

## The Cost of Waiting on an Orthopaedic Waiting List: a scoping review

J Morris, A Twizeyemariya and K Grimmer

### Abstract

**Background:** Approximately 30% Australians suffer from arthritis and other musculoskeletal disorders. From 2003-2033 there is a predicted 223% increase in expenditure on health management of musculoskeletal disorders. There is evidence of increasing prevalence of orthopaedic complaints, in longer waiting lists for specialist consultations in public hospital outpatient clinics. Little is known about the costs and ramifications of waiting for orthopaedic consultations.

**Aim:** Establish what is known about the direct and indirect costs of being placed on a waiting list for an orthopaedic consultation.

**Method:** Patient and Outcome search strategy of Medline, Embase, Pubmed, NHS Economic evaluation database (NHS-EED) from each database inception date. Handsearching of reference lists of included papers also occurred. A realist synthesis framework underpinned the review, using a ubiquitous patient journey to map available literature on the impact of waiting. Hierarchy of evidence was reported using NHMRC criteria and articles critically appraised using either the PEDRo or CASP criteria (relevant to the design). A purpose-built data extraction instrument was developed.

**Results:** We identified 786 studies, of which 139 were relevant, including a systematic review (Hoozeboom et al) with 15 included articles which were added to the list of eligible papers (and the review itself deleted), leaving 153 included articles; 17 were relevant to the review. Fourteen papers reported on quality of life and four reported on costs, two of these papers reported on both and all were of low to moderate quality. The research was not based on a comprehensive understanding of the stages of waiting, and there were inconclusive outcomes for quality of life and cost.

**Conclusion:** There is scant evidence of the impact on quality of life and costs of waiting for orthopaedic outpatient appointments. Future research should aim for improved methodological quality and use patient-focused quality of life measures, and validated measures of cost.

**Abbreviations:** NHMRC – National Health and Medical Research Council; PROMS – Patient Related Outcome Measures; QoL – Quality of Life; WOMAC – Western Ontario and McMaster Universities Osteoarthritis Index; YLD – Years Lived With Disability.

**Key words:** Orthopaedics; waiting list; costs; scoping review.

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## Introduction

In May 2015, the Australian Institute of Health and Welfare (AIHW) reported that 28% of Australians (approximately 6.1 million people), suffered from arthritis and other similar degenerative musculoskeletal disorders. [1] Moreover, musculoskeletal disorders were identified in 2010 as contributing 21.3% to worldwide years lived with disability (YLDs), this being second only to mental and emotional disorders. [2] Hip and knee osteoarthritis alone are reported to be the 11th highest contributor to global disability. [3] Gross explored predicted healthcare expenditure in Australia from 2003 to 2033, by disease. He documented a 223% anticipated increase in healthcare expenditure for musculoskeletal disorders, citing an ageing population and an increase in the incidence of disease as key drivers for escalating costs. [4] The increasing prevalence of orthopaedic conditions has been noted since as escalating use of hospital outpatient orthopaedic services, [5] particularly noticeable for individuals who require public health system management. [6,7,8,9] One way of managing the increasing volume of individuals requiring orthopaedic consultations in the public sector is to place them on waiting lists. In Australia there are two avenues for accessing healthcare, including orthopaedic care, via the public health system or through private health facilities. The public health system in relation to specialist orthopaedic care is fully funded through the Medicare system, therefore the patient is not required to pay anything for this care, including appointments and subsequent treatment (including surgery) and investigations. The public health facilities are managed at state level and therefore there state-by-state variations in process, procedures and definitions are inevitable.

The private health system can be accessed in two ways: the patient can fully fund all aspects of care or if they have private health insurance they can seek reimbursement through their private fund. Invariably in private healthcare the patient is subject to out of pocket expenses regardless of their level of cover.

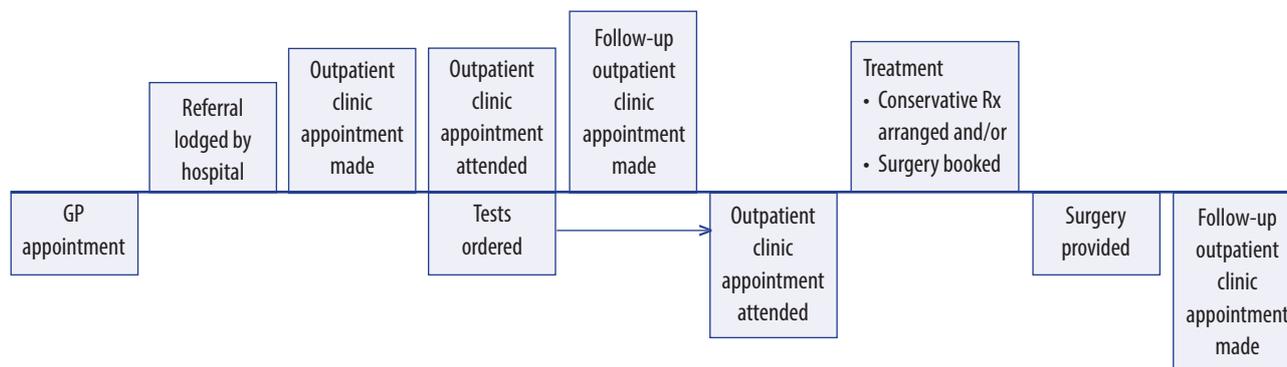
There is consistent evidence of increasing numbers of people on public hospital waiting lists for orthopaedic consultations, and lengthening waiting periods for orthopaedic/musculoskeletal surgery. [10,11,12] Outpatients can wait for months from first being placed on the hospital waiting list, to having their first orthopaedic consultation, and there is usually additional waiting time following that, for treatment to be provided. For some patients, the time delay between initial consultation and treatment could be

12 or more months. [13] There is also increasing evidence that whilst waiting, patients incur significant out-of-pocket costs for formal or informal care, in order to manage their condition. [5] These costs are direct and indirect. Direct costs could include medication, GP appointments, accessing further tests, travel to appointments, loss of wages, allied health visits, formal care and home adaptations, whilst indirect costs may be in the form of lost time at work or informal care arrangements. [14,5] There are also potential societal impacts, in the form of use of government funded care (residential or home-based care), loss of tax revenue, social support and hospitalisation. [5] In addition to the economic burden of waiting there is the potential for health deterioration, altered capacity to perform usual activities of daily living, and reduced capacity to be productive at home and/or in society. [15,16] Deterioration in health state associated with musculoskeletal disease is considered to impact on many facets of well-being, general health, physical, social and mental health, and as such, produces barriers to participation in daily activities. [5]

Health departments and public hospitals particularly in the United Kingdom and in Australia have been exploring alternative workforce models of care to meet the increasing need for health services for patients with chronic orthopaedic/musculoskeletal complaints. [17,18,8,19,11,20] This includes new pathways of care and changes in the traditional models of care within the health workforce. [7,21] A common alternative model of care is senior allied health professionals performing roles traditionally undertaken by specialist medical practitioners, for example a specialist physiotherapist assessing, diagnosing and managing patients referred to an orthopaedic consultant. The purpose of these initiatives is to streamline and optimise use of expensive medical consultant time, minimise time 'wasted' on waiting lists, and provide alternative earlier care options for patients instead of simply 'waiting'. [7,8]

Patients attending outpatient orthopaedic clinics are usually referred by general medical practitioners, or from other outpatient clinics. Within Australia, public hospital orthopaedic specialist consultation is often the preferred pathway to care, particularly when patients do not have private health insurance. Most public hospital orthopaedic waiting lists reflect a range of orthopaedic conditions affecting lower and upper limb joints, and the spine. [20] Increasing numbers of patients on orthopaedic outpatient waiting lists mean longer wait time for most people, [11] and potentially greater costs.

Figure 1. Realist synthesis framework of ubiquitous patient journey



This paper reports on a systematic scoping review of the literature undertaken with the aim of identifying what has been written about the costs of waiting (both direct and indirect) and the ramifications of waiting on quality of life (QoL).

**Methods**

**Study design:** A systematic scoping review of the international peer-reviewed literature was undertaken to identify the amount and type of research published in this area, and provide the first known evidence scan of what has been published to date on the cost and quality of life impact of waiting for an orthopaedic consultation.

**Review registration:** This review was registered with PROSPERO (CRD42016047332). PROSPERO is an international database used to register systematic reviews prior to the review being commenced. The purpose of PROSPERO is to provide a comprehensive list of systematic reviews in which the key characteristics of the review are permanently recorded to avoid repetition and reporting bias.

**Reporting standard:** This review was reported in line with the Joanna Briggs Institute methodology for scoping reviews. [22] This provides a rigorous framework in the planning, development, study selection, collation of results and reporting to ensure that the most information is gleaned from the search and reported in a systematic, reproducible way.

**Review purpose:** The purpose of this review was to systematically identify and classify all freely available, relevant peer-reviewed literature which reported on the impact of waiting for consultation/treatment for patients with an orthopaedic/musculoskeletal complaint.

**Framework of the review:** We undertook this review within the context of a usual patient journey through the outpatient orthopaedic consultation process. This framework was based on a Realist Synthesis approach [23] which assists

systematic review findings to be mapped for complex situations. Defining a waiting list is one such complex situation. To establish the realist synthesis framework, we undertook an informal overview of the literature about the orthopaedic outpatient journey, and found that there is a growing body of literature over the last decade on waiting list management. We constructed a map of the literature which reports on aspects of patient journeys (entering, being on, and leaving, an orthopedic outpatient waiting list). We proposed a ubiquitous patient journey (Figure 1) which outlines our understanding of the stages of waiting. This journey was used as an aid to describing the relevance of the literature identified in this review, to aspects of the journey.

**Search strategy:** The search was conducted in March 2016 and updated in September 2016. A PO search strategy (Participants, Outcomes) was applied to identify relevant articles. Library databases of Medline, Embase, Pubmed, and NHS Economic evaluation database (NHS-EED) were

Table 1: Search terms

P	Orthopedics/musculoskeletal/orthop?edic*
I	Outpatient*/Ambulatory Care/clinic visit* Surgery/ treatment AND Waiting Lists/or wait*
C	Not relevant
O	cost*/Cost Control/Cost Sharing/ Cost-Benefit Analysis/Cost Savings/ Cost of Illness/ Cost Analysis Quality of life/function* status/ productivity/ work/sick leave
S	No restriction on the study design
Exclusions	Inpatients, not Orthopaedic/musculoskeletal patients, paediatric Conference papers and abstract only

searched, from each database inception date. Broad search terms and inclusion criteria were applied in an attempt to identify all relevant papers related patients with an orthopaedic/musculoskeletal complaint waiting for specialist consultation/treatment. MESH headings or Boolean operators were used with the search terms, relevant to the database being searched. The search terms are outlined in Table 1.

**Additional searching:** The reference lists of the papers identified through the database searches were hand-searched to identify additional papers which were relevant, but which had not been identified from the literature search.

**Population:** Adult patients (18 years and over) with an orthopaedic and/or musculoskeletal complaint for which they had been referred to an outpatient clinic for specialist consultation/ treatment. No limitations were applied in terms of diagnostic categories.

**Outcomes:** Impact of waiting was explored in terms of cost, such as a costbenefit analysis, to the patient (in terms of productivity, loss time from work, direct health costs incurred), healthcare providers (visits to GPs, hospitalisations, community care) and society (loss of tax revenue) and the impact on the patient's quality of life, function and social integration.

**Study identification:** The titles and abstracts of each potentially relevant paper were screened by two researchers (JM, AT) for relevance to the study purpose. In the case of dispute, a third author (KG) arbitrated.

**Eligible studies:** Studies of any hierarchy of evidence were considered for inclusion as long as they met the P and O criteria, and were in English language. Thus studies were included if they explored any impact of waiting for orthopaedic/musculoskeletal consultation and/or treatment for adults.

**Exclusion criteria:** Articles were excluded if they did not report on the impact of waiting for management of an orthopaedic/musculoskeletal complaint by a specialist, if they described children (younger than 18 years), if they did not report on quality of life and/or cost impacts, were not available in full text, and were not in English.

**Hierarchy of evidence:** Hierarchy of evidence was reported using National Health and Medical Research Council (NHMRC) criteria relevant to the study question. [24] This provides a comprehensive and structure way of grading evidence according to the research design. We anticipated that most studies would be classified using the aetiology

hierarchy, as they would be largely observational (what happened as a result of waiting). The NHMRC evidence hierarchy is subdivided into five areas that mean the grading system is adaptable to different research questions, aetiology hierarchy refers to studies that explore causation of diseases or conditions.

**Critical appraisal:** This was undertaken by two independent reviewers using the relevant appraisal tool. Any level II studies were critically appraised with Physiotherapy Evidence Database [25] criteria, and the Level III-3 and IV studies were critically appraised with the Critical Appraisal Skills Program (CASP). [26] Critical appraisal scores were compared, and disagreements discussed and resolved.

**Data extraction:** Data was extracted by two reviewers working together (JM, AT). Data was extracted into a custom-built MS Excel sheet to allow for easy comparison between the outcomes from the extracted studies. Extracted data included country of research, patient demographics, health condition, study design, waiting list description, where in the patient journey the research was conducted (see Figure 1), measures of quality of life or cost. Cost data was further reported as types of cost.

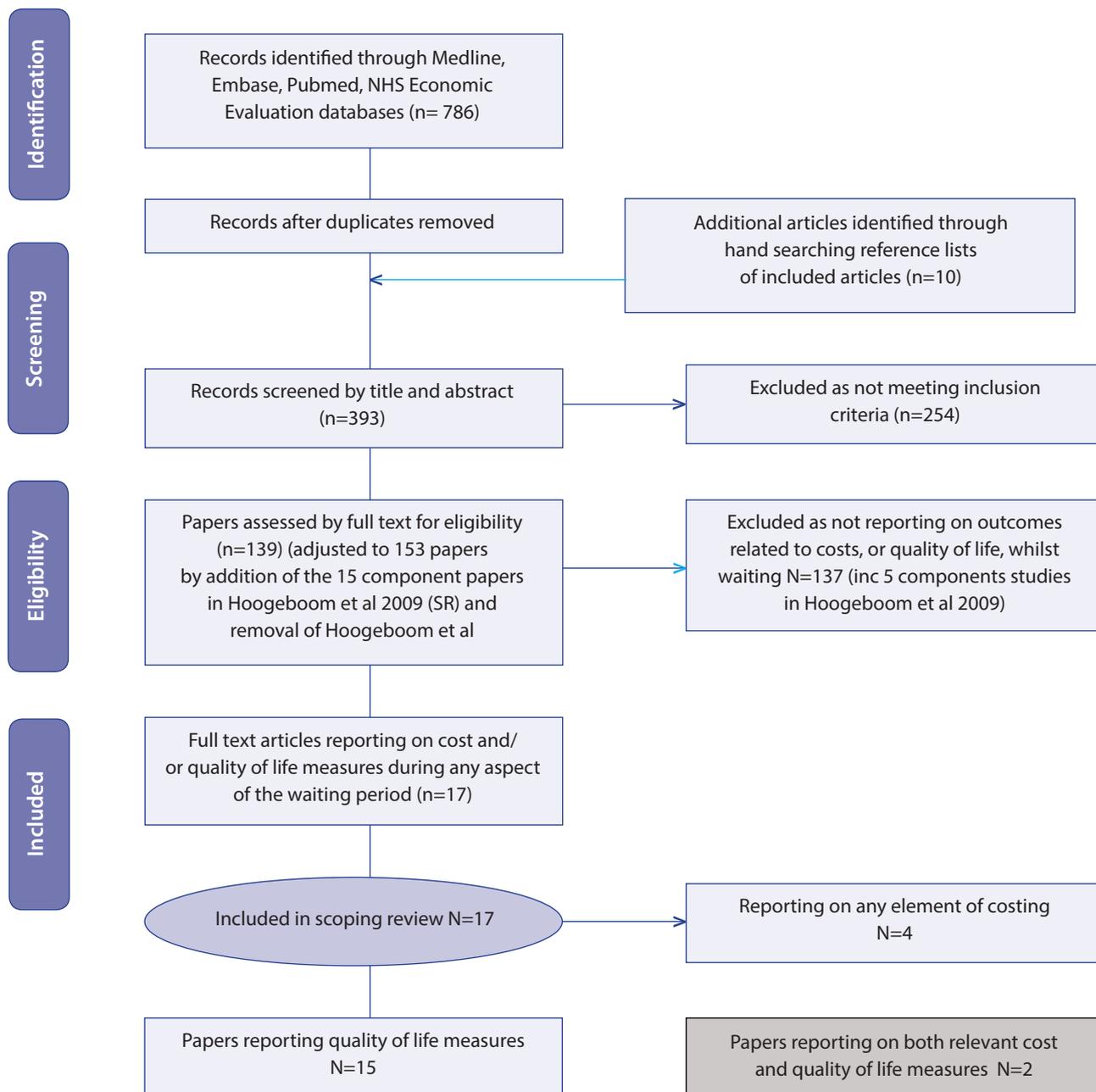
## Results

The search identified 786 potentially eligible studies (see Figure 2). There were 393 duplicates, and another 254 articles were removed, after considering title and abstract, as not meeting the inclusion criteria. This left 139 potentially relevant articles.

**Handsearching:** Included in these potentially relevant articles was a systematic review [27] which summarised 15 primary articles. After debate, it was decided that, as aims of our review differed from the Hoogeboom et al aims, we should consider the 15 individual papers in the Hoogeboom review, rather than the review itself. [27] No other relevant references were identified from handsearching the remaining included papers' reference lists.

**Search results:** The search output was adjusted from 139 potentially relevant papers (including Hoogeboom et al) to 138 papers (excluding the Hoogeboom review) plus the 15 component papers from the Hoogeboom et al review, giving 153 potentially relevant papers. Using the Pawson realist synthesis framework (Figure 1) to map the reported outcomes from the potentially relevant papers identified 17 papers which met the review's inclusion criteria (excluding 135).

Figure 2:



- There were two included papers which reported on both costs and quality of life; March et al; Fielden et al. [28,29]
- The 13 included papers that reported only on quality of life measures included Ackerman et al; Ahmas and Konduru; Chakravarty et al; Desmeules et al; Desmeules et al; Hirvonen et al; Kapstad et al; Kelly et al; McHugh et al; Nilsson and Lohmander; Nunez et al; Ostendorf et al; Pace et al. [31-41,16]
- The two included papers that reported only on costs comprised Rolfson et al and Tuominen et al. [14,42]

**Hierarchy and quality of evidence:** The included studies when graded according to the NHMRC hierarchy of evidence, demonstrated that the research in this area is generally low-level aetiology studies, and III-3 uncontrolled prospective studies (see Table 2) and therefore of relatively low quality. Table 2 also reports critical appraisal scores.

**Data descriptions**

**Countries where research was conducted:** The studies were from a wide range of developed world countries (Canada, Finland, Australia, Holland, Spain, New Zealand, Sweden, Norway and the United Kingdom). None came

**Table 2: Aetiology hierarchy**

QUALITY OF LIFE PAPERS	NHMRC	CRITICAL APPRAISAL – CASP COHORT TOOL	PEDRO
Desmeules et al 2010a	III-3	12/14	N/A
Desmeules et al 2010b	III-3	12/14	N/A
Hirvonen et al 2009	II	N/A	8/11
Ackerman et al 2011	III-3	12/14	N/A
Ostendorf et al 2004	III-3	11/14	N/A
Fielden et al 2005	III-3	9/14	N/A
Nunez et al 2006	III	N/A	7/11
March et al 2002	III-3	9/14	N/A
Ahmas & Konduru 2007	III-3	6/14	N/A
Chakravarty et al 2005	IV	9/14	N/A
Kapstad et al 2007	III-3	11/14	N/A
Kelly et al 2001	III-3	13/14	N/A
McHugh et al 2007	III-3	13/14	N/A
Nilsdotter & Lohmander 2002	III-3	11/14	N/A
Pace et al 2006	III-3	12/14	N/A
COST PAPERS		CRITICAL APPRAISAL – CASP ECONOMIC TOOL	PEDRO
Tuominen et al 2009	II	N/A	8/11
March et al 2002	III-3	9/14	N/A
Fielden et al 2005	III-3	9/14	N/A
Rolfson et al 2012	III	9/14	N/A

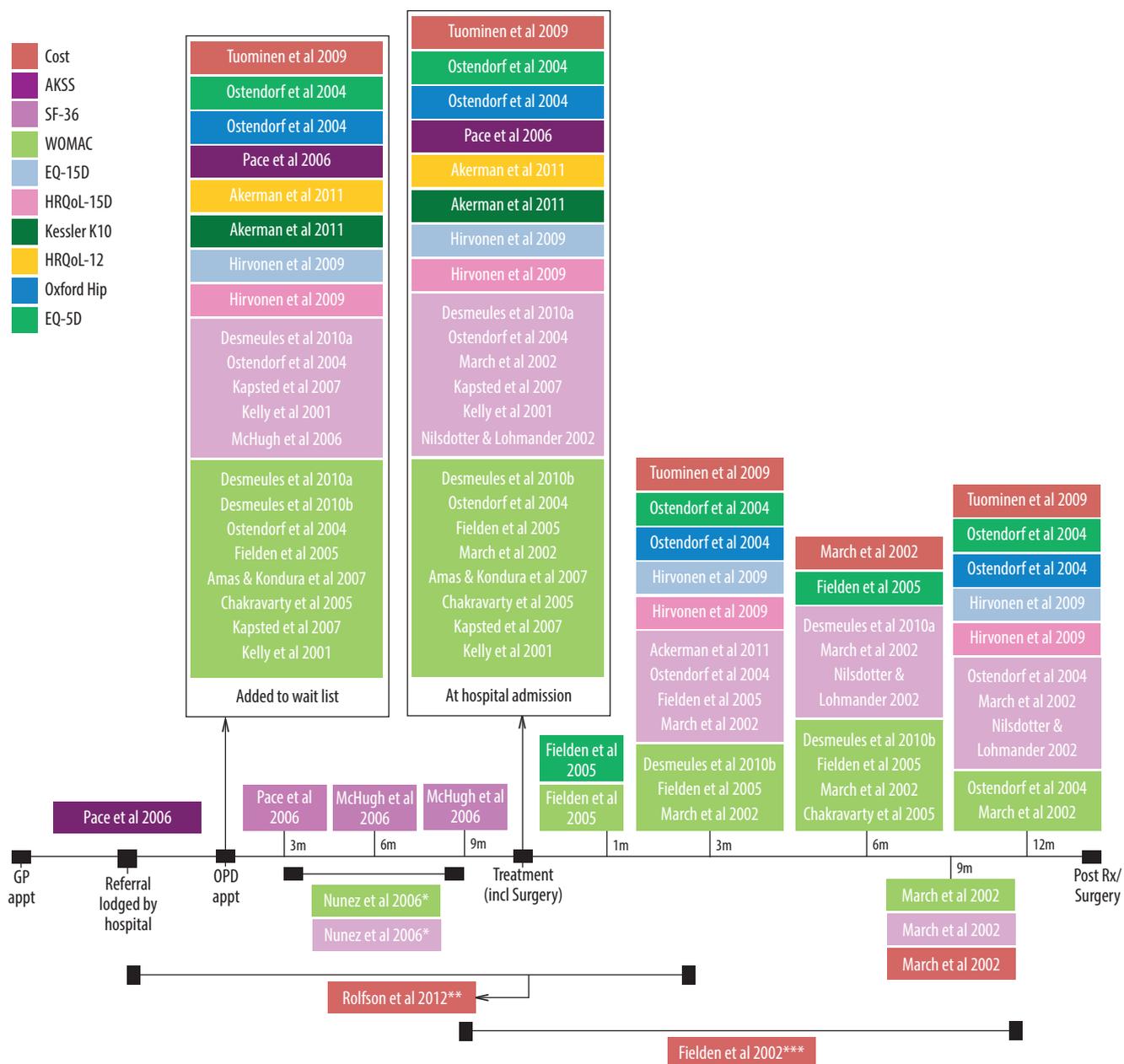
from developing countries. Whilst all countries in the studies have established healthcare systems, there were significant differences between them in terms of how healthcare was delivered. This constrained comparison of findings.

**Study periods:** There was wide variability in the periods of research, the majority reported a 12-18 month recruitment of patients, whilst some recruited for over three years. Mapping the data against the realist synthesis ubiquitous patient journey (outlined Figure 1), there was a lack of consistency in the period of time over which data was collected making comparison of findings difficult. Figure 3

outlines the included papers against the realist synthesis patient journey.

**Musculoskeletal conditions:** The included studies reported only on patients with osteoarthritis of the hip or knee, in particular there is a significant emphasis on patients awaiting total hip and knee replacements, and the period following surgery. In terms of the patients included in the reported studies, one striking issue is the lack of standardised measures used to add patients to the surgical waiting list. Only two papers [38,39] described a standardised grading system for severity of joint disease, one using the

Figure 3: Papers across the spectrum of waiting



Kellgren-Lawrence grading system [43,44] and the other the Osteoarthritis Research Society International criteria whilst the remaining papers only reported that the patients had severe enough arthritis to warrant a joint replacement.

**Waiting times:** This was described variably, particularly what was considered to be long, medium and short term waiting periods and at what time points in the waiting period the measures are taken. Again the realist synthesis framework outlined in Figure 1 assisted in the comparison between studies. Fifteen papers explored the impact of the pre-operative waiting period on the outcome of surgery in some cases up to twelve months post-surgery. Only two

papers [14,41] reported on the waiting period from point of GP referral into the specialist service. For the remaining papers, the start of the waiting period was deemed to be at the point the patient was placed on a surgical waiting list for a total hip or total knee replacement, depending on the study. See Figure 3.

**Quality of life:** Table 3 reports of the different quality of life measures reported in the included papers. The most commonly reported outcome measures were Short Form (36) Health Survey (SF-36) [45] and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). [46] There were inconsistent findings about the impact of

**Table 3: Quality of life outcome measures reported**

	QUALITY OF LIFE STUDIES	COUNTRY	YEAR	BODY PART	SF36	WOMAC	WOMAC OF CONTRALATERAL KNEE	EQ-15 D	MODIFIED HARRIS HIP SCORE	OXFORD HIP SCORE	KESSLER PSYCHOLOGICAL DISTRESS SCALE	HRQOL ITEM INSTRUMENTS	EQ-5 D	AMERICAN KNEE SOCIETY SCALE
1	Desmeules et al 2010a	Canada	2006-7	Knee	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
2	Desmeules et al 2010b	Canada	2006-7	Knee	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
3	Hirvonen et al 2009	Finland	2002-3	Hip	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗
4	Ackerman et al 2011	Australia	2002-5	Hip & knee	✗	✗	✗	✗	✗	✗	✓	✓	✗	✗
5	Ostendorf et al 2004	Holland	Apr 1997 Sept 2000	Hip awaiting THR	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
6	Nunez et al 2006 Spain	Spain	Feb-Oct 2001	Knee awaiting TKR	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
7	Fielden et al 2005	New Zealand	Apr 1997- Mar 2002	Hip awaiting THR	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗
8	March et al 2002	Australia	1994-95	Hip & knee	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
9	Ahmad & Konduru	UK	June 2003- Dec 2004	Knee	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
10	Chakravarty et al 2005	UK	Unknown	Hip	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
11	Kapstad et al 2007	Norway	June 2003- June 2004	Hip & Knee	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
12	Kelly et al 2001	Canada	Dec 1995- Jan 1997	Hip & Knee	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
13	McHugh et al 2006	UK	May-Nov 2003	Hip & Knee	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
14	Nilsdotter & Lohmander 2002	Sweden	Feb 1997- Oct 1998	Hip & Knee	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
15	Pace et al 2005	UK	Jan 2000- May 2003	Knee	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

waiting on QoL. Two studies reported that some patients have improvements in their symptoms whilst waiting for surgery, [30,32] whilst four studies reported no change for some patients [36,32,35,38] whilst five studies reported worsening QoL. [16,33,30,37,41]

What is also unclear is which patients are likely to deteriorate and which are likely to stay the same or improve. Knapstad et al reported deterioration in stiffness and physical function in those patients awaiting a total knee replacement, in their study patients who were married/cohabiting demonstrated greater deterioration than those who were single/widowed,

no other predisposing factors for deterioration could be established. [35] There is some evidence [31,32] that younger patients will deteriorate faster than older patients. There was also evidence to suggest that the length of wait pre-operatively negatively impacts on recovery operatively in terms of pain, function and QoL. [16,33]

**Cost information:** Table 4 reports the cost information recorded in the included papers reported under the broad categories of healthcare costs, community costs, informal care costs and society costs.

**Table 4: Cost parameters reported**

	PAPER	COUNTRY	YEAR	BODY PART	HEALTHCARE COSTS				COMMUNITY COSTS			PERSONAL EXPENSES/ INFORMAL CARE		PRODUCTIVITY LOSS	
					PHARMA-CEUTICAL	HEALTH-CARE	TESTS	HOSPITAL CARE	TRANSPORT &	HOME HELP	HOME MODIFICATIONS				
1	Fielden et al 2005	New Zealand	Apr 1999-Mar 2002	Hip waiting THR	✓	✗	✗	✗	✗	✗	✗	Private expense paid for medical care (user charges, privately funded care, travel costs and paid help)			Time away from work or casual activity
2	Rolfson	Sweden	Oct 2005-	Hip	✓	GP visit physiotherapy	✗	Hospital in ward care	Transport for disabled	✓	✓	Value of lost leisure by caregivers	Value of time away from work by caregivers	Disability pension	Sick leave
3	Tuominen et al 2009	Finland	Aug 2002-Nov 2003	Hip	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
4	March et al 2011	Australia	1994-99	Hip & knee	✓ Prescribed and non-prescribed	Health profession at visits	✓	Hospitalisation	Community services	✗	✗	Private services	✗	✗	✗

**Discussion**

This paper presents the first known synthesis of information on the impact of waiting for orthopaedic care for musculoskeletal complaints, in terms of costs and quality of life. This review found a moderate amount of relevant literature (17 studies), reported mostly in prospective observational or descriptive studies, of low to moderate quality. There was interest from the developed world in assessing the impact of waiting, as evidenced by research produced in nine countries. This scoping review found little information on the impact of waiting that could assist in understanding how waiting on an outpatient orthopaedic waiting list impacted on the health system, the individual or society. The papers included in the review reported heterogeneous information on the patient journey, the costs measured whilst waiting and QoL of patients whilst waiting.

**Orthopaedic conditions:** The literature focused entirely on osteoarthritic hips and knees, and all studies were about patients waiting for surgery. The focus on hips and knees possibly reflects the high prevalence of these conditions on public hospital waiting lists, the high cost of these joint replacements, the high prevalence of these conditions in the sociodemographics of people who require the public hospital system, and the orientation that this places on current research. [1,4,5] Thus there are many gaps in current knowledge regarding the impacts of waiting for individuals suffering other orthopaedic/musculoskeletal complaints.

**Realist synthesis approach:** The Realist Synthesis approach [23] was helpful in assisting us to understand just where in the patient journey, the included research focused. Without this approach, it would have been more difficult to scope the research findings. A key finding from investigating QoL in this scoping review was that all but one paper (with the exception of Pace et al [41]) was focused on one time period in the patient journey, that being from the point of being placed on a surgical waiting list to varying points postoperatively (one, three, six and twelve months following surgery) (See Figure 3). This constrained a useful synthesis of information on impact of waiting, and highlighted the need for greater understanding of the stages of waiting before further research is undertaken. If the most costly or impactful stages of waiting can be identified, interventions to avert long waiting times in these priority stages of the patient journey can be developed and tested.

**Alternative models of care:** This body of literature did not inform current thinking about substitution of care (such as extended scope practice, or alternative treatment options (such as conservative care). Whilst there is some evidence that these alternative models of care reduce waiting times and are satisfactory to patients, [8,47,48] what is unclear is how effective they are in terms of impact on quality of life and cost parameters.

**Quality of life:** 80% articles included in this review reported on QoL. The findings were inconclusive regarding changes in QoL whilst outpatients waited for an orthopaedic

appointment, or for treatment. QoL can be used as a point in time measure, or an over-time measure. [49] Therefore the ability to track change in QoL over time is an important function of any QoL outcome instrument employed in waiting list research. The two QoL measures reported in this review were WOMAC and SF36.

- The WOMAC is disease specific, and is one of the most commonly-used outcome measures in arthritis research, particularly for osteoarthritis of the hip and knee. [46] WOMAC is a self-reported instrument with five items for scoring pain, two for stiffness and 17 for functional limitation. Functional tasks include stair use, standing up from sitting, getting in and out of the car, shopping, putting on and taking off socks, bending and walking. WOMAC has been widely translated and validated in other languages, although mainly for hip and knee arthritis. [50] Whilst WOMAC has been tested for conditions other than OA hip and knee, this is less common and therefore less is known about its validity for other musculoskeletal conditions. [50] The WOMAC instrument has been shown to be less sensitive to detecting change over time in some intervention-based studies. [51,52,53,54] It is proposed that the rigid nature of the questions may impact on sensitivity to change, particularly when compared with more open-ended measures. [51]
- The SF36 is a broad QoL measure, estimating health status in domains of vitality, physical functioning, bodily pain, general health perceptions, physical role functioning, emotional role functioning, social function and mental health. [45] It has been widely used in research internationally, on many different health conditions to evaluate individual patient's health status and compare this to population norms, research the cost-effectiveness of treatments, and monitor and compare disease burdens. However Kean et al observed that it may not be sufficiently sensitive to change and thus its validity for use in research into the impact of waiting is questionable. [55]

To better understand the subtleties of the impact of waiting on an individual's QoL, it may require engagement with the notion of Patient Related Outcome Measures (PROMs). [56,57] To date, PROMs have been used to assess effectiveness of care. Safety and patient experience (such as shared decision-making, dignity, respect, comprehensive communication) have been less well explored. [57,58] These outcome elements may well reflect the subtleties of impact of waiting on QoL and thus there appears to be

room for sophisticated patient-directed outcome measures to be developed that capture individual patient experiences whilst waiting for orthopaedic care.

**Costs:** There was a small body of literature (four studies only) which reported on costs. Measures of cost included health, community, personal and societal costs, and productivity. Costs were measured in a variety of ways including cost diary, retrospective reflections of costs incurred whilst waiting, and purpose-built questionnaires. None of the studies used independent validation of these costs, for example there was no formal comparison with pharmacy receipts or with Medicare data sets. Only one paper reported sufficient data to inform an economic analysis of costs and benefits. [14] It was therefore not possible to synthesise the information on costs whilst waiting, and thus this scoping review highlighted this as a significant area for further research.

## Conclusion

This scoping review highlighted scant and inconsistent evidence regarding the impact of waiting on cost and QoL measures, for an orthopaedic outpatient appointment. The information that is available comes from a limited patient group (hip and knee osteoarthritis). There was little evidence of the impact of waiting across the continuum of the waiting period, as studies focused on sections of the patient journey. There was no clarity regarding how the waiting time in a patient's journey could be considered, and the bulk of the literature focused on the time from when the patient is placed on the waiting list for hip or knee replacement surgery to the point of surgical intervention and subsequent rehabilitation. This means that little is currently known what went before the decision-making about the need for surgery. This review highlighted that there is little known about other types of patients referred for surgical consultation whose ultimate management is not surgery, or who proceed to surgery for a condition other than osteoarthritis of the hip or knee. Further research is required, using sensitive and defensible measures of QoL, and costs, before an understanding of the impact of waiting occurs, and before health systems can support healthcare providers to make shared and informed choices with their patients about the best management of orthopaedic complaints.

## Future

Areas for improvement in future studies which assess the impact of waiting for specialist orthopaedic opinion are:

- Broadening the focus of research to other types of orthopaedic conditions. At this time the evidence

focuses on patient with hip and knee osteoarthritis that are awaiting surgical intervention. Nothing was found in this review about the impact of waiting for specialist consultation and/or care for patients with other musculoskeletal conditions (e.g. shoulder pain, ankle problems, spinal pain and wrist/hand and elbow problems).

- Improving capture of QoL and cost outcomes. Standard agreement is required regarding the most appropriate and sensitive measures across a broad range of musculoskeletal conditions to capture the impact of waiting.

For QoL, PROMs should be considered, as well as new outcome measures to capture subtle individual concerns, particularly in measuring individual concerns about having to wait for attention for a condition that may be worsening.

For costs, valid measures of productivity costs, opportunity costs, societal costs and healthcare costs incurred by both the patient and the healthcare system are required.

- Increasing understanding of the phases of 'waiting'. Waiting is not simply about the time between the orthopaedic decision and proceeding to surgery. It includes the time between consulting a GP, being placed on an outpatient waiting list, and then waiting for an orthopaedic consultation. In the literature that is available there is a lack of consistency in the measures used to report the impact of waiting, in terms of both cost and health outcomes/QoL. In particular the different time points at which the impact of waiting is measured across the different studies, makes comparing outcomes problematic.

### Key findings

Little is known about the impact of waiting for an orthopaedic specialist assessment. What evidence is available is of low hierarchy and low to moderate quality. Standardised measures of QoL and cost are required, as is a better appreciation of the waiting period, and the phases within it.

### Competing interests

The authors declare that they have no competing interests.

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