hypothesise as to the reasons,  
 699 and indeed the impact, of these differences but  
 700 this falls outside the remit of this evaluation.  
 701 Nevertheless, there does not seem to have been an  
 702 under-referral by the physiotherapists' as the  
 703 majority of patients appear to have been managed  
 704 within the 1st Line Physiotherapy Service  
 705 itself or subsequent conservative physiotherapy  
 706 management.

707 Previous concerns expressed with regards to  
 708 the proposition of physiotherapists as first line  
 709 practitioners centred on both safety of patients  
 710 and the expectation of an increase in resource  
 711 utilisation. This evaluation seems to reinforce  
 712 previous evidence that physiotherapists, with  
 713 extended roles, do not utilise resources any more  
 714 than their medical colleagues and in fact less so  
 715 (Carr, 2003; Rabey *et al.*, 2009).

716 **Strengths and limitations of this study**

717 As an evaluation of a clinical service a pragmatic  
 718 approach had to be taken and, as such, there are  
 719 acknowledged weaknesses in the methodology  
 720 and subsequent data generated. The primary  
 721 short-coming is the lack of a comparison group.  
 722 The resultant lack of clinical equivalence of  
 723 difference also compromises the economic  
 724 evaluation with no cost minimisation or cost  
 725 effectiveness analysis possible. However, as  
 726 previously stated there has been, at least, equivalence  
 727 demonstrated between such services in  
 728 the past (Scholten-Peters *et al.*, 2006) and similar  
 729 physiotherapy services have demonstrated clinical  
 730 efficacy (Holdsworth *et al.*, 2007).

Further challenge could be ascribed to the  
 economic evaluation; despite costs being  
 attributed to any further physiotherapy interven-  
 tion, beyond the 1<sup>st</sup> Line Physiotherapy Service,  
 these costs were not fully explored; were patients  
 subsequently referred to secondary care, were  
 patients subsequently referred for additional  
 diagnostic tests? Nevertheless, these challenges  
 could equally be ascribed to the GP cohort.

With regards to prescription costs neither of the  
 physiotherapists were prescribers (supplementary  
 or independent). As such any recourse to  
 prescription medication would have been made  
 via the GP. No recommendations for GP  
 consultations for medication reviews were made  
 by either Physiotherapist. The Physiotherapists  
 described recommending patients consult with  
 their local pharmacist with respect to over the  
 counter medication and it would seem reasonable  
 to hypothesise that this accounts for the absence  
 of recourse to GPs.

Clearly, the prescribing activity is different  
 between the physiotherapy and GP groups. As  
 previously stated we were unable to feel confident  
 about attributing a cost to this difference due the  
 lack of specificity about prescriptions issued.  
 Nevertheless, this difference somewhat results in  
 an underestimation of the cost difference for the  
 average cost per case.

Nonetheless, despite these limitations the  
 evidence for the cost efficiency of a service  
 providing physiotherapy as a first point of contact  
 appears positive but requires further controlled,  
 comparative studies to fully evaluate the costs  
 differences between the two approaches.

The fact that two very different practices were  
 used is both a strength and a weakness of this  
 evaluation. It is acknowledged that the university  
 practice stands outside the usual inner city practice  
 typical for Nottingham city and as such it was  
 felt inappropriate to combine the physiotherapy  
 outcomes. Alternatively, the clear consistencies  
 between the two practices reinforce the efficacy of  
 the 1st Line Physiotherapy Service.

In addition, as only one physiotherapist, at each  
 practice, provided the clinical input this evaluation  
 could be seen as an analysis of their individual  
 practice rather than physiotherapy *per se*. Clearly  
 this could have been addressed by changing the  
 therapists within the practices during the evalua-  
 tion period. When balanced against the need for

782 consistency within the practices a decision was  
783 made not to do this. It is also within the parameters  
784 of the pragmatic nature of the evaluation that  
785 acknowledgement is made of the non-blinding  
786 of the PA.

787 The issues of response/loss to both baseline  
788 and follow-up bias are also acknowledged. The  
789 pragmatic approach meant that the plan was to  
790 contact patients in the physiotherapy group either  
791 by email or over the telephone by the PA. It  
792 immediately became apparent that patients were  
793 not responding to the email contact and as such  
794 this was abandoned. As such the follow-up details,  
795 at one and six months, were all collected over the  
796 telephone. To maintain some reliability a period of  
797 five working days either side of the scheduled date  
798 was permitted but inevitably this meant patients  
799 were lost from the data set. Outcome measures  
800 for 130 patients (23% of total physiotherapy  
801 cohort) were collected at six months. This could  
802 reasonably be said to potentially bias the sample.  
803 However, the PA sought to contact all patients  
804 as timetabled and indeed this somewhat reduces  
805 this potentiality. Again, the authors would  
806 propose addressing this through a more robust  
807 methodology.

### 808 **Impact**

809 The impact of this evaluation is potentially wide-  
810 spread. Clearly, one of the greatest motivations for  
811 the instigation of the 1st Line Physiotherapy Service  
812 was the potential reduction in GP burden. Of  
813 importance is the fact that the service proved to be  
814 safe for patients. Furthermore, the service was well  
815 received by patients and the clinical outcomes  
816 proved satisfactory. As such, the potential positive  
817 impact of this novel service has been shown. It has  
818 been estimated that up to 30% of a general practice  
819 caseload presents with a musculoskeletal problem.  
820 Theoretically this could also reduce the GP burden.

821 There is also potential impact for physiotherapy  
822 and physiotherapists with greater skill develop-  
823 ment and professional autonomy. Physiotherapists  
824 continue to push back their traditional boundaries  
825 and in this evaluation the Physiotherapists  
826 were able to make referrals to secondary care  
827 and for some diagnostics (x-ray, MRI scan).  
828 Clearly, physiotherapy scope has extended  
829 elsewhere to include further diagnostic referrals,  
830 injection therapy and independent prescribing.

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Hypothetically, this has the potential of further 831  
reducing GP burden. 832

Another finding of this evaluation is the potential 833  
cost implications of implementing a 1<sup>st</sup> Line 834  
Physiotherapy Service. Whilst acknowledging the 835  
pragmatic nature of this service evaluation the eco- 836  
nomic analysis demonstrates encouraging results. 837

### 838 **Future research**

839 There are acknowledged short-comings of this  
840 pragmatic service evaluation. This clearly leaves  
841 opportunities for future research. Of fundamental  
842 importance is a randomised comparative study  
843 between GP and physiotherapy care. Not only  
844 would this validate, or otherwise, the clinical find-  
845 ings of this evaluation but it would also allow for a  
846 more robust economic evaluation.

847 There are also potentially interesting societal  
848 issues that could be explored. Anecdotal evidence  
849 from the evaluation demonstrates potential  
850 barriers to the implementation of a novel service  
851 like 1<sup>st</sup> Line Physiotherapy. Further research into  
852 these barriers would seem to be important if the  
853 traditional model of health care delivery, in the  
854 NHS, is to be successfully modified. Certainly, this  
855 challenge appears to be necessary due to the rising  
856 demands on an increasingly unsustainable service.

### 857 **Conclusion**

858 Based on the average cost per episode of care  
859 evaluation and the clinical evaluation undertaken  
860 the 1<sup>st</sup> Line Physiotherapy Service appears to offer  
861 a safe, clinically efficacious and financially expedi-  
862 ent service for patients with musculoskeletal  
863 complaints in primary care. This would appear to  
864 offer a part-solution to the rising clinical and  
865 financial pressures currently encountered in  
866 primary care.

867 It is acknowledged that this is an area of little  
868 research and it would be useful to undertake  
869 a more controlled, comparative trial. 870

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### 880 Conflicts of Interest

881 None.

### 882 Ethical Standards

883 Ethical approval was not necessary.

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