

EXTENDED REPORT

How do GPs use x rays to manage chronic knee pain in the elderly? A case study

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Objectives: To determine whether clinical signs and symptoms of osteoarthritis influence general practitioners' (GPs) decisions about x raying older patients with knee pain and whether x ray reports alter their initial treatment or referral plan.

Methods: A cross sectional survey of 1000 GPs in England and Wales using "paper cases" in three questionnaires mailed at two-weekly intervals. The first questionnaire assessed GPs' management of patients with knee pain using four case scenarios, two with features of clinical knee osteoarthritis. The second questionnaire contained the same scenarios with information on x ray findings added. The third questionnaire considered management of knee pain in general.

Results: 447 GPs responded to questionnaire 1, 316 (71%) to questionnaire 2, 287 (64%) to questionnaire 3. 106 responders (25%) would have x rayed all four patients and 64 (15%) none. Choosing to carry out an x ray examination was not influenced by the presence of clinical signs and symptoms of osteoarthritis but was linked to other management choices, such as referral to orthopaedics (odds ratio (OR) 2.13; 95% confidence interval (CI) 1.62 to 2.81). The strongest predictor in questionnaire 2 of a treatment or referral was whether it had been chosen in the first survey. However, the x ray report was associated with a significant change in treatment and referrals. Where radiographic osteoarthritis was present, GPs were less likely to refer to a physiotherapist (OR 0.64; 95% CI 0.50 to 0.83) or rheumatologist (OR 0.15; 95% CI 0.08 to 0.28), and more likely to refer to an orthopaedic surgeon (OR 31.34; 95% CI 21.51 to 45.66). Questionnaire 3 showed that GPs' general views on the use of x rays correlated with the frequency of their choosing to x ray in the four individual case scenarios.

Conclusions: A GP's choice to x ray older people with knee symptoms is linked with decisions on treatment and referral even before the x ray result is known, but it does not appear to be influenced by clinical features of osteoarthritis. The presence of radiographic osteoarthritis has a marked impact on the decision to refer to secondary care. More evidence on the outcome of management without x rays is needed to help GPs in decision making.

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Chronic knee pain affects an estimated 25% of people over 50 years,^{1,2} and is a common presentation among elderly patients in primary care.³ Osteoarthritis is the most frequent diagnosis associated with this symptom but general practitioners (GPs) can make this diagnosis either as the clinical syndrome (pain, stiffness, restricted movement) or on the basis of the radiographic appearance (joint space narrowing, bony sclerosis, osteophytes). However, clinical osteoarthritis is not necessarily equivalent to radiographic disease because patients in this age group with knee pain will have x ray changes consistent with osteoarthritis in about 47% of cases,⁴⁻⁷ whereas only about 50% of patients with x ray evidence of knee osteoarthritis complain of pain.⁷

The issue for primary care in establishing the place of x rays is whether routinely determining the radiographic status of older patients with knee pain leads to changes in treatment, referral, and outcome compared with management based on clinical presentation only.

Although the United Kingdom Royal College of Radiologists' recommendation is that the routine use of x rays to investigate knee pain in primary care is inappropriate,⁸ little is known about the actual policies and practices of GPs when managing this common condition, particularly the factors that influence their decisions about treatment and referral. We have therefore carried out a study among GPs to estimate how x rays are used in the management of knee pain in older people, and how their decisions about treatment and referral might be separately influenced by the patient's clinical presentation and the results of x rays.

METHODS

The study took the form of a cross sectional survey of GPs working either full or part time in England and Wales. The study group was chosen by randomly sampling 1000 doctors from a comprehensive list of 37 000 registered GPs held by Beechwood House Publishing Ltd, specialists in the publication and distribution of information about the NHS and local government in the United Kingdom.⁹ All questionnaires were piloted for comprehensibility and relevance on a group of 36 GPs in North Staffordshire, and on a group of five clinical and non-clinical researchers with experience in this type of survey.

Three questionnaires were mailed at two-weekly intervals to the selected GPs. The first two questionnaires (see appendix) included four clinical scenarios that the GPs might encounter in day to day practice. Each scenario revolved around a syndrome of knee pain. Each patient was aged in their mid-60s, when knee pain and osteoarthritis are generally known to be more common. Two of the scenarios described signs and symptoms consistent with clinical osteoarthritis as characterised by chronic knee pain associated with joint stiffness, crepitus, soft tissue swelling, and quadriceps weakness. The other two described chronic knee pain in the absence of these associated signs and symptoms, and as such represented "chronic simple knee pain". For each scenario the GPs had a choice of treatments and referrals to each of which they could respond positively or negatively (advice on joint exercises, analgesia, review the patient, order an x ray of the knee, physiotherapy, a steroid joint injection, or referral to secondary

Table 1 Number (%) of GPs who would choose a particular option (questionnaire 1)*

	Patient 1 Clinical OA Female	Patient 2 No clinical OA Male	Patient 3 Clinical OA Male	Patient 4 No clinical OA Female
Advise on knee joint exercises	330 (76)	318 (73)	287 (66)	256 (59)
Advise about analgesia	439 (>99)	437 (99)	435 (99)	441 (99)
Review in few weeks	381 (87)	366 (84)	359 (83)	391 (89)
x Ray knee	229 (52)	224 (51)	249 (58)	284 (65)
Refer to physiotherapy	194 (44)	209 (48)	208 (48)	233 (54)
Inject knee with corticosteroid	31 (7)	32 (7)	15 (3)	52 (12)
Refer to rheumatologist	45 (10)	9 (2)	16 (4)	20 (5)
Refer to orthopaedic surgeon	17 (4)	75 (17)	184 (42)	84 (20)

*Maximum number=447.

care). Because all the scenarios contained patients of the same age and had the same management options, differences in management could be attributed either to the presence or absence of clinical osteoarthritis, possibly to the sex of the patient, to subtle differences in the brief social content provided, or to differences in standard treatment policies between GPs.

Questionnaire 2 was identical to the first but included the result of a knee x ray examination for each patient. The scenarios made it clear that the x ray examinations did not originate at the request of the GP. Two x ray findings described classic radiographic osteoarthritis, the other two showed no such changes. The x ray results were allocated so that one of the patients with "clinical osteoarthritis" had radiographic osteoarthritis and the other did not; correspondingly one of the patients with "chronic simple knee pain" had radiographic osteoarthritis and the other did not. The same management choices were available except for the option to x ray. This allowed us to study changes in management between the first and second questionnaires, on the basis that any changes were likely to be due to the influence of the x ray report.

The third questionnaire contained no vignettes and asked the GP directly about their perceived actions in managing chronic knee pain. A visual analogue scale was used where 1=never, and 10=always, and the GPs were asked several questions about their personal management of this problem. Examples were: how often they would make a diagnosis of osteoarthritis with or without an x ray examination and how often an x ray examination would be used when considering referral to an orthopaedic surgeon. Each GP could be identified individually so this final questionnaire allowed comparison between what the GP perceived their management strategy to be in general, and what their actual decisions were for the individual patients in the first two questionnaires.

The second questionnaire was mailed two weeks after receipt of the first in the study centre and the third was mailed two weeks after that. Non-responders at each stage were mailed a duplicate questionnaire.

Statistical analysis

The data for questionnaires 1 and 2 follow a hierarchical structure whereby each GP makes certain decisions on actions on four patients. To take this into account, multilevel modelling was used. Multilevel logistic models were constructed to assess the effects of clinical osteoarthritis, sex of the patient, and the decision to x ray on each action in questionnaire 1, summarised by odds ratios (ORs). These were two level ("patients within GPs") models, formulated using MLwiN.¹⁰ Similarly, multilevel modelling was used to assess the additional effect of the x ray result on these decisions in questionnaire 2.

Conditional logistic regression, with patients matched with respect to GP, was also used to model the data from questionnaire 1. This gave similar ORs and confidence intervals (CIs) to multilevel modelling and so has not been reported here.

Jonckheere-Terpstra tests were used to compare scores from questionnaire 3 with the x ray decision making status of GPs. For this analysis, GPs were split into three groups from questionnaire 1: those wishing to x ray all four patients, those wishing to x ray some patients, and those GPs not wishing to x ray at all. The Jonckheere-Terpstra test, unlike the Kruskal-Wallis test, takes into account the ordered nature of these groups (x ray status). This analysis was performed using SPSS for Windows 10.0.¹¹

RESULTS

Four hundred and forty seven (46%) GPs responded to questionnaire 1. Of questionnaire 1 responders, 316 (71%) responded to questionnaire 2, and 287 (64% of questionnaire 1, 91% of questionnaire 2) responded to questionnaire 3. There was no difference in response across the regions of England and Wales surveyed. Responders tended to come from slightly larger partnerships (median number of partners: responders 5.0, non-responders 4.0), with larger list sizes (median: responders 8275, non-responders 7617).

Table 1 shows the distribution of management choices for each patient in questionnaire 1. One hundred and six (25%) of the GPs would have x rayed all four patients, 64 (15%) would have x rayed none, and 249 (59%) would have x rayed one or more, but not all. Of the 249 GPs who would x ray some but not all patients, there was no consistent pattern choice. Only 15 (4% of all GPs) would have x rayed both of the patients with clinical osteoarthritis and neither of the other two. Another 15 (4% of all GPs) would have x rayed the two patients with simple knee pain but not the other two. Overall, the presence of clinical osteoarthritis did not appear to influence the decision to x ray (OR 0.88; 95% CI 0.66 to 1.17). It did, however, increase the likelihood of offering advice on joint exercises and referral to a rheumatologist or to an orthopaedic clinic (table 2). By contrast, it was associated with a reduced chance of referral to physiotherapy or injection of the joint with a steroid. Independent of clinical osteoarthritis, the two females cases were reviewed more often, more frequently received knee injections, and were referred more often to a rheumatologist and less often to orthopaedic clinics.

Table 2 further compares management decisions between all those GPs who chose to x ray a particular subject and those who chose not to. Those who would x ray appear less likely, in the case of that patient, to give advice on joint exercises, and more likely to review, inject and refer to physiotherapy, orthopaedics, or rheumatology, compared with those who would not have x rayed that subject.

Table 3 looks at the effect of introducing the result of an x ray examination in questionnaire 2. The strongest predictor of a GP's decision about a specific patient in questionnaire 2 is what he or she decided to do for that same patient in questionnaire 1. This was true for each management option.

However the x ray result did have an independent effect on the GP's intended management plan, after allowing for the

Table 2 Associations between management decisions by the general practitioner and (a) clinically defined osteoarthritis (OA), (b) sex of the patient, and (c) general practitioner choice to x ray (questionnaire 1), summarised by the odds ratio (95% confidence interval)

	Action taken on questionnaire 1					
	Advise on knee joint exercises	Review in few weeks	Refer to physiotherapy	Inject knee with corticosteroid	Refer to rheumatologist	Refer to orthopaedic surgeon
Number*	1724	1726	1713	1715	1711	1715
No clinical OA	1.00	1.00	1.00	1.00	1.00	1.00
Clinical OA	1.37 (1.09 to 1.73)	0.87 (0.65 to 1.16)	0.81 (0.66 to 0.99)	0.52 (0.35 to 0.78)	2.53 (1.56 to 4.10)	1.36 (1.06 to 1.74)
Male	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.90 (0.71 to 1.13)	1.42 (1.06 to 1.90)	1.02 (0.83 to 1.25)	1.99 (1.33 to 2.99)	2.73 (1.67 to 4.47)	0.29 (0.22 to 0.37)
Chooses not to x ray	1.00	1.00	1.00	1.00	1.00	1.00
Chooses to x ray	0.55 (0.42 to 0.74)	2.68 (1.95 to 3.70)	1.42 (1.12 to 1.81)	1.92 (1.21 to 3.05)	2.92 (1.66 to 5.15)	2.13 (1.62 to 2.81)

* Number of observations, with each GP responder included between one and four times.

Table 3 Effects of decision from questionnaire 1 and presence of radiographic OA on actions of GP in questionnaire 2, measured by odds ratio (95% confidence interval)

	Action taken on questionnaire 2					
	Advise on knee joint exercises	Review in few weeks	Refer to physiotherapy	Inject knee with corticosteroid	Refer to rheumatologist	Refer to orthopaedic surgeon
Number*	1222	1220	1212	1214	1204	1220
Chose action on questionnaire 1?						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	4.99 (3.48 to 7.16)	2.64 (1.76 to 3.97)	3.58 (2.72 to 4.69)	10.08 (5.68 to 17.91)	3.87 (2.00 to 7.51)	3.79 (2.49 to 5.78)
x Ray shows no OA	1.00	1.00	1.00	1.00	1.00	1.00
x Ray shows OA	0.69 (0.51 to 0.93)	0.27 (0.20 to 0.36)	0.64 (0.50 to 0.83)	1.19 (0.80 to 1.76)	0.15 (0.08 to 0.28)	31.34 (21.51 to 45.66)

* Number of observations for GPs responding to both questionnaires 1 and 2. Numbers differ as not all GPs chose an action for each patient on both questionnaires.

Table 4 Median (IQR) VAS* scores for options on questionnaire 3 classified by category of GP x ray choice across the four patients

x Ray status	n	Diagnose knee OA after confirmation with x ray	x Ray if consider referral to orthopaedic surgeon	x Ray painful knee that has not settled over period of time	Happy to diagnose OA on clinical grounds only	x Ray if pain distresses patient	x Ray if patient asks them to	If x ray, will stipulate views
All responders	273	5 (3–7)	8 (7–10)	8 (7–9)	7 (5–8)	7 (5–8)	6 (4–8)	2 (1–5)
x Ray all	65	7 (5–8)	9 (8–10)	9 (8–10)	6 (4–7)	8 (6–9)	7 (5–8)	3 (1–5)
x Ray some	161	5 (3–7)	8 (7–9)	8 (7–9)	7 (5–8)	7 (5–8)	6 (4–8)	2 (1–5)
x Ray none	47	4 (3–5)	7 (3–8)	7 (4–8)	8 (7–9)	5 (3–7)	4 (3–7)	1 (1–3)
p Value†		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.065

*Scale runs from 1=never to 10=always; † p values using Jonckheere-Terpstra test.

initial management choice in questionnaire 1. In the presence of radiographic osteoarthritis, the GPs were less likely to opt for advice on joint exercises, to review, or to refer to physiotherapy or rheumatology. By contrast, there was a substantially greater willingness, if the x rays showed osteoarthritis, to refer to orthopaedics (OR 31.34; 95% CI 21.51 to 45.66). These findings hold true whether the GP had previously indicated he or she would x ray the patient or not. If the x ray findings indicated radiographic osteoarthritis, the absolute proportion of GPs who would refer to orthopaedics increased, independently of patient type (clinical osteoarthritis or not). In patient 2 (radiographic osteoarthritis, no clinical osteoarthritis), this increase was from 17% to 74%. In patient 3 (radiographic osteoarthritis and clinical osteoarthritis), orthopaedic referrals increased from 38% to 62%. In other words, irrespective of the clinical presentation or the intended management plan based on that presentation, an x ray result was significantly likely to alter those plans.

Questionnaire 3 revealed consistencies between what the GPs had actually chosen to do about x rays in the clinical scenarios and how they reported that they would use x rays in general when making a diagnosis of osteoarthritis of the knee (table 4). Those choosing to x ray all the patients in the scenarios subsequently scored higher in questionnaire 3 for preferring to make a diagnosis of osteoarthritis only after x raying the knee, and lower when asked if they would make a diagnosis of osteoarthritis on clinical grounds alone. Those who had x rayed in the scenarios were also more likely to carry out an x ray examination in response to patient distress and patient request. Stipulating a particular view on the request form if they did order an x ray was scored very low regardless of x ray status.

DISCUSSION

Our study has demonstrated that GPs vary in their decision to x ray when managing chronic knee pain. The presence of the

clinical features of osteoarthritis appears to have little effect on this decision. However, the initial decision to x ray a patient is associated with a particular management strategy. Subsequent treatment and referral choices are also clearly influenced by the presence of osteoarthritis changes on an x ray report. This applies to those GPs who would not have chosen to x ray the patient in the first place as well as to those who would have done so.

The response to the initial questionnaire was 46% and so our findings may not reflect the full range of GPs' management strategies in treating chronic knee pain in the elderly—that is, external validity may be limited. All regions of the country were represented by the responders. The response to the second and third questionnaires was higher with 71% responding to questionnaire 2 and 91% of these to questionnaire 3. This is important because a comparison of the first two questionnaires represents the main analysis in this study—that is, internal validity is strengthened by the good follow up response.

We chose to keep the vignettes reasonably short to maximise response. As a result, the degree of detail included might not have reflected the full content of real-life consultations. Additional information about, for example, the patient's own attitude towards their problem, or more detailed treatment choices might have further influenced a GP's decision about an individual patient. However, this should not undermine our overall findings. Confirmation of this comes from questionnaire 3: those GPs who indicated a general tendency to use radiology if the patient was distressed or if the patient requested an x ray were more likely to have used an x ray in the individual vignettes. It was also beyond the scope of our study to investigate GPs' knowledge of current guidelines for the use of x rays in knee pain, such as those of the United Kingdom Royal College of Radiologists.⁸ Further study of the more detailed management strategies used by GPs and their knowledge of current evidence based guidelines would be a useful area for future research.

The four clinical scenarios had only a limited amount of clinical information in them. We recognise that GPs make complex clinical decisions based on many factors, and the global changes in management that we have reported here must therefore be taken in the context of the information provided. Because demonstrable change is evident, however, the factors we have included can be taken on their own merits as representing some of the influences on the decision making process. Furthermore, our study was specifically concerned with the effect of x ray examinations on decision making, regardless of the other factors.

The wide variation in the choice to x ray among the GPs in our study has been previously observed in a "paper case" study from the Netherlands of the management of hip osteoarthritis in primary care.¹² In our case, this variation did not seem to be influenced by the presence of clinical osteoarthritis or sex of the patient. Overall, x ray examinations were ordered in 58% of the clinically osteoarthritic cases. This compares with 88.5% in a study by Glazier *et al* using one knee "paper case", in which the patient had previously received high dose anti-inflammatory drugs.¹³

GPs appeared consistent within themselves in their management of knee pain. A strong predictor of selecting a treatment or action in questionnaire 2 was whether they had chosen the same option when first presented with the clinical case in questionnaire 2. This compares with a two year Canadian study of knee pain management by Canadian family doctors, general internists, and rheumatologists, which indicated that each group adhered to a particular management strategy, different from the others, after all groups had all made the same diagnosis of osteoarthritis of the knee.¹⁴ Although the presence or absence of clinical features of osteoarthritis did not appear to affect the choice to x ray, choosing to x ray does appear to be linked to other treatment or referral

choices, including an increased likelihood of reviewing, referring to physiotherapy and rheumatology or an orthopaedic clinic. This suggests that the choice to x ray or not is a part of a set way of managing certain patients.

It might be assumed that the rationale for an orthopaedic referral is for an opinion on active intervention such as arthroplasty, and that an x ray examination would be requested in advance to confirm the presence and severity of osteoarthritis. x Ray changes alone, however, do not reflect clinical severity, hence the recommendation by United Kingdom Royal College of Radiologists that the routine use of x rays in knee pain is inappropriate.⁸ Although our study was not an audit of actual practice, it does suggest that GPs are not necessarily following these guidelines and may be using x rays regularly in their practice. In each of the cases presented here, more than half of our sample of GPs opted for an x ray in the first questionnaire. For the GP this may be a logical thing to do. Finding osteoarthritis on an x ray gives a definite diagnosis, even if it were not to alter management or lend itself then to further appropriate action.

However, our study further shows that the x ray result can influence management because the presence or absence of radiographic osteoarthritis had an impact on treatment and referral choices regardless of whether the GP would have chosen to x ray that patient or not. The most notable feature was the marked increase in referral to orthopaedics when radiographic osteoarthritis is found on x ray. This reflects the finding of an audit of GPs' referral for imaging of the knee, in which their main reason for using x rays was to assist in making decisions about management.¹⁵ Coyte *et al*, however, found that among family doctors and rheumatologists in Canada there was no agreement about the value of grading the severity of radiographic knee osteoarthritis in helping to decide whether to refer for a knee replacement.¹⁶ Radiographic severity has only a minor role when applying the New Zealand priority criteria for joint replacement.¹⁷ This illustrates the lack of clear consensus on how knee x ray examinations contribute to the accurate identification of patients who would benefit from specific interventions. Furthermore, two recent population studies from Rotterdam indicate that age, pain in the knee, morning stiffness, and weakness are the most important independent determinants of functional impairment in knee and hip pain.^{18, 19} x Ray examinations appeared to add little to the prediction of locomotor disability.¹⁸ To advance our management strategies in chronic knee pain, and to prevent the x ray examination superseding pain, disability, and clinical features in decision making, further research into the clinical classification of chronic knee pain is required. In particular, a study to test whether the most appropriate basis for decision making is symptoms and activity, as in the Rotterdam studies, rather than radiographic results, would be helpful.

GPs themselves appear to be aware of the influences on their decision to x ray. In questionnaire 3, when they were asked to consider referral to an orthopaedic surgeon, they scored a median of 8 of a possible 10 for the strength of their likelihood to request an x ray examination. By contrast they scored a median of 5 for their willingness to diagnose osteoarthritis only after an x ray.

Our study confirms that GPs vary in their use of x rays and that clinical decision making in older patients with chronic knee pain is not only linked to the findings on x ray but also to the decision to x ray an individual in the first place. This seems partly to reflect a facet of their character (those who would x ray a patient and those who would not). Regardless of whether a doctor is a habitual or occasional x rayer, the decision to x ray a particular patient appears bound up with other aspects of management. However, clinical decision making in older people with knee pain will also be influenced by the subsequent availability and result of an x ray examination. Given that x rays are considered in the guidelines to be an unreliable guide to taking clinical action, and that the Rotterdam studies suggest that the clinical picture is more

important in predicting disability than *x* ray findings,^{18, 19} future research might usefully examine whether the *x* ray has any influence on the outcome of managing chronic knee pain in the elderly.

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APPENDIX: CASE SCENARIOS USED IN QUESTIONNAIRES 1 AND 2

Patient No 1

Mrs Wainwright is 64 years old and presents to you for the first time with knee joint pain that she has suffered with for some time. The pain is associated with stiffness in the mornings and after resting. Examination reveals joint pain with crepitus and soft tissue swelling. She appears to have quadriceps weakness in the same leg.

**An x ray of the knee taken at the Casualty Department following a minor injury to her knee indicates slight joint space narrowing but no other features.*

Patient Number 2

Mr Allan is a 63 year old ex-cricketer who now plays bowls and is 2 stones over weight. He injured his right knee 20 years ago, but it settled with conservative treatment. His complaint today is of pain in the same knee, which is worse after a weekend game of bowls. Examination reveals only joint tenderness. He feels he can't go on like this since his bowling average is declining and would like something done to put it right.

**Mr Allan has private medical insurance and prior to consulting you, attended the local private clinic for an x ray of his knee. The report indicates marked osteoarthritic change with loss of joint space and osteophyte formation.*

Patient Number 3

Mr Wooley is 65 years old and presents to you the first time with knee joint pain and swelling following a holiday in Benidorm. He has had the pain for some time and complains of the knee "giving way" and after resting finds it difficult to get the joint moving. Examination reveals joint pain with crepitus and soft tissue swelling. Knee extension in this leg is weaker when compared with the other.

**On holiday Mr Wooley had seen a local doctor about his knee. Because the doctor had on site imaging he took an x ray of Mr Wooley's knee, which shows marked osteoarthritic change, loss of joint space, and osteophyte formation.*

Patient Number 4

Mrs Bytheway is an old patient of yours nearing her 67th birthday. On a home visit you find she has become less mobile due to pain in her left knee, but she does not want to trouble you with it. Unfortunately, she is now unable to do her own shopping or washing and she has become quite depressed. Examination of the knee reveals a painful joint but little else.

**An x ray of her knee taken the month before as part of a University study was reported as normal.*

Box 1 shows the options available to the GP.

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Box 1: Options available to GP

This is the first time he/she has consulted you about her knee. In this situation what would you do?

- Advise on knee joint exercises?
- Advise about analgesia?
- Review in a few weeks time?
- *x Ray the knee?**
- Refer for physiotherapy?
- Inject the knee with a corticosteroid?
- Refer to a rheumatologist?
- Refer to an orthopaedic surgeon?

*Option only available on questionnaire 1.

REFERENCES

- 1 **McAlindon TE**, Cooper C, Kirwan JR, Dieppe PA. Knee pain and disability in the community. *Br J Rheumatol* 1992;31:189-92.
- 2 **O'Reilly SC**, Muir KR, Doherty M. Screening for pain in knee osteoarthritis: which question? *Ann Rheum Dis* 1996;55:931-3.
- 3 **Peat G**, McCarney R, Croft P. Knee pain and osteoarthritis in older adults: a review of community burden and current use of primary health care. *Ann Rheum Dis* 2001;60:91-7.
- 4 **Gresham GE**, Rathey UK. Osteoarthritis in knees of aged persons. Relationship between roentgenographic and clinical manifestations. *JAMA* 1975;233:168-70.
- 5 **Claessens AA**, Schouten JS, van den Ouweland FA, Valkenburg HA. Do clinical findings associate with radiographic osteoarthritis of the knee? *Ann Rheum Dis* 1990;49:771-4.
- 6 **McAlindon TE**, Snow S, Cooper C, Dieppe PA. Radiographic patterns of osteoarthritis of the knee joint in the community: the importance of the patellofemoral joint. *Ann Rheum Dis* 1992;51:844-9.
- 7 **Hannan MT**, Felson DT, Pincus T. Analysis of the discordance between radiographic changes and knee pain in osteoarthritis of the knee. *J Rheumatol* 2000;27:1513-17.
- 8 **Anonymous**. *Making the best use of a Department of Clinical Radiology. Guidelines for Doctors*. 4th ed. London: The Royal College of Radiologists, 1998.
- 9 **Beechwood House Publishing**, Grover House, Grover Walk, Corringham, Essex SS17 7LS.
- 10 **Rasbash J**, Browne W, Goldstein H, Yang M, Plewis I, Healy M, *et al*. *A user's guide to MLwiN*. London: Institute of Education, University of London, 2000.
- 11 **SPSS for Windows**, Rel. 10.0.7. Chicago: SPSS Inc, 2000.
- 12 **Bierma-Zeinstra SM**, Lipschart S, Njoo KH, Bernsen R, Verhaar J, Prins A, *et al*. How do general practitioners manage hip problems in adults? *Scand J Prim Health Care* 2000;18:159-64.
- 13 **Glazier RH**, Dalby DM, Badley EM, Hawker GA, Bell MJ, Buchbinder R, *et al*. Management of common musculoskeletal problems: a survey of Ontario primary care physicians. *Can Med Assoc J* 1998;158:1037-40.
- 14 **Mazzuca SA**, Brandt KD, Katz BP, Dittus RS, Freund DA, Lubitz R, *et al*. Comparison of general internists, family physicians, and rheumatologists managing patients with symptoms of osteoarthritis of the knee. *Arthritis Care Res* 1997;10:289-99.
- 15 **Morgan B**, Mullick S, Harper WM, Finlay DB. An audit of knee radiographs performed for general practitioners. *Br J Radiol* 1997;70:256-60.
- 16 **Coyte PC**, Hawker G, Croxford R, Attard C, Wright JG. Variations in rheumatologists' and family physicians' perceptions of the indications for and outcomes of knee replacement surgery. *J Rheumatol* 1996;23:730-8.
- 17 **Hadorn DC**, Holmes AC. The New Zealand priority criteria project. Part1: Overview. *BMJ* 1997;314:131-4.
- 18 **Oidding E**, Valkenburg HA, Algra D, Vandenouweland FA, Grobbee DE, Hofman A. Associations of radiological osteoarthritis of the hip and knee with locomotor disability in the Rotterdam Study. *Ann Rheum Dis* 1998;57:203-8.
- 19 **Oidding E**, Valkenburg HA, Algra D, Vandenouweland FA, Grobbee DE, Hofman A. The association of abnormalities on physical examination of the hip and knee with locomotor disability in the Rotterdam Study. *Br J Rheumatol* 1996;35:884-90.

* Information in *italics* given only in questionnaire 2.