Orthopaedic Waiting List (OWL) project

Phase I
Final report

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Preamble

This report describes the findings of a 2006 report on a project to (a) develop a tool to prioritise people with hip or knee joint disease and (b) develop a system that facilitates the management of people who may require joint replacement surgery. The project was funded by the Victorian Department of Human Services (now Victorian Department of Health).

The project underpinned the subsequent development of Victoria’s osteoarthritis hip and knee services (OAHKS).

Commencing in 2007, the Department of Health provided funding to pilot and establish OAHKS at 14 Victorian health services. Funding for the project was mainstreamed into the health services’ overall specialist clinics budgets in 2011.

The OAHKS model is helping to improve equity of provision of care and improved access to timely hip and knee replacement surgery. Benefits include:

- more appropriate use of limited specialist orthopaedic services, including deferral of patients not requiring surgery to appropriate conservative management by senior musculoskeletal physiotherapists
- early comprehensive assessment resulting in fast-tracking to surgical assessment as appropriate and/or early referral for conservative management
- active management of the elective surgery waiting list, including prioritisation to match patient need
- Improved patient satisfaction.

Other Australian states have begun to incorporate aspects of the OAHKS model, and many have been granted a license to use the prioritisation tool developed in Victoria.

Executive summary

Introduction
During the past 10 years the total number of hip and knee joint replacement procedures in Victoria has increased substantially. Osteoarthritis (OA) is the primary cause of joint deterioration leading to joint replacement surgery (JRS). Given the high demand and patient referral at different stages of disease progression, hospitals need to determine urgency for surgery. The current prioritisation system is relatively unstructured and insensitive to individual patient needs. As such, patients can experience extended and potentially avoidable morbidity due to the inability to distinguish the urgency of patients on waiting lists.

There is a need for an effective and equitable prioritisation system. Given that current evidence clearly points to an even greater demand in the future, a system that supports rational efficient and equitable clinical decision making will support better delivery of healthcare as well as improve health service planning and resource allocation. The Victorian Department of Human Services (DHS) recognised the need to improve the current system and provided funding to develop a system to prioritise and manage the care of those waiting for hip and knee JRS.

Project overview
The project sought to develop a system to ensure that patients with the highest urgency receive more timely JRS. The specific aims were to develop a tool to prioritise people with hip or knee joint disease and to develop a system that facilitates the management of people who may require JRS.

The tool was developed using modern clinimetric and psychometric techniques, with high-level input from relevant clinical and hospital management groups, particularly orthopaedics. A musculoskeletal coordinator (MSC) role was developed to facilitate the management of patients while waiting for surgery. A project working group provided project oversight.

Background
Literature review: National and international literature was reviewed to describe current approaches to JRS indicators, outline the waiting list system in Australia and identify current and previous attempts to construct prioritisation systems.

There is currently no consensus on indications for JRS and the wide variation in the views of referring clinicians, patients and surgeons leads to concerns regarding equity and transparency in the provision of JRS. There is also currently no reliable means of assessing the relative priority of patients on waiting lists.

Priority scoring systems have been developed in Canada, New Zealand and the United Kingdom, which suggests some commonality of problems with access to care in these countries. The literature review has identified several lessons for the development of priority systems including the following.

- Priority criteria need to be based on high-level input from orthopaedic surgeons, with consultation from other stakeholders to ensure a priority system is practical.
- The weighting of the components of a priority system should be well grounded in both clinical care and empirical evidence.
Best practice management of patients requiring JRS: Best practice management of patients awaiting JRS is difficult to define; first, because best practice has not been defined in the literature and second, because data about management of patients on the orthopaedic waiting list (OWL) are incomplete.

A more equitable and clinically responsive system would ensure all conservative care had been undertaken and those with the highest need (based on physical, functional, quality of life, economic and other issues) receive prompt care. Goals of OA management include controlling pain, improving and maintaining range of movement and stability of affected joints and improving functional impairment.

Current management of patients requiring JRS: DHS has published the Elective surgery access policy, which outlines processes for managing elective surgery waiting lists in Victorian public hospitals. Managing elective surgery waiting lists is complex and achieving consistency at a statewide level is challenging. Systematic differences in how health services function, local environments and culture are likely to impact the degree to which policies and procedures are consistently applied.

Utilisation of conservative management in people with end-stage OA is low. Management by general practitioners (GPs) seems to be the most commonly utilised option, while other options such as physiotherapy or rheumatology appear to be under-utilised or not used at all.

Development of a prioritisation tool
Central to this project was the development of a method of prioritising patients for JRS. The Multi-attribute Arthritis Prioritisation Tool (MAPT) was developed using modern clinimetric and psychometric techniques with high-level input from relevant clinical and hospital management groups, particularly orthopaedics.

Concept mapping workshops were undertaken to elicit from surgeons and patients the key issues relevant to priority for surgery. Both the surgeon and patient workshops revealed similar prioritisation issues and were grouped into the following domains: pain; limitations to daily activities; psychosocial health impact; economic impact; recent deterioration; and conservative treatment.

The construction phase involved mailing a 38-item questionnaire to participants in order to field test the items in the intended population. The final questionnaire comprises 11 items.

Individual items on the MAPT were allocated specific weights to reflect what happens in clinical practice and ultimately enable an overall priority score to be obtained. A process known as discrete choice experiments (DCE) was used to determine individual item weights. Ninety-six Victorian orthopaedic surgeons were involved in the DCE process.

Once the weighting of MAPT items had been determined the MAPT underwent a series of tests to establish validity, reliability, sensitivity and responsiveness. Construct validity was measured through comparing MAPT scores with other questionnaires used in orthopaedic research, with results revealing high to very high correlation. Criterion validity was measured through comparison of patient MAPT scores with a MAPT completed by the MSC following a clinical assessment, with these results revealing a high level of agreement. Criterion validity was also
measured through comparing the surgeon’s global priority rating with MAPT scores, with results confirming the MAPT is able to deliver clinically relevant scores.

The test re-test reliability was measured through the collection of participant MAPT scores at two-week intervals, with results revealing a very good level of reliability. Responsiveness and sensitivity to change were confirmed through comparison of MAPT scores before and after surgery and the comparison of MAPT scores for patients on the OWL with those not on the OWL. The results reveal that a valid and reliable prioritisation tool has been developed with the extensive assistance of patients and orthopaedic surgeons.

**Potential uses of the MAPT**

The main purpose of the MAPT is to enable evidence-based prioritisation of a wide range of patients requiring JRS; however, other applications are possible that may improve the care of people who may require JRS:

- the specification of a range of MAPT scores that indicate the need for JRS, which contribute to medical decision making with respect to JRS
- the use of the MAPT in general practice and by other referring clinicians to identify patients that have high or low probability of requiring JRS
- the use of the MAPT to prioritise and triage referral to orthopaedic outpatient clinics
- regular periodic completion of the MAPT by patients while on the OWL could provide a simple method of identifying deterioration and facilitating timely surgery and also identifying patients that are no longer suitable for JRS
- MAPT scores being used as a measure of disease burden associated with waiting lists for JRS, which has important implications for planning and equitable allocation of resources to individual hospitals and healthcare regions
- MAPT scores could also be used as to assess outcomes from JRS or to examine the overall benefits of a new procedure or prosthesis.

**Progress towards development of a service delivery model**

As well as the development of a tool that can be used to prioritise people with hip or knee joint disease, the other stated aim of this project was to develop a system that facilitates the management of people who may require JRS. A service delivery model, using the MAPT to support clinical decision making, was developed. MSCs were employed at each site and their principal role was to assist with validation of the MAPT and to provide assessment and referral for patients with musculoskeletal disorders of the lower limb.

The MSCs undertook 272 initial assessments of patients on the OWL and 85 three-month review assessments. Physiotherapy and hydrotherapy were the most common form of service referral and the main reason for non-uptake of services was due to lack of follow-up from the service. A selection of participants was interviewed regarding their experience with the OWL model. The majority stated that their participation was beneficial.

The project team sought to determine the suitability of the service delivery model to community-based and hospital-based services. It was found that: there were generally positive comments received from physiotherapists regarding the role of the MSC; there are currently a wide range of services available for people with arthritis; waiting times for physiotherapy services varied from one to 12 weeks between sites; all respondents suggested that their services could not currently deal with an increased number of referrals.
The project team also sought to determine the suitability of the service delivery model to GPs and found that: the majority of GPs reported they would appreciate short and concise letters; GPs thought an MSC would assist in the care of their patients through assessment and monitoring; the MAPT would be suitable for monitoring purposes; and the majority of GPs were willing to incorporate the MAPT into their referral system and supported the idea of an online process.

**Description of proposed service delivery models**

Two options for the proposed service delivery model have been developed based on information collected through the evaluation of the MSC service delivery model described in section 6 and from consultation with stakeholders through workshops held at each of the four project sites.

The workshops found that one of the major barriers encountered within the current system was difficulties with patient flow through the system, which resulted in long waits for outpatient clinic appointments and surgery. There was overwhelming support for use of the MAPT to prioritise patients for outpatient appointments as well as for surgery. Incorporating the MAPT into GP referral letters to outpatient clinics was also raised and widely supported. Improved information technology (IT) systems and increased clinic space were identified as resources required to implement the models into current practice. Participants from all sites were supportive of having an MSC who could assess patients and refer them to conservative management.

An ideal service delivery model would provide equitable access to surgical services based on a dynamic system that responds to clinical and social ‘need’ for surgery, including time waited for treatment. The proposed models of service delivery attempt to address patient waiting times at two points in their care path: the wait for an outpatient appointment and the wait for surgery. The service delivery models are designed to enable the implementation of an OA model of care for best practice management of OA, with clinical decision making supported by the MAPT.

There are a number of potential options for service delivery, two of which have been described in the report. Option 1 is an administrative model that enables data collection and waiting list prioritisation of patients through hospital administrative systems but does not enable the implementation of an OA model of care (see Figure 6). Option 2 includes an MSC embedded in the administrative model and who dynamically manages waiting list prioritisation of patients, as well as upstream triage of referrals from GPs and subsequent referral of patients to other services for the best practice management of OA (see Figure 7).

Principles of care and guidelines for implementation of the preferred model are provided and include principles of engagement of stakeholders, infrastructure requirements, personnel, process issues, target group, reporting and evaluation.

**Strategic management of waiting lists**

A potential difficulty with prioritisation based only on patient urgency without consideration of time waited is that those patients who have low priority but need JRS may never get their surgery because patients with greater urgency may always be entering the system. This could be addressed by undertaking dynamic modelling of the waiting list through incorporating local policy decisions regarding the proportion of weekly operating lists that should be dedicated to
those with most severe disease and those who have waited the longest with mild/moderate disease. The aim of the modelling would be to identify the best mix of patients to reduce the burden in the shortest possible time.
1. Introduction

Summary

- Over the past 10 years the number of hip and knee joint replacement procedures in Victoria has increased substantially.
- Osteoarthritis is the primary cause of joint deterioration leading to joint replacement surgery.
- Given the high demand, hospitals need to determine urgency for surgery.
- The current prioritisation system is relatively unstructured and insensitive to individual patient needs and, as such, patients with the highest urgency may not receive timely surgery.
- Patients can experience extended and potentially avoidable morbidity due to the inability to distinguish the urgency of patients on waiting lists.
- There is a need for an effective and equitable prioritisation system.
- Given that current evidence clearly points to an even greater demand in the future, a system that supports rational efficient and equitable clinical decision making will support better delivery of healthcare as well as improve health service planning and resource allocation.
- The Department of Human Services recognised the need to improve the current system and provided funding to develop a system to prioritise and manage the care of those waiting for hip and knee joint replacement surgery.

1.1 Elective orthopaedic surgery in Australian public hospitals

The growth of elective orthopaedic surgery in Australian public hospitals is well documented. In 2005 the national joint replacement registry (NJRR) reported that the number of hip and knee replacement procedures for the 12 months to 30 June 2004 increased by 5.8 per cent (to 59,064) compared with the same period the previous year.1

Data for the past 10 years indicate that, nationally, hip and knee joint replacement surgery (JRS) has increased by 84.5 per cent (hip replacement procedures by 56.5 per cent and knee replacement by 123.6 per cent). In Victoria, hip and knee JRS has increased by 79.4 per cent over the same period.1 Osteoarthritis (OA) is the primary cause of joint deterioration leading to JRS in just under 90 per cent of patients receiving primary hip replacements and just over 90 per cent of primary knee replacement cases. In the foreseeable future it is anticipated that the demand for JRS will continue to increase with the ageing population and an increase in risk factors for OA, such as obesity.

According to data collated by the Australian Institute of Health and Welfare (AIHW), the median length of time a person waits for JRS in the Australian public health system is around 92 days for a total hip replacement (THR) (11.1 per cent wait more than a year) and 134 days for a total knee replacement (TKR) (19.6 per cent wait more than a year).2

Given the high demand for services and patient referral at different stages of disease progression, hospitals need to determine urgency for surgery.3 Waiting lists can be used to prioritise patients in order to ensure hospital resources are used efficiently and equitably. Currently, surgeons and their registrars determine the priority/urgency of specific patients according to a three-tiered system (urgent, semi-urgent and non-urgent); however, this is relatively unstructured
and insensitive to individual patient need. While surgeons are clearly concerned with maximising health outcomes for their patients, using this approach to prioritise for surgery has several shortcomings. Most notably those patients who are the most ‘needy’ may not receive timely surgery.

1.2 The need for an effective prioritisation system

Long waiting times for hip or knee JRS are known to compromise health outcomes. Therefore, it is important that surgery is undertaken with minimal delay. At present, individuals waiting for an appointment with a specialist regarding whether JRS might be necessary and those on the orthopaedic waiting list (OWL) for JRS are not routinely reviewed. Some of these people may undergo considerable physical deterioration while waiting for the orthopaedic outpatient appointment and/while waiting for surgery once on the OWL. In addition, some people waiting for JRS have been shown to have very poor health-related quality of life (HRQoL) and high psychological distress. This is especially true for women and those from lower socioeconomic backgrounds. The current prioritisation system is relatively unstructured and insensitive to individual patient needs. As such, patients can experience extended and potentially avoidable morbidity due to the inability to distinguish urgency of patients on waiting lists.

There is a need for an effective and equitable prioritisation system as an immediate response to the large unmet demand (long waiting times). Given that current evidence clearly points to an even greater demand in the future, a system that supports rational efficient and equitable clinical decision making will support better delivery of healthcare as well as improve health service planning and resource allocation.

Providing timely access to JRS for those with OA and rheumatoid arthritis (RA) is a key priority for the Commonwealth and Victorian state governments. The DHS Elective surgery access policy states that consistent, equitable and efficient elective surgery waiting list management is a key priority for the department and that patients on waiting lists should be prioritised according to their clinical needs and receive appropriate care within clinically desirable timeframes. In addition, health services are required to maintain clinical and administrative structures that effectively and actively manage waiting lists.

The DHS Statewide Elective Surgery Program recognised the need to improve the current system and, in 2004, funded the Centre for Rheumatic Diseases (CRD) to develop a system to prioritise and manage the care of those waiting for hip or knee JRS.
2. Project overview

Summary
- The project sought to develop a system to ensure that patients with the highest urgency receive more timely JRS.
- The specific aims were to develop a tool to prioritise people with hip or knee joint disease and to develop a system that facilitates the management of people who may require JRS.
- The tool was developed using current clinimetric and psychometric techniques with high-level input from relevant clinical and hospital management groups particularly orthopaedics.
- A musculoskeletal coordinator role was developed to facilitate the management of patients while waiting for surgery.
- A project working group provided project oversight.

2.1 Aims

The overall aim of the project was to develop a system that considers the priority of all patients on the OWL and ensure the most ‘needy’ people receive more timely JRS. The project was founded on the belief that the management of people on waiting lists for JRS could be improved if they were regularly assessed using a short, easily administered tool that elicited information on hip- or knee-related health status and quality of life. This information could then be used to assign priority on waiting lists.

The specific aims of the project were to:
- develop a tool that can be used to prioritise people with hip or knee joint disease
- develop a system that facilitates the management of people who may require JRS.

2.2 Methods

The project was undertaken at four sites: The Royal Melbourne Hospital (RMH), Western Hospital (WH), Dandenong Hospital (DH) and Goulburn Valley Health (GVH). Patient recruitment and clinics took place at each of the sites and development of research activities was undertaken primarily at RMH. The project commenced in mid 2004 and was completed in May 2006. Ethics approval was granted at each of the four hospital sites.

To develop the prioritisation tool, state-of-the-art clinimetrics and psychometric techniques were used, together with high-level and consistent input from relevant clinical and hospital management groups, particularly orthopaedic surgeons.

A musculoskeletal coordinator (MSC) role was developed based on previous attempts to manage orthopaedic referrals described in the literature, a previously developed evidence-based OA pathway and expert clinical opinion. The two main roles of the MSC were to assist with validation of the Multi-attribute Arthritis Prioritisation Tool (MAPT) and the management of patients while waiting for surgery.
2.3 Governance

A project working group was established at the outset and met regularly. The group had representation from key stakeholders including allied health, the Arthritis Foundation of Victoria (AFV), community health, consumers, general practitioners (GPs), rheumatologists, surgeons and the project team (see Appendix 1). The working group aimed to capture all relevant points of view, and provide ‘local’ champions to assist in data collection and service delivery model development. Separate meetings were held with the directors of orthopaedics from each site after it became clear that they had difficulty attending the working group meetings at the agreed time due to clinical commitments.
3. Background

Summary

Literature review
- National and international literature was reviewed to describe current approaches to JRS indicators, outline the waiting list system in Australia and identify current and previous attempts to construct prioritisation systems.
- There is currently no consensus on indications for JRS and the wide variation in the views of patients, referring clinicians and surgeons leads to concerns regarding equity and transparency in the provision of JRS.
- There is currently no validated and reliable means of assessing the relative priority of patients on waiting lists.
- Priority scoring systems have been developed in Canada, New Zealand and the United Kingdom, which suggests some commonality of problems with access to care in these countries.
- The literature review has identified several lessons for the development of priority systems including the following.
  - Priority criteria need to be based on high-level input from orthopaedic surgeons with consultation from other stakeholders to ensure a priority system is practical.
  - The weighting of the components of a priority system should be well grounded in both clinical care and empirical evidence.

Best practice management of patients requiring JRS
- Best practice management of patients awaiting JRS is difficult to define; first, because best practice has not been defined in the literature and second, because data about management of patients on the OWL is incomplete.
- A more equitable and clinically responsive system would ensure all conservative care had been undertaken and those with the highest need (based on physical, functional, quality of life, economic and other issues) receive prompt care.
- Goals of OA management include controlling pain, improving and maintaining range of movement and stability of affected joints and improving functional impairment.
- Non-pharmacological interventions include:
  - education and the provision of information
  - physiotherapy including exercise therapy, manual therapy, the provision of joint protection devices and the provision of gait aids
  - weight loss, with studies showing that those who are overweight and obese can benefit from modest weight loss
- Pharmacological management should be considered an adjunct to non-pharmacological interventions and should be managed by the patient’s GP, rheumatologist or a pain management clinic.

Current management of patients requiring JRS
- DHS has published the Elective surgery access policy, which outlines processes for managing elective surgery waiting lists Victorian public hospitals.
- Managing elective surgery waiting lists is a complex process and achieving consistency at a statewide level is challenging. Systematic differences across health services in the performance of hospital systems and local contextual issues are likely to impact the degree to which policies and procedures are consistently applied.
3.1 Literature review

National and international literature was reviewed to describe current approaches to JRS indicators, outline the waiting list system in Australia and identify current and previous attempts to construct prioritisation systems.

3.1.1 Indicators for joint replacement surgery

The majority of JRS is performed as a result of joint failure caused by OA. The aims of JRS are relief of pain and improvement of function. A consensus statement by the National Institutes of Health (NIH) outlined the indications for TKR surgery: joint pain that is not adequately relieved by an extended course of non surgical management; functional limitation resulting in reduced quality of life; and radiographic evidence of joint damage.9 The same indications are generally acknowledged for THR surgery.

While indications for JRS are broadly defined in the literature, in practice, many other factors can influence the decision to perform JRS. A survey by Dreinhoefer et al. of 304 orthopaedic surgeons and 314 referring clinicians in 12 European countries found that currently there is limited consensus on objective criteria for THR. The study also found substantial differences regarding the appropriate level of symptoms for THR between referring clinicians and surgeons and concluded that these variations could lead to inequities in the provision of care.10

Quintana et al. studied the appropriateness of the use of THR in 583 patients. By applying previously developed appropriateness criteria to patients scheduled for surgery, it was found that 13.6 per cent of patients studied were considered to have undergone inappropriate THR procedure and in a further 46.2 per cent the indication for the procedure was uncertain.11

Dolin et al. studied the correlation between surgeons’ and patients’ assessments of patient pain and dysfunction and factors that influenced surgeons’ decisions to allocate priority for THR. The study found that while surgeon- and patient-rated current pain and function were reasonably correlated, surgeons predicted greater benefit from surgery in pain and function.12 Dreinhoefer also found differences between referring clinicians and surgeons, in that referring clinicians (who act as the ‘gatekeepers’) think that patients need to be more severely affected to warrant surgery than do the surgeons.10

This wide variation in the views of referring clinicians, patients and surgeons leads to concerns regarding equity and transparency in the provision of JRS. Since there is no consensus on indications for JRS, placing patients on waitlists and the subsequent monitoring of these waitlists is based on a variety of clinical and non-clinical factors that may differ across institutions and healthcare providers and indeed within healthcare provider groups. It has been proposed that setting formal clinical criteria could assist medical decision making.12 The NIH consensus statement on indications for TKR has recommended that ‘evidence based indications from results obtained with standardised instruments that measure pain, physical function and quality of life as perceived by the patient must be used to guide clinical decision making and choice of surgery’.9
### 3.1.2 Orthopaedic waiting lists in Australia

The existence of long waiting times for elective orthopaedic surgery implies a demand that exceeds the capacity or willingness to supply, while the magnitude of waiting lists is dependent on the balance between the demand for surgical services and their availability.\(^{13}\)

**Australian clinical urgency criteria**

In Australia, patients waiting for elective surgery are classified into three clinical urgency categories (see Table 1).

#### Table 1: Clinical urgency categories for elective surgery in Australia

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>Admission within 30 days is desirable because the condition may deteriorate quickly to a point requiring an emergency admission</td>
</tr>
<tr>
<td>Category 2</td>
<td>Admission within 90 days is desirable as the condition is causing some pain, dysfunction or disability but is not likely to deteriorate quickly or become an emergency</td>
</tr>
<tr>
<td>Category 3</td>
<td>Admission at some time in the future is acceptable because the condition is causing minimal or no pain, dysfunction or disability, is unlikely to deteriorate quickly, and does not have the potential to become an emergency</td>
</tr>
</tbody>
</table>

The clinical urgency category is assigned by the consultant at the time the patient is placed on the elective surgery waiting list. Waiting times are generally calculated by comparing the date on which a patient was added to the waiting list with the date on which the patient was admitted.\(^{14}\) Days on which the patient was 'not ready for care' are excluded.

Health services are required to report their performance regarding timeliness of treatment of patients by clinical urgency category. However, systematic differences across jurisdictions in clinicians’ judgements about the relative urgency of patients, as well as in the performance of hospital systems, are likely to affect reported results.\(^{15}\) In addition the clinical urgency categories are principally designed to expedite treatment of patients with life-threatening illnesses such as malignancy and potentially fatal cardiac conditions. It is not an effective mechanism for the prioritisation of treatment of chronic conditions such as arthritis as these patients are routinely classified as either category 2 or more commonly, category 3.

Australian orthopaedic patients often face long waits for surgery, that is, waiting times that exceed the recommended treatment time for their clinical urgency category. The figures for JRS are noticeably high. In Victoria in 2003–04, the median waiting time for a THR was 127 days, and for a TKR was 152 days.\(^{2}\) Of particular concern for health services is the proportion of patients waiting 12 months or more for surgery. In 2003–04, 12.4 per cent (up from 8.2 per cent in 2000–01) of Victorian patients waited 12 months or more for a THR and 16.2 per cent (up from 10.5 per cent in 2000–01) waited this long for a TKR\(^{2}\) (see Table 2).
Table 2: Waiting times for patients admitted from waiting lists for total hip and total knee replacement, Victoria, 2003–04

<table>
<thead>
<tr>
<th>Total hip replacement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions (n)</td>
<td>1,694</td>
</tr>
<tr>
<td>Days waited at the 50th percentile</td>
<td>127</td>
</tr>
<tr>
<td>Days waited at the 90th percentile</td>
<td>402</td>
</tr>
<tr>
<td>Percentage who waited more than 365 days</td>
<td>12.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total knee replacement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions (n)</td>
<td>1,647</td>
</tr>
<tr>
<td>Days waited at the 50th percentile</td>
<td>152</td>
</tr>
<tr>
<td>Days waited at the 90th percentile</td>
<td>448</td>
</tr>
<tr>
<td>Percentage who waited more than 365 days</td>
<td>16.2</td>
</tr>
</tbody>
</table>

A recent study of RMH patients (n = 134) showed that the median time from entry to the OWL to surgery at RMH was 286 (inter quartile range (IQR): 169-375) days. This waiting time ranged from 43 days to almost three years (1,069 days). Twenty-six per cent of participants waited less than six months for surgery, 46 per cent waited six to 12 months, and the remainder (28 per cent) waited more than 12 months.

Considering that waiting list times do not include the time it takes for a patient to see an orthopaedic surgeon in the outpatient department, these waiting times for relief of symptoms and disability may be considerably longer for some patients.

**Does waiting for joint replacement surgery matter?**

Waiting list times only matter when the timing of surgery impacts on medical outcomes and the patient’s quality of life. Hip and knee JRS is a cost-effective operation that reduces pain and disability and improves health-related quality of life. The timing of the surgery can significantly impact on health outcomes in at least two ways. Delaying surgery for extended periods can result in a deterioration in both function and health status. Most importantly, however, the final outcome of JRS is significantly impaired if there are delays in surgery. Hence waiting list figures by themselves can be misleading and it is important that surgery be timed according to clinical indicators.

Recent data suggests that longer waiting times have a negative impact on health outcomes. Hajat et al. in the United Kingdom (UK) found that the longer the wait for surgery, the greater the pain and disability at a 12-month follow up. This ‘waiting effect’ remained even after controlling for other factors (such as sex, age, pre-operative scores). Moreover, it appears that patients with the longest wait for surgery (12 months to outpatient appointment and 12 months to surgery) reported significantly more pain and disability at follow-up than did those with the shortest wait (six months to outpatient appointment and six months to surgery). This difference is clinically significant (4.2 points on the Oxford Hip Score).

Even for patients who have a low risk of worsening clinical outcomes, waiting can have an impact. In 2003 about one in 10 adults who had waited for non-emergency surgery told Statistics Canada they were affected by their wait. The most common issues reported were worry, anxiety, stress and pain.

Ostendorf et al. investigated the impact of waiting for THR on quality of life in a Dutch sample. Patients were measured using the EuroQOL, the SF-36 and the Oxford Hip Score at four points in time: when placed on the waiting list; pre-
operatively; three months after surgery; and 12 months after surgery. There was no effect of waiting time on disease-related outcomes postoperatively. However, the preoperative waiting time had a substantial effect on quality of life. Delaying surgery for longer resulted in a considerable loss of quality-adjusted life years, and disease scores continued to get worse while on the waiting list.

In summary, it appears that waiting times do matter. Many health services recognise that shorter waiting lists are difficult to achieve due to many and varied factors such as: a lack of capacity (for example, health professionals, equipment, facilities or funding); failure to help patients move smoothly through multi-step care paths; challenges in coordinating access to and the delivery of complex care; delays in adapting the health system to changing needs; evolving therapies and new technologies; difficulties in understanding who could benefit most from surgery; and problems in ensuring that wait lists (and therefore wait times) are kept up to date and accurately reflect patients who are ready for and want treatment.

Several national health services have introduced systems that aim to prioritise patients. Priority systems aim to achieve greater efficiency (assess patients more rapidly, and provide better short-term management) and improved equity. The next section looks at methods used by New Zealand (NZ), Canada and the UK to prioritise patients on orthopaedic waiting lists.

3.1.3 Methods for prioritising orthopaedic patients for surgery

As previously highlighted, the existence of waiting lists for elective orthopaedic surgery implies a demand that exceeds the capacity or willingness to supply. Given that equity of access is a fundamental principle of Australia’s publicly funded healthcare system, the existence of waiting lists makes it necessary to institute mechanisms to prioritise access to surgery in a way that is equitable and transparent. To this end, priority scoring systems that incorporate both clinical and social factors have been developed in some international settings as an attempt to make prioritisation more consistent and reproducible. NZ, Canada and the UK have engaged in the development of prioritisation tools and several published papers and reports are available for review. Evaluation of these tools to date indicates only limited success.

Definition of priority systems

Priority systems are designed to rank patients along one or more dimensions ranging from physical/clinical indications for surgery through to the economic and psychological impact of the physical problem on the person. The rank is then used to assign a queue position.

New Zealand

In 1992 NZ began a major effort to overhaul its health system including an attempt to improve the management of patients on waiting lists for elective surgery. The national priority criteria project was established to develop a system whereby clinicians assess a patient’s relative priority for surgery. This system was intended to ensure consistency and transparency across national surgical services and provide a basis for describing the kinds of patients who will and will not receive surgery under different levels of funding.

Based on a 1993 report, the National Health Committee of NZ recommended that elective surgery services move away from a waiting list system and towards a
‘booking system’ whereby patients receive a defined date (or date range) for their surgery. Part of the process to move towards a booking system involved developing prioritisation criteria for patients.

Figure 1 outlines how the NZ priority system was developed. The prioritisation criteria for JRS were developed by an advisory committee consisting of two or three surgeons from the four health regions in NZ, as well as two general practitioners. Orthopaedic surgeons across NZ had the opportunity to comment on the process via a two-stage Delphi process (a technique where the views of a panel of experts are refined and reviewed in a two-stage process in order to achieve or approach consensus). Between 20 and 30 surgeons provided feedback for each specialist area, including JRS. The draft criteria were then drawn up and assigned weights by the professional advisory group. These criteria were subsequently pilot tested and their weights recalibrated based on the results. The priority criteria for JRS are listed in Table 3.

Strengths and limitations of the New Zealand priority criteria
The NZ priority criteria constitute a linear or additive model for determining patient priority for surgery. Numerous studies have compared the effectiveness of such linear models to unaided human judgement in a medical setting. In general, linear models consistently outperform human judgement in terms of accuracy of responses when measured against a gold standard. This is primarily because such tools integrate complex information more efficiently than humans can. While humans are needed to determine the actual criteria and often gather the information, additive models can more effectively integrate the information. From this perspective the NZ priority criteria are probably an improvement over ordinary clinical judgement.

The main limitation of the NZ priority scoring system relates to how the weights were derived. To determine the weights clinicians filled in the priority scores for a patient using the new instrument, and then rated the patient on a 0–100 global judgement scale of priority. This global judgement then served as the dependent variable in a regression equation with the different elements of priority score (for example, pain and functional activity) serving as the independent variables. The problem with this process is that there is circularity between the two scores. The same clinician filled in the priority score card and then made a global judgement of priority using the 0–100 scale. The clinicians were not blind to the two scores. Hence, it is highly likely that the 0–100 global judgement was biased by the surgeon filling in the priority score sheet. As a result, when the regression equations were conducted to determine the weights for the new instrument, the dependent variable (0–100 score) was biased by the independent variable (the priority score). The results from the subsequent regression equation are unlikely to have yielded meaningful information for recalibrating the weights assigned for each priority criteria.

Perhaps more substantially, it is difficult to understand how the surgeon’s 0–100 global rating of priority constitutes a ‘gold standard’ for surgical priority. It is likely that the 0–100 global priority score merely reflects clinical judgement based on past cases. When humans make holistic judgements about complex problems without reference to a formal system for doing so, they are likely to be prone to error. The purpose of a priority system is to improve on ordinary clinical judgement in order to ensure that more needy patients are seen earlier, and to ensure that the process is equitable. Basing a new priority system on the
old clinical judgement method is therefore defeating the purpose of the innovation.

Coleman et al. assessed the correlation of the NZ priority criteria system with the Western Ontario and McMasters Universities Arthritis Index (WOMAC) and Musculoskeletal functional assessment questionnaires (two validated questionnaires of disability from musculoskeletal disease). The results demonstrated poor correlation between the priority scoring system and the WOMAC and Musculoskeletal functional assessment in patients placed on the waiting list. In addition, the results indicated that the priority scoring system does not differentiate between severity of impairment secondary to joint disease in patients placed on the surgical waiting list for joint replacement. The authors have suggested that the priority scoring system be revised and validated or a validated scoring system be used to prioritise patients for surgery.31

In addition, the development of the NZ priority scoring system involved relatively little consultation with the consumers affected by condition. In order to determine whether ‘the ability to work, give care to dependents and live independently’ should be included in the priority system a random sample of the public and patients from each surgical area were consulted at two public forums. Apparently consumers agreed that it was important to consider the impact the condition had on their quality of life (such as ability to work and to live independently) and the criteria was subsequently included. However, there was no research into the importance patients placed on quality-of-life issues relative to more medical areas, nor does there appear to have been an in-depth attempt to gauge their views on issues such as what constitutes an equitable and fair priority system.

The NZ priority system assigns 90 per cent of the total priority weight to clinical features, while quality of life was assigned only 10 per cent of the total priority weight. It has been demonstrated that consumers feel that the one of the biggest problems with having a bad hip or knee is not movement problems and pain per se, but the impact this has on their ability to work, engage in leisure activities and provide for dependents.32 In other words, quality of life may be far more important than the NZ priority criteria express.
Figure 1: Hadorn and Holmes’ methodology for determining priority scores for total joint replacement surgery²⁷

1. Professional advisory group consisting of 2 GPs and 8-12 orthopaedic surgeons from different health zones of NZ
2. A two stage Delphi process is open to all orthopaedic specialists and surgeons in NZ (aprx 20-30 clinicians provide feedback on how they prioritise patients)
3. The professional advisory group determine the criteria and assign the initial weights
4. In order to determine whether social factors (e.g., ability to work & care for dependents) should be included, 2 public meetings consisting of general public and patients are held. The meetings lead to including social factors.
5. To refine the weights, surgeons score patients (n=69) using the priority score and then again using a 0-100 global rating of priority for surgery. **Problem:** The surgeons are not blinded to the priority score and hence their 0-100 global rating may be biased.
6. To refine the weights for the priority system, the ability of the different priority criteria to predict the 0-100 global rating scores determined via a regression equation.
Table 3: New Zealand priority criteria for joint replacement surgery (maximum score 100)²⁷

<table>
<thead>
<tr>
<th>Clinical features</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Pain (40 per cent)</strong></td>
<td></td>
</tr>
<tr>
<td>Degree:</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Mild: slight or occasional pain; patient has not altered patterns of activity or activity</td>
<td>4</td>
</tr>
<tr>
<td>Mild-severe: moderate or frequent pain: patient has not altered patterns of activity or work</td>
<td>6</td>
</tr>
<tr>
<td>Moderate: patient is active but has had to modify or give up some activities because of pain</td>
<td>9</td>
</tr>
<tr>
<td>Moderate-severe: fairly severe pain with substantially limited activities</td>
<td>14</td>
</tr>
<tr>
<td>Severe: major pain and serious limitation</td>
<td>20</td>
</tr>
<tr>
<td>Occurrence:</td>
<td></td>
</tr>
<tr>
<td>None or with first steps only</td>
<td>0</td>
</tr>
<tr>
<td>Only after long walks (30 minutes)</td>
<td>4</td>
</tr>
<tr>
<td>With all walking, mostly day pain</td>
<td>10</td>
</tr>
<tr>
<td>Significant, regular night pain</td>
<td>20</td>
</tr>
<tr>
<td><strong>2. Functional activity (20 per cent)</strong></td>
<td></td>
</tr>
<tr>
<td>Time walked:</td>
<td></td>
</tr>
<tr>
<td>Unlimited</td>
<td>0</td>
</tr>
<tr>
<td>31–60 minutes (for example, longer shopping trips to mall)</td>
<td>2</td>
</tr>
<tr>
<td>11–30 minutes (for example, gardening, grocery shopping)</td>
<td>4</td>
</tr>
<tr>
<td>2–10 minutes (for example, trip to letter box)</td>
<td>6</td>
</tr>
<tr>
<td>&lt; 2 minutes or indoors only (more or less housebound)</td>
<td>8</td>
</tr>
<tr>
<td>Unable to walk</td>
<td>10</td>
</tr>
<tr>
<td>Other functional limitations (for example, putting on shoes, managing stairs, sitting to standing, sexual activity, recreation or hobbies, walking aids needed)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Mild</td>
<td>2</td>
</tr>
<tr>
<td>Moderate</td>
<td>4</td>
</tr>
<tr>
<td>Severe</td>
<td>10</td>
</tr>
<tr>
<td><strong>3. Movement and deformity (20 per cent)</strong></td>
<td></td>
</tr>
<tr>
<td>Pain on examination (overall results are both active and passive range of motion):</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Mild</td>
<td>2</td>
</tr>
<tr>
<td>Moderate</td>
<td>5</td>
</tr>
<tr>
<td>Severe</td>
<td>10</td>
</tr>
<tr>
<td>Other abnormal findings (limited to orthopaedic problems such as reduced range of motion, deformity limp, instability, progressive X-ray findings)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Mild</td>
<td>2</td>
</tr>
<tr>
<td>Moderate</td>
<td>5</td>
</tr>
<tr>
<td>Severe</td>
<td>10</td>
</tr>
<tr>
<td><strong>4. Other factors (20 per cent)</strong></td>
<td></td>
</tr>
<tr>
<td>Multiple joint disease:</td>
<td></td>
</tr>
<tr>
<td>No, single joint</td>
<td>0</td>
</tr>
<tr>
<td>Yes, each affected joint mild: moderate in severity</td>
<td>4</td>
</tr>
<tr>
<td>Yes, severe involvement (for example, severe rheumatoid arthritis)</td>
<td>10</td>
</tr>
<tr>
<td>Ability to work, give care to dependents, live independently (difficulty must be related to affected joint):</td>
<td></td>
</tr>
<tr>
<td>Not threatened or difficult</td>
<td>0</td>
</tr>
<tr>
<td>Not threatened but more difficult</td>
<td>4</td>
</tr>
<tr>
<td>Threatened but not immediately</td>
<td>6</td>
</tr>
<tr>
<td>Immediately threatened</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total score</strong></td>
<td>/100</td>
</tr>
</tbody>
</table>

Canada

The demand for JRS in Canada exceeds the available resources and has led to several recent attempts to develop prioritisation criteria. The foremost efforts to develop orthopaedic prioritisation criteria have been undertaken in Ontario under the Western Canada Waiting List (WCWL) project.³³, ³⁴

The WCWL project adopted the NZ major joint replacement priority criteria as a starting point, which subsequently underwent several revisions.³³ After an interim analysis of 156 patients the criteria were simplified, and the weights were adjusted. A second revision of 405 patients was used to calibrate the final
weights for the instrument. The inter-rater reliability of the items was also tested and all but one priority item had fair to excellent reliability between clinicians. The priority tool was named the Hip and Knee Replacement Priority Criteria Tool (HKPT).

**Strengths and limitations of the Canadian Priority Criteria**

Conner-Spady et al. examined the validity of the HKPT as a measure of patient urgency in two studies.\(^3^5\) The correlation between the HKPT and a 0–100 global measure of priority was found to be high (0.78). The HKPT also correlated moderately well (0.48) with the WOMAC. Hence there is some support that the HKPT measures the severity of hip and knee osteoarthritis.

One limitation of the WCWL project is that it is used a very similar process for validating the weights for the HKPT as the NZ project. That is, the validation of the weights faces circularity problems because the clinicians who used the new priority criteria (HKPT) also scored the patients’ global measure of priority (0–100 scale). Nevertheless, the HKPT was tested against ‘objective’ indices for hip and knee pain/disability such as the WOMAC, and used a larger sample, which led to more revisions to the original instrument than was the case in NZ.

One potentially important finding was that when a patient needed revision surgery, the new priority score did not reflect the surgeon’s overall judgement of urgency. The addition of a new criterion ‘potential for progression’ appeared to correct this problem. This problem and its subsequent solution highlights the importance of testing and revising criteria based on a reasonably large number of responses obtained across settings.

Another limitation of the development of the HKPT was that the tools were developed by panels of clinical experts; members of the public were not included in the development. The tools in essence model clinical judgement and clinical judgement may not always reflect best practice.\(^3^6\)

**United Kingdom**

The NZ and Canadian priority criteria are based on the opinion of surgeons sitting on advisory groups with little reference to the views of patients with joint problems. This is unfortunate because patients clearly have views about who should get priority for surgery and why. In order to explore patient views on this, Woolhead et al. conducted in-depth interviews with 25 patients waiting for a TKR in the UK.\(^3^2\)

The results indicated agreement between patients and health professionals that pain and disability should be key criteria when making decisions about surgery. However, patients also thought that there should be a fair decision-making process that included factors specific to the patient’s circumstances such as the length and degree of suffering, whether there is a chance of returning to work and whether the patient has dependents. Participants acknowledged that surgeons asked about these factors but thought they were not given enough importance and were not used in practice. Instead, patients thought that decisions for surgery were being made on age (being too old or too young limited your chance), weight (being overweight meant you pushed down the list) and how loudly they shouted at the surgeon.

These results highlight the problems with not having a transparent prioritisation system. Without a scoring system, it is not clear to patients how they are being
prioritised or why. Rightly or wrongly, patients may feel they are being ranked down a list based on factors such as weight and age.

The Salisbury Priority Scoring System (SPSS) was designed to address the lack of transparency in the UK system, and to improve on the current ‘first come, first served’ model of care that currently operates in the UK. It is widely believed in the UK that this system does not allow for more ‘needy’ patients to be seen earlier than less needy ones.

The Salisbury criteria were developed using a Delphi consultation process with consultants and GPs in the local area. Clinicians consistently reported that they used the following four areas to determine patient priority: (1) progress of disease; (2) pain or distress; (3) disability or dependence on others; and (4) interference with usual occupation. A fifth factor, ‘time already spent on waiting list’ was later added to the list. To reflect the relative importance of the different criteria, an algorithm was developed (see Figure 2).

**Figure 2: The SPSS elective surgery algorithm**

\[ s = \left[ 2 \times (r^2) \right] + p^2 + d^2 + (0.5 \times (o^2)) + \left[ \frac{t}{(w/5)} - 1 \right]^2 \]

- **s** = total score
- **r** = rate of progress of disease
- **p** = pain or distress
- **d** = disability or dependence on others
- **o** = loss of occupation
- **t** = time already waited
- **w** = waiting time of longest patient

Note: The weights were developed by expert opinion, not by empirical means.

At present the SPSS are not being used because of guarantees by the Salisbury Health Care NHS Trust to reduce waiting times. Hence patients are still being seen on a ‘first come, first served’ basis. Consequently the SPSS has not been rigorously evaluated. However, in order to evaluate the likely impact of the system, Lack et al. conducted a modelling exercise of 20 orthopaedic patients who were waiting to see a single surgeon. To establish the order in which they would normally be seen the 20 patients were listed using the ‘first come, first served’ system, and then again on SPSS.

The modelling exercise indicated that while the ‘first come, first served’ system decreased the total number of days spent on the waiting list, the SPSS meant that an additional 15 per cent of Salisbury ‘need’ was met, that is, those with the most pain and functional/social impairment were treated earlier. However, it should be noted that ‘need’ was defined in terms of the patient’s score on SPSS algorithm not by reference to an external criteria. However, the modest difference between the two systems in terms of ‘unmet need’ occurred in part because the SPSS takes into account time already spent on the waiting list.

In conclusion, the observation that priority scoring systems have been developed in Canada, NZ and the UK suggests some commonality of problems with access to care in these countries. The literature review identified several lessons for the development of priority systems. Priority criteria need to be based on high-level input from orthopaedic surgeons, with consultation from other stakeholders and the weighting of the components of a priority system should be well grounded in both clinical care and empirical evidence.
3.2 Other waiting list management strategies

Other national and local projects looking at management of referrals to orthopaedic outpatient clinics were reviewed. These programs have developed innovative ways of managing patients on the OWL and/or managing referrals to orthopaedic outpatient clinics. Previous attempts at prioritising patients awaiting JRS have not been identified. Below is a summary of some of the other projects being undertaken in Australia.

3.2.1 Pre-habilitation program, Tasmania

Orthopaedic surgeons in the North West Regional Hospital in Burnie, Tasmania, advocated for a ‘pre-habilitation’ program specifically targeting people on the OWL for hip and knee JRS. The program has been designed by the state’s physiotherapists and has been extended to include the Royal Hobart Hospital (RHH). Funding is provided by the Commonwealth’s ‘Pathways Home’ funding (Australian Department of Health and Ageing). The aim of the program is to assist those waiting for hip and knee JRS manage their condition prior to surgery and to prepare for surgery.

Patients who are placed on the OWL for hip and knee JRS are invited to participate in the eight-week program. All participants attend a one-hour hydrotherapy session followed by a talk from a health professional aimed at providing education about key health issues such as keeping active, living with arthritis and preparing for surgery. The health professionals include a physiotherapist, dietitian, occupational therapist, Arthritis Tasmania representative, pharmacist and preadmission nurse. In addition, a suitable home program is developed for each participant. Prior to commencing the program, each participant undergoes an assessment with a physiotherapist. The program has developed into a form of self-management.

In 2005, 55 people participated in the program and 26 attended a post-program assessment. The evaluation found:
- a high level of patient satisfaction
- 70 per cent of participants experienced improved fitness as indicated by six minute walk and sit-stand tests
- 50 per cent experienced a decrease in their level of pain (35 per cent experienced no change) and 42 per cent experienced an improvement in their physical function (54 per cent were worse off) as measured using the WOMAC (a 24-item instrument for the evaluation of patients with OA).

While these results are promising, this is a small study without a control group and so the results must be interpreted with caution.

3.2.2 Get Fit for Surgery, Queensland

Staff at the Mater Adult Hospital in Brisbane identified that, in addition to preadmission clinic, patients could benefit from further intervention to better prepare them for surgery in order to improve post-operative outcomes.

The aim of the program is to improve clinical, organisational and staff management processes and to improve patient outcomes for elective hip and knee JRS patients following attendance at the ‘Get Fit for Surgery’ classes.
Patients scheduled for hip and knee JRS with a primary diagnosis of OA are offered the opportunity to attend the Get Fit for Surgery class for a four-week period prior to surgery. The classes have an interdisciplinary emphasis with two components:

- a 30-minute presentation by rotating clinical specialists including a dietitian, pain management clinical nurse/pharmacist and orthopaedic physiotherapist (participants also view a patient education video)
- a one-hour exercise class run by a physiotherapist including provision of a home exercise program.

Clinical outcome measures include muscle strength, joint range of motion, timed up and go test and the Hospital for Special Surgery Knee Score. Organisational outcome measures include length of hospital stay and physiotherapy intervention time. Quality of life measures include the WOMAC, SF-36 and patient specific goals.

A number of benefits have been demonstrated including improved short-term clinical outcomes, increased quality of life and enhanced perception of the positive effect of surgery. From a health delivery perspective, the Get Fit for Surgery class facilitates efficient utilisation of physiotherapy services in the acute care setting.

### 3.2.3 Improving access to orthopaedics project, Victoria

A multidisciplinary system-wide approach was implemented at Barwon Health to deal with the substantial demand for orthopaedic services. Demand for orthopaedic outpatient appointments was found to be high, information contained in GP referrals was inadequate and there was infrequent conservative management being applied prior to referral for a surgical opinion.

As part of this system-wide approach, Barwon Health developed the Orthopaedic Access Service (OAS). This OAS is a physiotherapy-led orthopaedic assessment clinic based in the outpatient department and collocated with consultant clinics. The service is governed by a strict protocol. The physiotherapist assesses patient suitability for conservative therapy and arranges further investigations and conservative management.

The main aims of the program are to match patients with the most appropriate part of the service, reduce the waiting time to initial appointment and better utilise the skills of allied health practitioners.

The program appears to have reduced the number of patients waiting for elective surgery, reduced the average waiting time for category 2 patients, and reduced the waiting time for an orthopaedic outpatient appointment.

### 3.2.4 Get Moving program, Victoria

A physiotherapist from Barwon Health developed the ‘Get Moving’ program to assist people on the OWL for hip or knee JRS. The program is now part of the physiotherapy program at the North Geelong Community Rehabilitation Centre (NGCRC).
The aim of the program is to assist patients waiting for hip and knee JRS improve function, better manage their condition and maximise quality of life while waiting for hip and knee JRS surgery.

Referrals to the NGCRC come from the Geelong Hospital, GPs, orthopaedic specialists, community rehabilitation centre and the NGCRC. The program is administered by an exercise therapist under the guidance of a senior clinician, and runs over seven weeks with two sessions per week. Participants attend an initial information session, which includes goal setting. A home exercise program is also developed. The remaining weeks involve a hydrotherapy class and a gym session. Pre- and post-assessments are also performed. Participants are not typically monitored following completion of the program. Some participants elect to continue with hydrotherapy.

To date, an overview of the success of the program is limited as data have yet to undergo formal analyses.

3.2.5 Fit for Surgery program and the Orthopaedic Physiotherapy Screening Clinic, Queensland

The Queensland state government sought to implement initiatives to reduce elective surgery waiting lists in public hospitals. They identified that some inefficiencies in the system were occurring because cancellations were taking place due to patients not being ready for surgery. As such, funding was provided to develop a ‘Fit for Surgery’ program within public hospital systems, targeting patients awaiting orthopaedic surgery, particularly total hip and knee replacement and spinal surgery.

The project team identified that opportunities existed to improve access for patients to orthopaedic outpatient services. International literature reports conversion to surgery rates of only 10–25 per cent for patients referred to orthopaedic outpatient services. Literature also highlights that experienced physiotherapists could assist up to 60 per cent of patients not transferred to the OWL through conservative management. As such, it was decided to include the establishment of Orthopaedic Physiotherapy Screening Clinics (OPSC) in the Fit for Surgery program.

The Fit for Surgery program and OPSC is being run within four Queensland hospitals. The programs at each site are based on a common service model; however, individual sites have customised certain components depending upon local circumstances.

The aim of the Fit for Surgery program is to improve patient preparedness for elective orthopaedic surgery (THR, TKR and spinal surgery) in relation to cardiovascular and musculoskeletal fitness, smoking cessation, nutrition and weight management, psychological adjustment and the management of pain and disability. As such, the likelihood of cancellation of surgery due to lack of fitness to undergo the procedure is reduced. The aim of the OPSC is to improve patient access to orthopaedic surgeons in outpatient clinics. This is achieved through providing conservative management for patients referred to an orthopaedic outpatient service for whom surgery may not be the first option of management.
Fit for Surgery
Patients who are newly added to the OWL for THR, TKR and spinal surgery are referred to a Fit for Surgery project team physiotherapist. Screening tools are used to assess whether patients would benefit from assistance from members of the team of allied health professionals within the hospital. Patients are offered a group Fit for Surgery program and/or individual professional consultation and management. Allied health professionals include physiotherapy, occupational therapy, psychology and dietetics.

A comprehensive range of outcome measures is being used to evaluate the success of the intervention. Patients are re-evaluated at the end of the program, immediately prior to their surgery and at three months after surgery. After completion of the hospital-based program patients are also linked to appropriate community services.

Orthopaedic physiotherapy screening clinic
All referrals to the orthopaedic outpatient clinic are assessed by a consultant orthopaedic surgeon. Those considered to be unlikely to require surgery as their first option for management are referred to the OPSC, which is operated by experienced MSC physiotherapists who facilitate the multidisciplinary management of patients. Treatment services include physiotherapy, occupational therapy, dietetics and psychology and are located within the hospital. A benefit of this arrangement is that patients are able to efficiently undergo conservative management.

Patients are reviewed at approximately three months and an assessment is made as to whether they have achieved or are ‘on track’ to achieving their aims. A decision is made regarding whether they remain on the waiting list to see an orthopaedic surgeon. The patient is the primary decision-maker and the GP is kept informed throughout the process.

Preliminary analysis of the Fit for Surgery program is currently underway. Preliminary results of the OPSC indicate that patients are achieving good clinical outcomes. In addition, satisfaction surveys of patients, their referring doctors and the orthopaedic surgeons associated with each site are overwhelmingly positive. The program is funded until June 2007 and final data analysis will commence in December 2006. Recommendations regarding service delivery models and business cases to transfer these services to additional Queensland Health orthopaedic services will be included in the project report.

3.3 Best practice management of patients awaiting joint replacement surgery

Best practice management of patients awaiting JRS is difficult to define for two reasons. First, best practice management of patients with end-stage OA (those requiring a joint replacement) has not been defined in the literature. Second, data about management of patients on the OWL is incomplete.

The following is an outline of the evidence for conservative management options for OA. In addition, an evidence-based clinical pathway for the best practice management of OA of the hip and knee has been previously developed.8 (see Appendix 2).
Goals of managing OA include controlling pain, maintaining and improving range of movement and stability of affected joints and improving functional impairment. Management strategies can be grouped into three categories: non-pharmacological (education, physiotherapy, occupational therapy); pharmacological (paracetamol, non-steroidal anti-inflammatory drugs (NSAID)); and surgical (JRS).

JRS is an effective intervention used increasingly for severe hip and knee OA as it has been shown to provide marked pain relief and functional improvement in the vast majority of patients. Patients can, however, experience difficulty maintaining mobility and functional status while awaiting JRS. Various evidence-based strategies can be implemented to assist patients control pain, maintain or improve range of movement and manage or improve functional impairment. These strategies may be of assistance for patients for whom surgery is not yet indicated as well as those awaiting surgery. The group of patients in whom these strategies are most effective has not been identified. Health professionals must decide on the best management options based on individual patient characteristics and available local resources.

Non-pharmacological interventions

Education and the provision of information should form an integral component of the management of chronic diseases. This could include details of the disease, its investigations and management. The Arthritis Self-Management Program is a community-oriented, peer-led program through which patients receive education and gain skills for self-managing the consequences of arthritis. Studies in the United States (US) have suggested that participants have reduced joint pain, fewer arthritis-related visits to doctors, increased physical activity and improved quality of life.

Physiotherapy plays an integral role in the multidisciplinary approach to the management of arthritis and methods include exercise therapy (land and water-based), manual therapy and provision of joint protection devices.

Exercise therapy can be divided into joint-specific exercises for strength and range of motion and general aerobic conditioning. Exercise can be either directly supervised on land or in water or offered as a home-based self-directed program. Programs vary in frequency, intensity and duration. Exercise therapy has been found to be effective for patients with knee OA and there are indicators that exercise therapy is effective for patients with hip OA. However, Bijlsma and Dekker highlight the paucity of clinical trails in this area, as well as the substantial heterogeneity in terms of participants recruited and interventions studied. As such, specific recommendations regarding optimal treatment content, dosage or delivery mode cannot be made.

Physiotherapists use manual therapy to increase range of movement in joints and provide pain relief. There has been limited research regarding the effectiveness of manual therapy in the treatment of OA.

Gait aids, such as sticks, crutches and frames are used to reduce loading forces on the joint and hence provide pain relief and improve mobility. Various braces and splints can provide stability by reducing excessive joint mobility resulting in improved function. The Australian Physiotherapy Association (APA) highlights a number of international guidelines that recommend the prescription of gait aids for knee OA, based on the assessment of individual patient needs.
Orthopaedic Waiting List (OWL) project, June 2006

taping of the patella has been found to be a useful intervention for patients with OA of the knee who have symptomatic patellofemoral compartment involvement.39

Due to the symptoms of OA, sufferers may be at risk of falls. The APA highlights that physiotherapists play a key role in both identifying those at risk of falling and providing interventions such as exercise to improve balance and strength, prescription of recommended gait aids and activities to maximise endurance.44

Obesity is associated with the progression of OA. Studies of overweight patients with knee OA have shown that modest weight loss (< 5 kg) can result in a significant reduction in OA symptoms, however, sample sizes were small.38 Assistance from a dietitian may be of benefit to overweight and obese patients with OA.

Occupational therapists can assist in directing the patient in proper joint protection and energy conservation, use of splints and other assistive devices and improving joint function.39

Pharmacological
Pharmacological management should be considered as an adjunct to non-pharmacological measures.38 The patient’s GP may be in the best position to assist with the patient’s pharmacological needs; however, other options include a rheumatologist or multidisciplinary pain clinic (a healthcare delivery facility staffed by clinician and non-clinician healthcare providers who specialise in the diagnosis and management of a wide variety of patients with painful conditions).

3.4 Current management of patients awaiting joint replacement surgery

The DHS Elective surgery access policy outlines processes for managing elective surgery waiting lists in Victorian public hospitals.7 Managing elective surgery waiting lists is a complex process and achieving consistency at a statewide level is challenging. Systematic differences across health services in the performance of hospital systems and local contextual issues are likely to impact the degree to which policies and procedures are consistently applied.

The following is a description of current management of patients who may require JRS. In order to highlight some of the local contextual issues impacting upon the management of the OWL, RMH has been used as a case study. However, it should be noted that the situation at RMH does not necessarily reflect practices at other hospitals and may have changed since the time of the interviews, which took place in late 2004.

3.4.1 The general practitioner perspective

The patient’s choice of GP can influence their waiting time for JRS, particularly the GP’s knowledge of waiting lists, with some GPs using a range of strategies to reduce patient waiting times for outpatient appointments or surgery, including:

- referring patients to hospitals with shorter waiting lists
- referring patients to multiple hospitals
- referring patients to see surgeons in their private rooms
- referring patients earlier than necessary because of the perceived long waits

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• suggesting to patients on the OWL whose condition had deteriorated that they present at the emergency department.

The GP’s description of the patient’s condition in the referral letter and the capacity of the GP to advocate for the patient can be influential. GPs noted that communication between themselves and the hospital was often difficult, with GPs sometimes unable to contact the patient’s surgeon or registrar.

In addition, GPs said that treating patients’ comorbidities was sometimes problematic because they could not undertake treatment until they had undergone their surgery.

3.4.2 Outpatient clinics

Patients with a range of orthopaedic conditions are assessed at orthopaedic outpatient clinics. When referrals arrive they are reviewed by the outpatient department associate nurse unit manager (ANUM), who allocates patients to particular clinics. If a patient has previously attended the outpatient department for an orthopaedic condition they are booked to see the same surgeon as a review patient. Waiting times for review patients are shorter than those for new patients. If the referral indicates that the person requires urgent assessment (for example, if there is a possibility that the person has a tumour or fracture) they are allocated to one of the five fracture clinics that operate each week.

The amount of information provided in GP referral letters varies enormously, with some containing very little information. All the referrals for the month of February 2005 (n = 99) were reviewed. Of these, 23 appeared to be concerning knee or hip disease that could require JRS. Seventeen referrals were from GPs, two from the RMH emergency department, two from rheumatologists and two from orthopaedic surgeons. In 17 cases, X-rays had been performed and there was radiological evidence of OA. Two patients had rheumatoid arthritis. Seven referrals specifically mentioned the need for JRS.

During the consultation the orthopaedic surgeon may refer patients for physiotherapy. Patients may be seen by a physiotherapist at the clinic but are usually asked to make an appointment to attend the physiotherapy department. Alternatively, they may be referred to a community health service for further conservative management. Staff at the RMH reported that the outcomes of referrals to community health services are rarely known (for example, whether the patient attended the service or their discharge status).

3.4.3 Outpatient waiting times

For each surgeon, independent waiting lists for outpatient appointments exist and the waiting times vary between surgeons. In February 2005, new patients had to wait between 13 and 22 weeks for the next available appointment with one of four surgeons. Reasons for the differences in waiting times include the differing caseloads of the surgeons, that is, the balance of new and revision patients, the type of cases the surgeon specialises in and the other commitments the surgeon has.

Patients who are already on the OWL are rarely reviewed in outpatient clinics; however, if they are, the wait for a review appointment is not as long as it is for new patients.
Patients sometimes cancel outpatient appointments, for example, if they have had the surgery in the private system or are not well enough to attend. If the patient fails to attend the appointment they are sent a letter that instructs them to contact the clinic to re-book and they are placed at the end of the queue. Patients have sometimes changed their address in the time between receiving an outpatient appointment and the appointment date. This means they may not receive the letter to inform them that they have missed their appointment.

The ANUM receives about one call each day from either a GP or a patient regarding priority on the OWL. The ANUM tells GPs to write another letter, speak to the registrars or tell the patient to present to the emergency department and tells patients they need to go back to see their GP.

### 3.4.4 Entry to the OWL

When it is determined that JRS is required, the orthopaedic surgeon completes a standardised elective surgery request form. Most requests for orthopaedic surgery come from surgeons working in outpatient clinics; however, a small proportion come from surgeons consulting in their private rooms. The surgeon places the patient in one of three clinical urgency categories (category 1, category 2 or category 3) designating their priority for surgery (see Table 1). Occasionally the surgeon will make additional comments on the form to indicate priority such as category 2++. The manager of the OWL reported that this information was helpful. An average of six to seven patients requiring hip or knee joint replacements were added to the OWL each week in 2005.

All surgeons who perform JRS are allocated a four-hour theatre session each week. Each surgeon has their own waiting list, which is controlled by the surgeon. Occasionally, a patient is transferred from one surgeon’s list to the list of another surgeon who may have less complex cases at the time. A nurse working in the preadmission clinic is responsible for the management of the OWL.

In March 2006 there were approximately 400 people waiting for a total hip or knee joint replacement at RMH.

### 3.4.5 Determinants of progression on the OWL

The main determinant of progression on the OWL is time waited and priority is given to those who have waited longest in both category 2 and category 3.

Staff managing the OWL report that they receive numerous calls from patients wishing to know when their surgery will be scheduled. Patients who complain the most (the 'squeaky wheels') are sometimes given priority.

Patients who phone to say they need more urgent surgery are asked to return to their GP, and for the GP to write to the outpatient clinic about the patient’s condition. These letters are read by the registrar. If the patient is in category 3, the registrar may decide to upgrade them to category 2. Occasionally the nurse responsible for the OWL will receive a fax from one of the surgeons requesting that a patient has their surgery scheduled within the next few weeks.
Patients are notified of their surgery date by mail and asked to attend a preadmission clinic approximately two to four weeks prior to the surgery.

3.4.6 Determinants of delay on the OWL

Patients may request to have their surgery delayed. They are permitted three deferrals before being sent a letter saying they have been removed from the waiting list.

Once a surgery date has been given the surgery may be postponed by either the patient (for example, if the person becomes unfit for surgery between the preadmission clinic and the surgery date) or by the hospital (for example, due to limited bed availability, absence of the surgeon, equipment availability or emergency cases taking precedence). Data on reasons for cancellation or postponement of surgery have been collected from hospital administrative databases (see Table 4).

Decisions about the number of elective surgery cases that can be scheduled each day are made by the bed management committee. This committee meets daily to decide on elective surgery for the next day. The main influence on bed availability and hence the amount of elective surgery that can be undertaken is the number of emergency cases coming into the hospital, which are given priority over elective cases. Elective surgery rates are also dependent on the number of patients discharged and staff availability.

Table 4: Reasons for cancellation/postponement of orthopaedic surgery, RMH, 2005

<table>
<thead>
<tr>
<th>Reason for cancellation</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancelled for more urgent case</td>
<td>140</td>
<td>19</td>
</tr>
<tr>
<td>Patient declined surgery</td>
<td>137</td>
<td>18</td>
</tr>
<tr>
<td>Patient unfit</td>
<td>79</td>
<td>10</td>
</tr>
<tr>
<td>No beds</td>
<td>65</td>
<td>9</td>
</tr>
<tr>
<td>RMH arranged admission at other hospital</td>
<td>58</td>
<td>8</td>
</tr>
<tr>
<td>Offer of earlier date</td>
<td>44</td>
<td>6</td>
</tr>
<tr>
<td>Surgeon unavailable</td>
<td>42</td>
<td>6</td>
</tr>
<tr>
<td>Patient requested further investigation</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>Clerical error – patient unaware</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>List overrun / time expired</td>
<td>19</td>
<td>3</td>
</tr>
<tr>
<td>Patient did not confirm</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Inpatient or via emergency</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Procedure not required</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Overbooked list</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Date/time change</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>55</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>755</td>
<td>100</td>
</tr>
</tbody>
</table>

3.4.7 Current management of patients on the OWL

The degree to which current management of patients on the OWL meets best practice is difficult to ascertain for two reasons. First, best practice management of patients with end-stage OA (those awaiting surgery) has not been defined in
the literature. Second, data about management of patients on the OWL is
incomplete. Utilisation of conservative treatments by people with end-stage OA is
thought to be low. Management by GPs seems to be the most commonly utilised
option while other options such as physiotherapy or rheumatology appear to be
under-utilised or not used at all.

In a study undertaken at RMH between March and June 2003, 246 people placed
on the OWL were sent a questionnaire about their previous utilisation of
conservative management options for management of their OA. The median
number of GP visits in the month prior to being waitlisted was one (range 0–8).
The median number of visits to an orthopaedic surgeon in the month prior to
being waitlisted was also one (range 0–4), which was to be expected given that
an orthopaedic consultation is required to be waitlisted. The median number of
visits to a physiotherapist, rheumatologist or any other conservative
management option was zero (see Table 5).

Table 5: Frequency of visits to health professionals in the month prior to entry
to the orthopaedic waiting list, RMH, 2003

<table>
<thead>
<tr>
<th>Number of times seen a GP in last month (n = 246)</th>
<th>Number of times seen an orthopaedic surgeon in last month (n = 246)</th>
<th>Number of times seen a rheumatologist in last month (n = 246)</th>
<th>Number of times seen a physiotherapist in last month (n = 246)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median (range) 1.0 (0.0–8.0)</td>
<td>1.0 (0.0–4.0)</td>
<td>0.0 (0.0–4.0)</td>
<td>0.0 (0.0–10.0)</td>
</tr>
</tbody>
</table>

A second questionnaire was administered to the same patients at preadmission
clinic (n = 97). At preadmission (around six weeks prior to surgery), the median
number of visits to a GP in the month prior to attendance at preadmission clinic
remained the same (1; range 0–5), and no other management options had been
utilised (see Table 6).

Table 6: Frequency of visits to health professionals at preadmission, RMH,
2003

<table>
<thead>
<tr>
<th>Number of times seen a GP in past month (n = 97)</th>
<th>Number of times seen an orthopaedic surgeon in past month (n = 97)</th>
<th>Number of times seen a rheumatologist in past month (n = 97)</th>
<th>Number of times seen a physiotherapist in past month (n = 97)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median (range) 1.0 (0.0–5.0)</td>
<td>0.0 (0.0–2.0)</td>
<td>0.0 (0.0–1.0)</td>
<td>0.0 (0.0–8.0)</td>
</tr>
</tbody>
</table>

The reason for lack of utilisation of conservative management options for OA,
such as physiotherapy and rheumatology, is not known but could include:
- lack of knowledge about services by gatekeepers (GPs)
- lack of uptake of services by patients for financial reasons or difficulty
accessing services or competing priorities such as caring responsibilities
- insufficient capacity in community health settings to meet demand.
4.0 Development of a prioritisation tool

Summary
- Central to this project was the development of a method of prioritising patients for JRS.
- The prioritisation tool was developed using modern clinimetric and psychometric techniques with high-level input from relevant clinical and hospital management groups, particularly orthopaedics.
- Concept mapping workshops were undertaken to elicit from surgeons and patients the key issues relevant to priority for surgery. Both the surgeon and patient workshops revealed similar prioritisation issues and were grouped into the following domains: pain; limitations to daily activities; psychosocial health impact; economic impact; recent deterioration; and conservative treatment.
- Guttman items, where a descriptive stem is followed by several defined health states of increasing severity, were generated.
- The construction phase involved mailing a 38-item questionnaire to participants in order to: field test the items in the intended population; generate descriptive data on item performance; and generate data on the similarities and differences of items.
- A range of techniques were employed to select the most parsimonious set of items that would capture the breadth of issues.
- The final tool consists of 11 items and has been named the Multi-attribute Arthritis Prioritisation Tool (MAPT).
- Individual items on the MAPT must be allocated specific weights to reflect what happens in clinical practice and ultimately enable an overall priority score to be obtained. A process known as DCEs was used to determine individual item weights. Ninety-six Victorian orthopaedic surgeons were involved in the DCE process.
- Once the weighting of MAPT items had been determined the MAPT had to be tested for validity, reliability, sensitivity and responsiveness, in order to be of clinical value.
- Construct validity was measured through comparing MAPT scores with other questionnaires used in orthopaedic research. A high correlation was obtained.
- Criterion validity was measured in two ways:
  - through comparing patient MAPT scores with a MAPT completed by the MSC following a clinical assessment, with results revealing a high to very high level of agreement
  - and through comparing the surgeon’s global priority ratings with MAPT scores, with results lending strong support for the MAPT to being able to deliver clinically relevant scores.
- The test-retest reliability was measured with a two-week interval between administrations of the MAPT. Results reveal a very good level of reliability.
- Responsiveness and sensitivity to change were confirmed through comparing MAPT scores before and after surgery and comparing MAPT scores for patients on the OWL with those not on the OWL.
- The results reveal that a valid and reliable prioritisation tool has been developed with the extensive assistance of patients and orthopaedic surgeons.
4.1 The Multi-attribute Arthritis Prioritisation Tool

Central to this project was the development of a method of prioritising patients for JRS. An ideal OWL prioritisation tool would:

- provide accurate information on the urgency for which an individual might require surgery, that is, support ‘fast tracking’ of those most in need
- be able to be applied serially to identify clinically and socially relevant deterioration.

The tool should be highly respected and endorsed by clinical, administrative and government groups. To meet these demands, the construction of the prioritisation tool broadly involved the following steps:

- developing a clear definition of what needed to be measured, including any sub-components
- generating items that covered the ‘universe’ of what needed to be measured
- demonstrating that the items were of high quality
- selecting the minimum number of items that best captured what needed to be measured (producing a draft questionnaire)
- testing the quality of the draft items
- weighting the items in a clinically appropriate manner and generating a priority ‘score’
- validating the final questionnaire.

The tool that was subsequently developed has been called the Multi-attribute Arthritis Prioritisation Tool (MAPT).

4.2 Concept mapping workshops and item generation

In order to determine the key issues relevant to priority for surgery, concept mapping workshops were undertaken with both surgeons and patients. These workshops employed a nominal group approach where a seeding statement was presented to the participants who then individually wrote down their responses to the statement. The seeding statement used for the workshops was:

Thinking as broadly as possible, generate statements about patient issues that should be considered in determining their priority for JRS:

- patient characteristics
- patient context and circumstances.

The language and values of participants were used to derive a graphical representation of all major ideas and their interrelationships. An outline of the methods of these workshops is provided in Appendix 3.

4.2.1 Surgeon concept mapping workshops

Four concept mapping workshops were held with orthopaedic surgeons from RMH, WH, DH and Geelong Hospital (GH) between July and October 2004. Orthopaedic surgeons from GVH did not participate in the formal concept mapping process as there were only three surgeons at that site, making the concept mapping difficult to run. GVH surgeons participated by reviewing and commenting on the output from the workshops at other sites. In particular, they vetted the draft results from the perspective of the rural surgeon.
Surgeons were recruited with the assistance of the head of the orthopaedic department at each site. A total of 32 surgeons participated from RMH (n = 10), WH (n = 4), DH (n = 10), GH (n = 5) and GVH (n = 3).

The workshops raised 25 separate concepts relating to the seeding statement (above) and the 20 most important are listed in Table 7. A summary of the major categories of concepts and their average importance rating is provided in Table 8.

**Table 7: Top 20 concepts from a concept mapping workshop showing breadth of issues raised and average importance rating* of each cluster**

<table>
<thead>
<tr>
<th>Num</th>
<th>Statement</th>
<th>Cluster</th>
<th>Mean*</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Amount of disability a patient has</td>
<td>6a</td>
<td>4.5</td>
</tr>
<tr>
<td>4</td>
<td>Pain level as perceived by patient</td>
<td>5a</td>
<td>4.0</td>
</tr>
<tr>
<td>8</td>
<td>Ability to live independently</td>
<td>5b</td>
<td>4.0</td>
</tr>
<tr>
<td>16</td>
<td>Interference with sleep</td>
<td>5a</td>
<td>4.0</td>
</tr>
<tr>
<td>7</td>
<td>Ability to walk distance</td>
<td>6a</td>
<td>3.8</td>
</tr>
<tr>
<td>9</td>
<td>Basic daily functions limitation and type</td>
<td>5b</td>
<td>3.8</td>
</tr>
<tr>
<td>11</td>
<td>Degree of deformity-progression will lead to worse outcome</td>
<td>3</td>
<td>3.8</td>
</tr>
<tr>
<td>13</td>
<td>Rate of progression of disease process</td>
<td>3</td>
<td>3.8</td>
</tr>
<tr>
<td>2</td>
<td>Effect on ability to work</td>
<td>5b</td>
<td>3.5</td>
</tr>
<tr>
<td>6</td>
<td>Patients ability to do activities they wish to do</td>
<td>5b</td>
<td>3.5</td>
</tr>
<tr>
<td>10</td>
<td>Amount of non-operative management that has been tried</td>
<td>1b</td>
<td>3.5</td>
</tr>
<tr>
<td>19</td>
<td>Impact on others (for example, patient is carer for someone else)</td>
<td>5a</td>
<td>3.5</td>
</tr>
<tr>
<td>21</td>
<td>Analgesic requirements (increasing)</td>
<td>5a</td>
<td>3.5</td>
</tr>
<tr>
<td>22</td>
<td>Impact of comorbidities that may complicate surgery or preclude it</td>
<td>1b</td>
<td>3.5</td>
</tr>
<tr>
<td>23</td>
<td>Other illnesses at risk of worsening due to decreased mobility</td>
<td>3</td>
<td>3.5</td>
</tr>
<tr>
<td>25</td>
<td>Revision surgery and rapidity of deterioration</td>
<td>3</td>
<td>3.5</td>
</tr>
<tr>
<td>1</td>
<td>Age and implications for remaining life</td>
<td>1a</td>
<td>3.3</td>
</tr>
<tr>
<td>14</td>
<td>Judgement of clinical timescale of deterioration</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>20</td>
<td>Financial provider for others</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>12</td>
<td>Severity of disease process on X-ray</td>
<td>4</td>
<td>3.0</td>
</tr>
</tbody>
</table>

* Importance rating: 1 = unimportant, 2 = a little importance, 3 = moderately important, 4 = very important, 5 = essential (highest possible importance)

**Table 8: Result of concept mapping workshops indicating broad prioritisation domains and the importance rating* of each domain**

<table>
<thead>
<tr>
<th>Major category</th>
<th>DH</th>
<th>GH</th>
<th>RMH</th>
<th>WH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>4.6</td>
<td>3.8</td>
<td>4.3</td>
<td>4.3</td>
<td>4.3</td>
</tr>
<tr>
<td>Function</td>
<td>3.6</td>
<td>3.9</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Health system</td>
<td></td>
<td></td>
<td>2.6</td>
<td>2.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Life circumstances</td>
<td>3.5</td>
<td>3.2</td>
<td>2.6</td>
<td>3.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Medical/comorbidities</td>
<td>3.7</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.6</td>
</tr>
<tr>
<td>Pathology</td>
<td>3.6</td>
<td>3.3</td>
<td>3.8</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>2.8</td>
<td>2.9</td>
<td>3.6</td>
<td>3.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Quality of life</td>
<td>3.6</td>
<td>2.9</td>
<td>3.6</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>Surgical risks</td>
<td>3.1</td>
<td></td>
<td>3.1</td>
<td></td>
<td>3.1</td>
</tr>
<tr>
<td>Surgical technique</td>
<td>3.5</td>
<td>4.2</td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2.4</td>
<td>3.0</td>
<td>2.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Importance rating: 1 = unimportant, 2 = a little importance, 3 = moderately important, 4 = very important, 5 = essential (highest possible importance)
4.2.2 Patient concept mapping workshops

Four patient workshops were also held at RMH between February and March 2005. Two groups participated: those patients currently on a waiting list for JRS, and those who had been on a waiting list and had had a joint replaced. Participants were purposefully recruited to balance gender, age and time since being placed on the list. Participants were only recruited if they lived in metropolitan Melbourne. Letters of invitation were sent to participants and written consent was then obtained from those willing to take part.

4.2.3 Analysis of surgeon and patient concept mapping workshops

The patient workshops revealed similar prioritisation issues to those raised by the surgeons. No new domains arose, although there was different emphasis on some domains. The data from the eight workshops were consolidated to six key domains (see Table 9). Issues that were not patient-reported and were technical medical or surgical concepts, such as surgical risk or health system issues (for example, bed availability) were excluded from the list as these were regarded as issues that were independent of a patient’s need for surgery (and prioritisation) or were issues dealt with after individual patient prioritisation had taken place.

Table 9: Consolidated list of prioritisation domains

<table>
<thead>
<tr>
<th>Domain</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pain</td>
</tr>
<tr>
<td>1.1</td>
<td>Sleep disturbance</td>
</tr>
<tr>
<td>1.2</td>
<td>Rest pain</td>
</tr>
<tr>
<td>1.3</td>
<td>Pain related to movement</td>
</tr>
<tr>
<td>2.</td>
<td>Limitations to daily activities</td>
</tr>
<tr>
<td>2.1</td>
<td>Impairment of mobility</td>
</tr>
<tr>
<td>2.2</td>
<td>Ability to self-care</td>
</tr>
<tr>
<td>2.3</td>
<td>Level of domestic support</td>
</tr>
<tr>
<td>2.4</td>
<td>Carer roles</td>
</tr>
<tr>
<td>3.</td>
<td>Psychosocial health impact</td>
</tr>
<tr>
<td>3.1</td>
<td>Psychological effect of disability</td>
</tr>
<tr>
<td>3.2</td>
<td>Social effect of disability</td>
</tr>
<tr>
<td>4.</td>
<td>Economic impact</td>
</tr>
<tr>
<td>4.1</td>
<td>Interference with ability to work</td>
</tr>
<tr>
<td>4.2</td>
<td>Financial provider for others</td>
</tr>
<tr>
<td>5.</td>
<td>Recent deterioration</td>
</tr>
<tr>
<td>6.</td>
<td>Conservative treatment</td>
</tr>
</tbody>
</table>

From the list of consolidated domains, draft questionnaire items were generated. The type of items generated were Guttman items where a descriptive stem was followed by several defined health states of increasing severity. Guttman items were chosen above the more common type of item, Likert items (items with a stem followed by indicators of level of agreement such as strongly, moderately, weakly agree) as it was thought that Guttman items would be less prone to gaming and stoicism.

The domain covering conservative management was included in the MSC assessment and therefore was not included among the patient MAPT items.

Over 50 draft items were generated (see Appendix 4), with careful consideration of the following:

- the wording and concepts patients use (direct statements were taken from concept mapping workshops where possible)
• the way surgeons ask questions and the type of information they need for decision making
• the distance between response options, ensuring it was reasonably evenly spaced
• the response options, ensuring very severe end-stage disease states were included
• the item content of over 50 other questionnaires to assess the range of impacts of arthritis on people.

4.3 Pre-test

The intention of pre-testing potential MAPT items was to identify any ambiguities in the items and to ensure patients were clearly responding to the intended 'messages' of the item.

The 50 draft items were posted to stakeholders (surgeons and health professionals) and structured interviews were undertaken. To reduce patient burden, the 50 items were divided into three shorter questionnaires and cognitive interviews were undertaken with patients in outpatient clinics (see Appendix 5). Telephone interviews using a similar methodology were also undertaken with those patients who attended the concept mapping workshops as well as other patients who were on the OWL. This phase identified minor ambiguities in some questions, which were corrected before the draft items were sent to patients in the construction phase.

4.4 Construction phase

The intention of this phase was to:
• field test the items in the population in which the questionnaire was intended to be used
• generate descriptive data on item performance including
  o missing responses indicating respondents did not understand the item or the content was objectionable
  o the distribution of scores across response options to provide information on floor and ceiling effects (the item was ‘too easy’ or ‘too hard’ to adequately capture the breadth of health states experienced by patients)
• generate data on the similarities and differences of items within domains and across domains to assist with identifying the key items that capture the necessary breadth of prioritisation.

Four different versions of questionnaires were created and randomly sent to participants. The different versions had items sorted in different orders to avoid systematic effects of respondent fatigue (respondents may tire of answering items towards the end of the questionnaire or their answers may be influenced by preceding questions). Thirty-eight items were administered in the following domains:
• sleep (3)
• rest pain (2)
• pain related to movement (2)
• limits on movement (2)
• ability to self-care (5)
• enough support (5)
• carer roles (2)
• psychosocial (5)
• social impact (4)
• economic impact (5)
• deterioration in the last six months (5).

Questionnaires were mailed to 1,061 participants from five hospitals: DH (n = 295), GH (n = 131), RMH (n = 133, including participants on the RMH rheumatology database n = 124), GVH (n = 200) and WH (n = 300). Surveys were completed and returned by 606 individuals (57.1 per cent response rate: DH 62.4 per cent; GH 80.9 per cent; RMH 41.4 per cent; GVH 56.5 per cent and WH 48.7 per cent). Two questionnaires were returned without any record of the hospital.

Participants
The demographics of the construction sample are shown in Table 10. Ages ranged from 32 to 100 years (mean 68.3; SD 10.5). Participants comprised 325 people with hip conditions and 462 people with knee conditions who reported having pain, aching, stiffness or swelling in the affected joint in the previous three months.

Table 10: Demographic details of the construction phase study sample

<table>
<thead>
<tr>
<th></th>
<th>Total (n = 606)</th>
<th>DH (n = 184)</th>
<th>GH (n = 106)</th>
<th>RMH (n = 55)</th>
<th>GVH (n = 113)</th>
<th>WH (n = 146)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>≤ 49</td>
<td>31</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>50–59</td>
<td>93</td>
<td>15</td>
<td>20</td>
<td>11</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>60–69</td>
<td>179</td>
<td>30</td>
<td>54</td>
<td>29</td>
<td>31</td>
<td>29</td>
</tr>
<tr>
<td>70–79</td>
<td>225</td>
<td>37</td>
<td>78</td>
<td>43</td>
<td>37</td>
<td>35</td>
</tr>
<tr>
<td>≥ 80</td>
<td>75</td>
<td>12</td>
<td>22</td>
<td>12</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>345</td>
<td>57</td>
<td>108</td>
<td>59</td>
<td>62</td>
<td>58</td>
</tr>
<tr>
<td>Male</td>
<td>255</td>
<td>42</td>
<td>75</td>
<td>41</td>
<td>42</td>
<td>40</td>
</tr>
<tr>
<td>Missing</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary or less</td>
<td>131</td>
<td>22</td>
<td>34</td>
<td>18</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>7–10</td>
<td>262</td>
<td>43</td>
<td>79</td>
<td>43</td>
<td>52</td>
<td>49</td>
</tr>
<tr>
<td>11–12</td>
<td>99</td>
<td>16</td>
<td>38</td>
<td>21</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Trade/TAFE</td>
<td>56</td>
<td>9</td>
<td>19</td>
<td>10</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>University</td>
<td>29</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Missing</td>
<td>29</td>
<td>5</td>
<td>9</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Country of birth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>338</td>
<td>56</td>
<td>80</td>
<td>44</td>
<td>77</td>
<td>73</td>
</tr>
<tr>
<td>Other</td>
<td>260</td>
<td>43</td>
<td>100</td>
<td>54</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Missing</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Language spoken</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>504</td>
<td>83</td>
<td>144</td>
<td>78</td>
<td>99</td>
<td>93</td>
</tr>
<tr>
<td>Other</td>
<td>93</td>
<td>15</td>
<td>36</td>
<td>20</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Missing</td>
<td>9</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: 2 cases no record of hospital
Item selection
A range of state-of-the-art techniques were employed to select the most parsimonious set of items that captured the breadth of issues (see Appendix 6). Two additional experts in question design, Professor Peter Fayers¹ and Dr Gerald Elsworth, RMIT University,² were engaged during this phase.

The statistical analysis revealed that the great majority of items performed very well, a reflection of the integrity of item generation. Some respondent confusion was apparent regarding the economic and carer items and so these items were reviewed and amended. The final MAPT items represented the minimal number of high-quality items that best reflected the breadth of issues required by surgeons to generate a priority ranking.

The final number of items was 11 and the final MAPT is shown in Appendix 7.

4.5 Weighting MAPT items

Some of the items on the MAPT may be considered to be more important than others. Therefore individual items were given a specific weight so they reflected what happens in clinical practice and enabled an overall MAPT score to be obtained. A process known as DCEs was used to determine the relative importance of individual MAPT items. DCEs are based on the notion that any good or service can be described by its characteristics (or attributes) and the extent to which an individual values a good or service depends upon the nature and levels of these characteristics.⁴⁷ The technique was originally developed in marketing research in the early 1970s and has since been widely used in transport research. DCEs are now increasingly being applied to health and healthcare.⁴⁸

DCEs can be used to show how people are willing to trade between attributes and are useful when deciding on the optimal way to provide a service within limited resources.⁴⁹ Individuals are presented with choices of scenarios described in terms of attributes and associated levels. For each choice they are asked to choose their preferred scenario.

Response data are modelled within a benefit (or satisfaction) function that:
- provides information on whether or not the given attributes are important
- the relative importance of attributes
- the rate at which individuals are willing to trade between attributes
- overall benefit scores for alternative scenarios.⁴⁷

Methods
Design
The MAPT has 11 attributes (items), with up to six levels (response options) in each. In designing a DCE, 11 attributes is usually considered to be too many for any one individual to trade off. Non-compensatory decision rules are more likely to be used as the number of attributes increase,⁵⁰ which limits the interpretation of the results in terms of utilities. The MAPT was used to construct three different

¹ Peter Fayers, PhD, Professor of Medical Statistics, University of Aberdeen, UK, President of the International Society for the Quality of Life Research (ISOQOL).
² Gerald Elsworth, PhD, Principal Researcher, CIRCLE: Collaborative Institute for Research, Consulting and Learning in Evaluation, RMIT University, Australia
experimental designs. Five attributes (out of the 11) were used in each design with two attributes repeated across the three designs to provide anchor states (care for dependents and enjoyment of life). Each design also contained one of the three pain attributes. Appendix 8 provides further details of the DCE design. Examples of a discrete choice from each of the three designs are provided in Table 11.

### Table 11: Example scenarios from each of the three designs

<table>
<thead>
<tr>
<th>Design 1</th>
<th>Patient A</th>
<th>Patient B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I do not</strong> look after, or experience <strong>no difficulty</strong> looking after, dependents.</td>
<td><strong>It is moderately</strong> difficult looking after dependents.</td>
<td><strong>I have pain that stops me going to sleep most of the time.</strong></td>
</tr>
<tr>
<td>I have pain that stops me going to sleep <strong>moderately</strong> difficult looking after dependents.</td>
<td><strong>It makes it</strong> <strong>moderately</strong> or <strong>very</strong> difficult for me to enjoy my life.</td>
<td><strong>I do not get enough help with looking after myself.</strong></td>
</tr>
<tr>
<td>It does not affect, or causes <strong>little</strong> affect to, my enjoyment of life.</td>
<td><strong>It makes it</strong> <strong>moderately</strong> or <strong>very</strong> difficult for me to enjoy my life.</td>
<td>It makes it <strong>moderately</strong> difficult for my household to manage financially.</td>
</tr>
<tr>
<td>I do not get enough help with looking after myself.</td>
<td><strong>I do not get enough help with looking after myself.</strong></td>
<td><strong>It makes it</strong> <strong>moderately</strong> difficult for me to enjoy my life.</td>
</tr>
<tr>
<td>It makes it <strong>moderately</strong> difficult for my household to manage financially.</td>
<td><strong>It makes it</strong> <strong>moderately</strong> or <strong>very</strong> difficult for me to enjoy my life.</td>
<td><strong>I do not get enough help with looking after myself.</strong></td>
</tr>
<tr>
<td><strong>Higher priority:</strong> Patient A</td>
<td><strong>Higher priority:</strong> Patient A</td>
<td><strong>Higher priority:</strong> Patient A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design 2</th>
<th>Patient A</th>
<th>Patient B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>It is very</strong> difficult looking after dependents.</td>
<td><strong>It is very</strong> difficult looking after dependents.</td>
<td><strong>I have severe pain when resting.</strong></td>
</tr>
<tr>
<td>I have pain that stops me going to sleep <strong>extremely</strong> difficult looking after dependents.</td>
<td><strong>It makes it</strong> <strong>moderately</strong> or <strong>very</strong> difficult for me to enjoy my life.</td>
<td>It makes it <strong>moderately</strong> or <strong>very</strong> difficult for me to enjoy my life.</td>
</tr>
<tr>
<td>It makes it <strong>moderately</strong> or <strong>very</strong> difficult for me to enjoy my life.</td>
<td><strong>I am in paid work and it is very difficult to continue.</strong></td>
<td>I am in paid work and it is <strong>very</strong> difficult to continue.</td>
</tr>
<tr>
<td>I have been in paid work in the past six months, however, have had to <strong>stop</strong> working.</td>
<td><strong>I can only walk for a short time before pain stops me.</strong></td>
<td><strong>I can only walk for a short time before pain stops me.</strong></td>
</tr>
<tr>
<td>I can look after myself.</td>
<td><strong>I can only walk for a short time before pain stops me.</strong></td>
<td><strong>It makes it moderately difficult looking after dependents.</strong></td>
</tr>
<tr>
<td><strong>Higher priority:</strong> Patient A</td>
<td><strong>Higher priority:</strong> Patient A</td>
<td><strong>Higher priority:</strong> Patient A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design 3</th>
<th>Patient A</th>
<th>Patient B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I am unable</strong> to look after dependents.</td>
<td><strong>It is moderately</strong> difficult looking after dependents.</td>
<td><strong>I can only walk for a short time before pain stops me.</strong></td>
</tr>
<tr>
<td>I only walk for a <strong>short time</strong> before pain stops me.</td>
<td><strong>It makes it moderately or very difficult for me to enjoy my life.</strong></td>
<td><strong>All of the time it causes difficulties with my relationships with people close to me.</strong></td>
</tr>
<tr>
<td>It makes it <strong>extremely</strong> difficult for me to enjoy my life.</td>
<td><strong>All of the time it causes difficulties with my relationships with people close to me.</strong></td>
<td><strong>Overall, my problem is very much worse compared with six months ago.</strong></td>
</tr>
<tr>
<td>It does not cause, or <strong>sometimes</strong> causes, difficulties with my relationships with people close to me.</td>
<td><strong>Overall, my problem is very much worse compared with six months ago.</strong></td>
<td></td>
</tr>
<tr>
<td>Overall, my problem is a <strong>little</strong> worse compared with six months ago.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Higher priority:</strong> Patient A</td>
<td><strong>Higher priority:</strong> Patient A</td>
<td><strong>Higher priority:</strong> Patient A</td>
</tr>
</tbody>
</table>
Application
The DCEs were presented to orthopaedic surgeons at the annual general meeting (AGM) of the Victorian Division of the Australian Orthopaedic Association (AOA) in November 2005. A brief presentation was made regarding the background of the OWL project, the concept of DCEs and the task at hand. The following instructions were given:

<table>
<thead>
<tr>
<th>Imagine you have two patients, A and B, who may require joint replacement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each patient has the same:</td>
</tr>
<tr>
<td>• age</td>
</tr>
<tr>
<td>• gender</td>
</tr>
<tr>
<td>• comorbidities</td>
</tr>
<tr>
<td>• technical challenges/ease regarding surgery</td>
</tr>
<tr>
<td>• use of conservative treatments.</td>
</tr>
<tr>
<td>You have all the clinical information available and you are asked to decide which patient should have higher priority for joint replacement given the characteristics presented, which are directly attributable to the patient’s hip or knee disease. Apart from those presented, all other characteristics between the patients are the same.</td>
</tr>
<tr>
<td>Please carefully read through the characteristics of the two patients before answering.</td>
</tr>
</tbody>
</table>

As only 10 minutes was available in which respondents could complete the discrete choices, the three designs were distributed evenly among the group. As such, each respondent was requested to complete only one of the three designs (15 discrete choices) and for each, asked which patient they would assign higher priority for JRS.

In order to ensure maximum participation from Victorian orthopaedic surgeons, a mailout was conducted through the AOA. This was designed to obtain participation from surgeons who were not at the AGM. A total of 150 letters were sent, outlining the background of the OWL project, the concept of DCEs and the task at hand. The letter highlighted that surgeons who were at the AGM were not required to participate. As this method enabled more time for the completion of the discrete choices, surgeons were mailed all three designs, that is, all 45 discrete choices. They were given the opportunity to complete one, two, or all three designs, depending on time available to them.

Analysis and prediction of utility scores
Appendix 8 provides a description of the methods for DCE analysis and prediction of utility scores.

Results
Sixty-five orthopaedic consultants and registrars participated in the DCE task at the AOA meeting and completed one of the three designs. Thirty-one DCEs were returned from the mailout and all were completed by consultants. All three designs were completed by 30 consultants, with the remaining one completing one design. A total of 96 Victorian orthopaedic consultants and registrars participated in the DCE task. Table 12 outlines the characteristics of respondents and number of discrete choices obtained from the three designs.
There were four incomplete discrete choices received from design 1, two from design 2, and four from design 3. These were still included in the study as this was accommodated in the analysis. Appendix 8 provides for a comprehensive overview of the results. Following the analysis of results, each of the MAPT items was allocated a weight to be incorporated into the algorithm to generate an individual’s MAPT score.

### 4.6 MAPT validation

An important phase in the development of the new assessment tool was the evaluation of its measurement properties. A number of properties needed to be addressed if the instrument was to be of clinical value. These include the following.

#### Validity

This provides evidence that a tool measures what it was designed to measure. The three main types of validity are content validity, criterion validity and construct validity:

- **Content** validity is concerned with the extent to which the individual items of a tool address the area(s) of theoretical interest.
- **Construct** validity has two main forms
  - **Convergent** validity describes the extent to which a new measure agrees with existing measures.
  - **Discriminant** validity indicates that the new tool measures different constructs when compared with other instruments.
- **Criterion** validity evaluates how the new measure compares to external criteria such as diagnosis or other ‘gold standards’.

#### Reliability

This refers to the stability of the new measure over time, in the absence of factors that may be reasonably expected to affect the measure (such as surgery). Substantial variability between initial and subsequent measures may indicate that the instrument is unreliable.

#### Sensitivity

This describes the ability of an instrument to detect differences between groups, for example, the identification of people with significant hip or knee dysfunction compared with those without, or those on or not on a waiting list for JRS.

#### Responsiveness

This refers to the ability of a questionnaire to detect change over time.
Methods
The main validation procedures undertaken were the administration of the MAPT with internationally recognised arthritis questionnaires (construct validity), comparison of patient MAPT scores with MSC-assessed MAPT scores and surgeons’ global rating (criterion validity), assessment of the stability of questionnaire when administered over two time points (reliability), and differences between groups and over time (sensitivity and responsiveness).

Content validity is assumed as a result of the extensive clinical input throughout the design of items and dimensions and rigorous clinimetric techniques used in selection of the final items.

Sample
In total, 1,790 questionnaires were mailed to participants from six hospitals: Austin Hospital (AH, n = 196), DH (n = 342), GH (n = 120), RMH (n = 538, including participants on the RMH rheumatology database n = 118), GVH (n = 219), WH (n = 375). A total of 954 individuals completed and returned surveys (53.6 per cent response rate). The response rates for each site were: AH, 64.8 per cent; DH, 51.2 per cent; GH, 73.3 per cent; RMH, 52.4 per cent; GVH, 49.3 per cent; and WH, 48.0 per cent. There was no follow-up. A series of statistical comparisons were made of those who did and did not return a questionnaire (based on age, gender and socioeconomic status from SEIFA codes (Socio-Economic Index for Areas) using postcode data). There were no substantial differences between these groups so the results can be regarded as reasonably representative of people on OWLs at those hospitals.

To reduce respondent burden (as there were seven questionnaires plus a demographics section), three different questionnaire pack versions were created. All included the MAPT and EQ-5D and one to three other questionnaires (see Table 13). The questionnaires used are outlined in Table 14. The versions were randomly allocated across sites which enabled a representative sample to be collected.

<table>
<thead>
<tr>
<th>Questionnaire version</th>
<th>Sent N</th>
<th>Received N</th>
<th>Response rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version 1: MAPT; EQ-5D; Oxford Hip; Oxford Knee; HADS</td>
<td>600</td>
<td>333</td>
<td>55.5</td>
</tr>
<tr>
<td>Version 2: MAPT; EQ-5D; WOMAC; AQoL</td>
<td>578</td>
<td>302</td>
<td>52.2</td>
</tr>
<tr>
<td>Version 3: MAPT; EQ-5D; SF-36</td>
<td>580</td>
<td>319</td>
<td>55.0</td>
</tr>
<tr>
<td>Total</td>
<td>1,758*</td>
<td>954</td>
<td></td>
</tr>
</tbody>
</table>

Note: *n = 32 excluding GH because there is no record of which version was sent.
### Table 14: Description of measures used in the validation (construct validity) of the MAPT

<table>
<thead>
<tr>
<th>Type of measure</th>
<th>Name of measure</th>
<th>Description of measure</th>
</tr>
</thead>
</table>
| **Disease-specific arthritis** | Oxford Hip and Oxford Knee Scales | • Designed to measure the levels of pain and function in patients with hip and knee problems  
• Consist of 12 questions measured on a five-point scale  
• Provide a score between 12 and 60. High scores indicate higher pain and disability  
• Widely used, particularly as outcome measures for total joint replacement\(^{51, 52}\) |
| | Western Ontario McMaster Universities Osteoarthritis Index (WOMAC\(^{TM}\)) | • 24-item instrument for the evaluation of patients who have OA  
• Three subscales: pain, stiffness and physical functioning, as well as a global score  
• Scores standardised to provide a scale from 0 (no disease) to 100 (worst disease)  
• Widely used and validated\(^{53}\) |
| **Health-related quality of life** | Assessment of Quality of Life (AQoL) | • Generic 12-item health-related quality of life (HRQoL) utility instrument  
• Incorporates four dimensions: independent living, social relationships, physical senses, and psychological wellbeing  
• Each subscale provides weighted scores between 0.0 (death) and 1.0 (full health)  
• Scores combined to form an overall utility score ranging from −0.04 (worst possible HRQoL state) through 0.00 (equivalent to death) to 1.00 (full HRQoL)  
• Widely used for general healthcare evaluation, including cost-utility evaluation\(^{54–58}\) |
| | EuroQol (EQ-5D) | • Simple general-purpose instrument  
• Comprises five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression  
• Each dimension scored on a three-category response scale  
• Widely used for a wide range of conditions\(^{60–61}\) |
| **Health-status measure** | SF-36V2 | • Generic health-status instrument  
• Consists of eight subscales: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional and mental health and two summary composite scores: mental component score and physical component score  
• Subscale scores weighted, summed and transformed to provide a 0–100 scale, with high scores indicating better function\(^{59}\) |
| **Anxiety and Depression** | Hospital Anxiety and Depression Scale (HADS) | • 14-item instrument to measure the psychological signs of anxiety and depression  
• Anxiety and depression subscales each comprise seven items measured on a four-point Likert scale. Subscale scores range from 0 to 21, with higher scores indicating states associated with anxiety or depression  
• Widely used for a wide range of conditions\(^{60, 61}\) |

### Results

**Respondents**

Ages ranged from 29 to 94 years (mean 68.2; SD 10.9). Participants comprised 614 people who reported being on a waiting list for JRS (mean age 68.1; SD 10.6) and 280 people who reported they were not a waiting list for surgery (mean age 67.6; SD 11.7). Self-reported status and demographics are shown in Table 15 and Table 16.
Table 15: Self-reported status of respondents

<table>
<thead>
<tr>
<th>Waiting list for JRS (n = 954)</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>On waiting list</td>
<td>614</td>
<td>64.4</td>
</tr>
<tr>
<td>Not on waiting list</td>
<td>280</td>
<td>29.3</td>
</tr>
<tr>
<td>Don’t know</td>
<td>19</td>
<td>2.0</td>
</tr>
<tr>
<td>Missing</td>
<td>41</td>
<td>4.3</td>
</tr>
<tr>
<td>On waiting list for surgery on (n = 680):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip</td>
<td>203</td>
<td>29.9</td>
</tr>
<tr>
<td>Knee</td>
<td>325</td>
<td>47.8</td>
</tr>
<tr>
<td>Both hips</td>
<td>16</td>
<td>2.4</td>
</tr>
<tr>
<td>Both knees</td>
<td>56</td>
<td>8.2</td>
</tr>
<tr>
<td>Both hip and knee</td>
<td>7</td>
<td>1.0</td>
</tr>
<tr>
<td>Don’t know</td>
<td>3</td>
<td>0.4</td>
</tr>
<tr>
<td>Missing</td>
<td>70</td>
<td>10.3</td>
</tr>
</tbody>
</table>

Table 16: Demographic details of the validation study sample

<table>
<thead>
<tr>
<th></th>
<th>Total (n = 954)</th>
<th>AH (n = 127)</th>
<th>DH (n = 175)</th>
<th>GH (n = 88)</th>
<th>RMH (n = 282)</th>
<th>GVH (n = 103)</th>
<th>WH (n = 179)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N   %</td>
<td>N   %</td>
<td>N   %</td>
<td>N   %</td>
<td>N   %</td>
<td>N   %</td>
<td>N   %</td>
</tr>
<tr>
<td>Age group (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 49</td>
<td>64</td>
<td>7%</td>
<td>7</td>
<td>7%</td>
<td>6</td>
<td>5%</td>
<td>5</td>
</tr>
<tr>
<td>50–59</td>
<td>129</td>
<td>13%</td>
<td>12</td>
<td>12%</td>
<td>9</td>
<td>7%</td>
<td>9</td>
</tr>
<tr>
<td>60–69</td>
<td>269</td>
<td>28%</td>
<td>28</td>
<td>22%</td>
<td>29</td>
<td>24%</td>
<td>26</td>
</tr>
<tr>
<td>70–79</td>
<td>368</td>
<td>39%</td>
<td>39</td>
<td>30%</td>
<td>47</td>
<td>38%</td>
<td>42</td>
</tr>
<tr>
<td>≥ 80</td>
<td>123</td>
<td>13%</td>
<td>12</td>
<td>9%</td>
<td>12</td>
<td>11%</td>
<td>10</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>565</td>
<td>59%</td>
<td>90</td>
<td>71%</td>
<td>62</td>
<td>57%</td>
<td>68</td>
</tr>
<tr>
<td>Male</td>
<td>387</td>
<td>41%</td>
<td>36</td>
<td>29%</td>
<td>44</td>
<td>38%</td>
<td>33</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary or less</td>
<td>209</td>
<td>22%</td>
<td>23</td>
<td>18%</td>
<td>24</td>
<td>17%</td>
<td>18</td>
</tr>
<tr>
<td>7–10</td>
<td>378</td>
<td>40%</td>
<td>49</td>
<td>37%</td>
<td>39</td>
<td>30%</td>
<td>44</td>
</tr>
<tr>
<td>11–12</td>
<td>158</td>
<td>17%</td>
<td>17</td>
<td>13%</td>
<td>20</td>
<td>16%</td>
<td>26</td>
</tr>
<tr>
<td>Trade/TAFE</td>
<td>108</td>
<td>11%</td>
<td>18</td>
<td>14%</td>
<td>14</td>
<td>11%</td>
<td>16</td>
</tr>
<tr>
<td>University</td>
<td>57</td>
<td>6%</td>
<td>7</td>
<td>6%</td>
<td>7</td>
<td>6%</td>
<td>4</td>
</tr>
<tr>
<td>Missing</td>
<td>44</td>
<td>4%</td>
<td>3</td>
<td>2%</td>
<td>2</td>
<td>1%</td>
<td>12</td>
</tr>
<tr>
<td>Country of birth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>562</td>
<td>59%</td>
<td>90</td>
<td>71%</td>
<td>82</td>
<td>66%</td>
<td>78</td>
</tr>
<tr>
<td>Other</td>
<td>374</td>
<td>39%</td>
<td>36</td>
<td>28%</td>
<td>28</td>
<td>22%</td>
<td>21</td>
</tr>
<tr>
<td>Missing</td>
<td>18</td>
<td>2%</td>
<td>1</td>
<td>1%</td>
<td>1</td>
<td>1%</td>
<td>7</td>
</tr>
<tr>
<td>Language spoken</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Distribution of patient responses to items

For those participants on OWLs (being the target population for the questionnaire), frequent lowest possible scores were reported by 57 per cent on the self-care item (item 4), 75 per cent on the enough help item (item 5), 39 per cent on the relationships item (item 7), 56 per cent on the financial item (item 8), 85 per cent on the work item (item 9), and 77 per cent on the carer item (item 10). Frequent highest possible scores were reported by 39 per cent of participants on the condition change item (item 11). These results indicate that a wide range of 'item difficulty' is present among the items, which is critical when attempting to construct a scale that spreads people across the range of health states. When the total MAPT score (0 lowest priority and 100 highest priority) was considered, only 6.4 per cent of patients reported scores below five units, and only 6.5 per cent of patients scored above 95 units, which indicates nil floor and ceiling effects that may compromise the measurement properties of the MAPT.

The items also performed well for the entire sample, that is, people on an OWL and those people with hip or knee disease who were not on an OWL (rheumatology outpatients or those who had had surgery) (see Table 17).

Table 17: Response option frequency for each MAPT item for entire sample (people on and not on an OWL)*

<table>
<thead>
<tr>
<th>MAPT Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pain with rest</td>
<td>248</td>
<td>26</td>
<td>353</td>
<td>37</td>
<td>222</td>
<td>23</td>
<td>74</td>
</tr>
<tr>
<td>2. Pain and sleep</td>
<td>283</td>
<td>30</td>
<td>269</td>
<td>28</td>
<td>209</td>
<td>22</td>
<td>129</td>
</tr>
<tr>
<td>3. Walking pain</td>
<td>133</td>
<td>14</td>
<td>217</td>
<td>23</td>
<td>342</td>
<td>36</td>
<td>224</td>
</tr>
<tr>
<td>4. Self-care</td>
<td>598</td>
<td>63</td>
<td>203</td>
<td>21</td>
<td>92</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>5. Enough help</td>
<td>749</td>
<td>79</td>
<td>85</td>
<td>9</td>
<td>41</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>6. Enjoyment of life</td>
<td>207</td>
<td>22</td>
<td>272</td>
<td>28</td>
<td>217</td>
<td>23</td>
<td>155</td>
</tr>
<tr>
<td>7. Relationships</td>
<td>436</td>
<td>46</td>
<td>228</td>
<td>24</td>
<td>129</td>
<td>14</td>
<td>81</td>
</tr>
<tr>
<td>8. Financial diff.</td>
<td>576</td>
<td>60</td>
<td>139</td>
<td>15</td>
<td>122</td>
<td>13</td>
<td>77</td>
</tr>
<tr>
<td>9. Paid work</td>
<td>792</td>
<td>83</td>
<td>36</td>
<td>4</td>
<td>44</td>
<td>5</td>
<td>31</td>
</tr>
<tr>
<td>10. Carer role</td>
<td>750</td>
<td>79</td>
<td>48</td>
<td>5</td>
<td>76</td>
<td>8</td>
<td>38</td>
</tr>
<tr>
<td>11. Change</td>
<td>174</td>
<td>18</td>
<td>155</td>
<td>16</td>
<td>165</td>
<td>18</td>
<td>169</td>
</tr>
</tbody>
</table>

* Refer to the MAPT in Appendix 7 for a description of the response options

Validity

Construct validity

A critical indicator of the validity of a questionnaire is its association with other established and validated questionnaires. Table 18 and Table 19 show that the MAPT is highly correlated with like scales. A correlation of 0.6 and above indicates that the two scales are measuring similar concepts above 0.8 indicates that the two scales are very likely to measuring the same concept, and above 0.9 indicates that the scales are probably measuring precisely the same concept.

The correlation between the MAPT and arthritis-specific questionnaires is remarkably high, given the small number of MAPT items and range of issues captured by the MAPT (see Table 18). The correlations between the MAPT and
other questionnaires also indicate that the MAPT captures the important dimension of quality of life, anxiety, depression and general health status (see Table 19).

**Table 18: Correlation* between the MAPT and arthritis-specific questionnaires**

<table>
<thead>
<tr>
<th></th>
<th>MAPT Whole sample</th>
<th>MAPT Hips only</th>
<th>MAPT Knees only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxford Hip</td>
<td>–</td>
<td>0.80</td>
<td>–</td>
</tr>
<tr>
<td>Oxford Knee</td>
<td>–</td>
<td>–</td>
<td>0.75</td>
</tr>
<tr>
<td>WOMAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>0.75</td>
<td>0.87</td>
<td>0.62</td>
</tr>
<tr>
<td>Stiffness</td>
<td>0.66</td>
<td>0.70</td>
<td>0.68</td>
</tr>
<tr>
<td>Physical function</td>
<td>0.75</td>
<td>0.81</td>
<td>0.88</td>
</tr>
<tr>
<td>WOMAC total</td>
<td>0.78</td>
<td>0.84</td>
<td>0.92</td>
</tr>
</tbody>
</table>

* Pearson’s correlation coefficient

**Table 19: Correlation* between the MAPT and Quality of life and Health status questionnaires**

<table>
<thead>
<tr>
<th></th>
<th>MAPT Whole sample</th>
<th>MAPT Hips</th>
<th>MAPT Knees</th>
</tr>
</thead>
<tbody>
<tr>
<td>AQoL Independent living</td>
<td>–0.57</td>
<td>–0.56</td>
<td>–0.42</td>
</tr>
<tr>
<td>Social relationships</td>
<td>–0.47</td>
<td>–0.48</td>
<td>–0.41</td>
</tr>
<tr>
<td>Physical senses</td>
<td>–0.13</td>
<td>–0.07</td>
<td>–0.10</td>
</tr>
<tr>
<td>Psychological wellbeing</td>
<td>–0.75</td>
<td>–0.69</td>
<td>–0.66</td>
</tr>
<tr>
<td>AQoL total</td>
<td>–0.71</td>
<td>–0.76</td>
<td>–0.61</td>
</tr>
<tr>
<td>EQ-5D (Euroqol)</td>
<td>–0.77</td>
<td>–0.78</td>
<td>–0.74</td>
</tr>
<tr>
<td>HADS Depression</td>
<td>0.62</td>
<td>0.61</td>
<td>0.56</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.58</td>
<td>0.59</td>
<td>0.52</td>
</tr>
<tr>
<td>SF-36 Physical function</td>
<td>–0.57</td>
<td>–0.59</td>
<td>–0.64</td>
</tr>
<tr>
<td>Role physical</td>
<td>–0.59</td>
<td>–0.48</td>
<td>–0.61</td>
</tr>
<tr>
<td>Bodily pain</td>
<td>–0.36</td>
<td>–0.26</td>
<td>–0.27</td>
</tr>
<tr>
<td>General health</td>
<td>–0.32</td>
<td>–0.24</td>
<td>–0.40</td>
</tr>
<tr>
<td>Vitality</td>
<td>–0.50</td>
<td>–0.48</td>
<td>–0.47</td>
</tr>
<tr>
<td>Social function</td>
<td>–0.60</td>
<td>–0.62</td>
<td>–0.62</td>
</tr>
<tr>
<td>Role emotional</td>
<td>–0.54</td>
<td>–0.41</td>
<td>–0.48</td>
</tr>
<tr>
<td>Mental health</td>
<td>–0.44</td>
<td>–0.43</td>
<td>–0.41</td>
</tr>
<tr>
<td>Physical component summary</td>
<td>–0.46</td>
<td>–0.33</td>
<td>–0.49</td>
</tr>
<tr>
<td>Mental component summary</td>
<td>–0.51</td>
<td>–0.51</td>
<td>–0.52</td>
</tr>
</tbody>
</table>

* Pearson’s correlation coefficient

**Criterion validity: Comparison of patient MAPT and MSC-assessed MAPT**

When participants attended the MSC clinic (see section 6) they completed a MAPT. An MSC completed a structured clinical interview followed by the completion of their own MAPT in which they were blinded to the participant score. Figure 3 shows the association between the two scores and indicates high agreement. The single measures intraclass correlation coefficient (ICC) was also high (0.740, p < 0.001). Potential reasons for the ‘non-perfect relationship’ have been explored through structured notes made by the MSC after the patient was assessed. For the participants where the scores were most discordant (worst 20 pairs, that is, people in the upper left and lower right quadrants of Figure 3, two
discrepancies (five per cent) could be related to gaming and two (five per cent) were attributed to stoicism. Another seven (35 per cent) could be attributed to the MSC scoring differently (usually less severe) on MAPT items that were moderately to highly weighted, which resulted in a substantial deviation between the patient and MSC total MAPT scores.

**Figure 3: Scatter plot of patient MAPT vs MSC assessed MAPT showing deviations between patients’ scores and coordinators scores**

![Scatter plot](image)

**Criterion validity: Comparison of patient MAPT and surgeon global rating**

An additional form of criterion validity was performed comparing the surgeon’s global rating of priority for surgery with the MAPT. Figure 4 shows the association between the surgeon ranking, based on a 10-point visual analogue scale, and the patient MAPT. The correlation was 0.52 and there was only one outlier.

While the graph demonstrates a high concordance, the two scales have some different properties. The surgeons rarely rated a person requiring surgery in the bottom 50 per cent of the scale (only one case observed); however, a clear pattern of increasing surgeon ranking versus increasing MAPT score is observed in the attenuated scale. These results lend strong support for the MAPT being able to deliver clinically relevant scores and to place patients widely across the priority continuum.
Reliability

Internal consistency reliability
The internal consistency of the MAPT was high. For the 11 items in the entire sample (n = 854), Cronbach’s alpha coefficient was 0.87.

Test-retest reliability
The test-retest reliability of the MAPT was evaluated in a sub-sample of participants on the OWL at the AH (n = 80, 63 per cent response rate). Participants completed the MAPT on two occasions with a two-week interval between administrations (mean 14.9 days). The single measure ICC was 0.75 (95 per cent confidence interval 0.63 to 0.83, p < 0.001) indicating very good test-retest reliability. The test-retest reliability for each item was moderate to excellent (ICC range 0.49 to 0.86).

Overall, the MAPT has very good reliability. Reliability is not expected to be extremely high (ICC > 0.9) as arthritis (the most common reason for requiring a joint replacement) is a condition that fluctuates from week to week for many people.

Sensitivity
Figure 5 shows the distribution of MAPT scores for participants on or not on the OWL, which clearly shows those not on the OWL have a much higher probability of having very low MAPT scores (p < 0.001), as expected.
The MAPT is also sensitive to time since surgery. Table 20 shows a dramatic decline in MAPT scores for those people currently on the OWL, and those people who recently had surgery. This clearly reflects the known rapid improvement in their condition (hence reducing priority for surgery) that occurs in the months following surgery.

These data indicate that the mean MAPT score changes from 45.53 to 6.80, which is a 38.73 change (equivalent to about a 39 per cent change across the scale). This suggests that the MAPT is very sensitive to change when compared with other questionnaires. Previous studies of people before and after surgery using questionnaires such as the AQoL or WOMAC demonstrate change scores of 20 per cent or so of scale range.61, 62

<table>
<thead>
<tr>
<th>Weeks since surgery</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently on OWL and not had surgery in the past two years</td>
<td>460</td>
<td>45.53</td>
<td>30.37</td>
</tr>
<tr>
<td>1–12</td>
<td>54</td>
<td>21.79</td>
<td>27.48</td>
</tr>
<tr>
<td>13–24</td>
<td>32</td>
<td>11.81</td>
<td>22.26</td>
</tr>
<tr>
<td>25–104</td>
<td>118</td>
<td>6.80</td>
<td>15.44</td>
</tr>
</tbody>
</table>
Responsiveness: Change over time

For 140 participants, baseline and three-month follow-up MAPT data were available. The initial patient mean score was 41.55 (SD 27.57) and the follow-up mean score was 40.78 (SD 29.61); that is, no difference between the time points ($t(139) = 0.404, \text{NS}$). A similar result was found for the coordinator MAPTs. This is a reassuring result as it is known that a patient’s quality of life deteriorates while waiting. In the RMH cohort study patients’ AQoL scores declined by 0.04 utility units while waiting, which is regarded as clinically significant. A larger sample would be required to detect such small changes.

During the survey, 14 participant before and after surgery MAPT results ($n = 14$) were available: pre-surgery mean score was 42.98 (SD 26.53) and post-surgery mean score was 26.12 (SD 33.29), demonstrating a 16.85 improvement in MAPT scores ($t(13) = 2.47, p < 0.05$). The result is reassuring as surgery is known to result in large changes and the MAPT was able to detect this change and it was statistically significant despite the very small sample size.
5.0 Potential uses of the prioritisation tool

Summary
- The main purpose of the MAPT is to enable evidence-based prioritisation of a wide range of patients requiring JRS; however, other applications are possible including:
  - the specification of a range of MAPT scores that indicate the need for JRS, which could contribute to relative medical decision making with respect to indications for JRS
  - the use of the MAPT in general practice and by other referring clinicians to identify patients that have high or low probability of requiring JRS
  - the use of the MAPT to prioritise and triage referral to orthopaedic outpatient clinics
  - regular periodic completion of the MAPT by patients while on the OWL could provide a simple method of identifying deterioration and facilitating timely surgery and also identifying patients that are no longer suitable for JRS
  - MAPT scores being used as a measure of disease burden associated with waiting lists for JRS, which has important implications for planning and equitable allocation of resources to individual hospitals and healthcare regions
  - MAPT scores could also be used as to assess outcomes from JRS or even to examine the overall benefits of a new procedure or prosthesis.

5.1 Possible applications of the MAPT

Following consultation with stakeholders, it became apparent that other applications of the MAPT have the potential to improve the delivery of healthcare for patients requiring JRS. These include:
- specification of a range of MAPT scores that indicate the need for JRS, which contribute to medical decision making with respect to JRS
- indication of suitability for JRS for referring clinicians
- prioritisation of initial orthopaedic review for JRS
- monitoring of patients on OWLs
- determination of hospital specific disease burden
- monitoring outcomes.

5.1.1 Specification of a range of MAPT scores that indicate the need for JRS, which contribute to medical decision making with respect to JRS

A wide variation in the views of referring clinicians, patients and surgeons with respect to criteria that determines suitability for JRS has been previously mentioned. This has the potential to lead to inequity in service provision and a lack of transparency in the provision of JRS. As there is no consensus on indications for JRS, the placing of patients on waitlists and the subsequent ordering of patients on waitlists is based on a variety of clinical and non-clinical factors that may differ across institutions and healthcare providers and indeed within healthcare provider groups. Setting formal criteria will assist medical decision making.\(^1\)\(^2\) The implementation of the MAPT with the specification of a range of scores that strongly or weakly indicate the need for JRS goes a considerable way to fulfilling this recommendation.
5.1.2 Indication of suitability for JRS for referring clinicians

Through discussion with stakeholders it was noted that the MAPT could support GPs in their decision to refer patients for JRS. The use of the MAPT in general practice and by other referring clinicians is a logical extension of its original purpose as it can be used to clearly identify patients that have high or low probability of requiring JRS. As the MAPT has been developed in close collaboration with the orthopaedic community it is likely that there will be considerable referring clinician and orthopaedic surgeon confidence in the utility of the MAPT for this purpose.

5.1.3 Prioritisation of initial orthopaedic review for JRS

The wait for surgery includes the time spent on the OWL, the time waiting to see the surgeon once an appointment is made (more than one year in some hospitals) and the time between GP referral and date allocated to see surgeon. Significant delays can occur in sorting out GP referral letters. This observation, and information from stakeholders, indicates that the MAPT would be a useful tool to prioritise and triage referral to orthopaedic outpatient clinics. The use of the MAPT at the time of referral has the potential to improve the timeliness of both the surgery and the initial orthopaedic review that is required prior to addition to the OWL.

5.1.4 Monitoring of patients on the OWL

A significant number of patients deteriorate while waiting for JRS, which impacts on their functional capacity and health status prior to surgery. The associated detrimental effect on both the short- and long-term outcome of the surgery has been established. Regular periodic completion of the MAPT by patients while on the waiting list provides a simple method if identifying deterioration early and facilitating timely surgery. The MAPT has the potential to identify patients that are no longer suitable for JRS.

5.1.5 Determination of hospital-specific disease burden

The MAPT has the potential to be used as a measure of disease burden associated with waiting lists for JRS. This has important implications for planning and equitable allocation of resources to individual hospitals and healthcare regions. Currently hospital waiting lists are compared using absolute numbers of patients on the waiting list and perhaps average waiting time. There is no measure of the severity or urgency of the patients waiting for surgery. The MAPT is a prioritisation tool that identifies the need as well as the required urgency of JRS. A more accurate determination of disease burden associated with JRS can therefore be undertaken at individual sites and sites compared. The number of people on the waiting list multiplied by the MAPT score and waiting time is an indication of the volume of burden at any one centre. This information can be used to identify and prioritise the need for higher throughput at those hospitals carrying the greatest burden.

This approach is not only useful for comparing individual hospitals but it can also be used as a method to compare the waiting list burden of individual surgeons. Each surgeon in an orthopaedics department will be able to get a thorough picture of the burden of their patients, for example, how many have scores in the
top 10 per cent, how many have waited for over six months with a ‘low’ MAPT score and so on.

5.1.6 Monitoring outcomes

The MAPT can also be used as to assess outcomes from JRS or even to examine the overall benefits of a new procedure or prosthesis.

Essential to the accurate determination of outcomes for JRS is the ability to make a comparison of post-surgical data with prospectively collected pre-surgical data. In this manner, differences following surgery can be accurately assessed. The project has established that the MAPT equates very highly with other well validated tools previously used to determine outcomes of JRS (WOMAC, Oxford Hip and Knee scores). Unlike the MAPT, the latter two tools are joint specific and can only be used for either hip or knee replacements. The WOMAC was developed as a knee severity scale. The MAPT, however, has been specifically designed for use with both. This is an important difference as it adds substantially to the utility of the tool.

An important extension of the use of the MAPT as a pre-surgery prioritisation tool is that the same information collected after surgery can be used to determine the extent of change. The institutional introduction of the MAPT as a prioritisation tool means that the critical pre-surgery data necessary to determine outcomes are being collected. The further step of collecting the required post-surgery information becomes a relatively simple step requiring little further effort from the treating institution. When completed by patients at routine post-surgical reviews, MAPT scores can be used as a comparison with pre-surgery data. This approach will add significantly to the assessment of outcomes not only for the individual patients but also the outcomes for an institution as a whole. These data can then be used to readily compare outcomes of JRS for the different institutions.
6.0 Progress towards development of a service delivery model

Summary

- As well as the development of a tool that can be used to prioritise people with hip or knee joint disease, the other stated aim of this project was to develop a system that facilitates the management of people who may require JRS. A service delivery model, using the MAPT to support clinical decision making, was developed.
- MSCs were employed at each site. The principal roles of the MSC were to assist with validation of the MAPT and to provide assessment and referral for patients with musculoskeletal disorders of the lower limb.
- The MSCs undertook 272 initial assessments of patients on the OWL and 85 three-month review assessments.
- Physiotherapy and hydrotherapy were the most common form of service referral and the main reason for non-uptake of services was due to lack of follow-up from the service.
- A selection of participants were interviewed regarding their experience with the OWL model. The majority participants stated that their participation was beneficial. In addition, participants: were responsive to further management of their condition and appreciated the opportunity to talk to someone; found the information provided useful and easy to understand; and were interested in learning about the care process such as the timeframe for their stay in hospital and the rehabilitation procedure and would recommend the service to others in a similar situation.
- The project team sought to determine the suitability of the service delivery model to community-based and hospital-based services. Results indicated that: there were generally positive comments received from physiotherapists regarding the role of the MSC; there are currently a wide range of services available for people with arthritis; waiting times for services varied from one to 12 weeks between sites; and all respondents suggested that their services could not currently deal with an increased number of referrals.
- The project team also sought to determine the suitability of the service delivery model to GPs and found that: the majority of GPs reported that they would appreciate short and concise letters; GPs thought an MSC would assist in the care of their patients through assessment and monitoring; the MAPT would be suitable for monitoring purposes; and the majority of the GPs were willing to incorporate the MAPT into their referral system and supported the idea of an online process.

As well as the development of a tool that can be used to prioritise people with hip or knee joint disease, the other stated aim of this project was to develop a system that facilitates the management of people who may require JRS. A service delivery model incorporating an MSC using the MAPT to support clinical decision making, was developed and evaluated. The following is an outline of the service model and the evaluation of that model.

6.1 Musculoskeletal clinic

The proposed service delivery model consisted of a musculoskeletal clinic staffed by an MSC. These clinics were established at each of the four main hospital sites. The principal roles of the MSC were to assist with validation of the MAPT
(see section 4) and to provide assessment and referral for patients with musculoskeletal disorders of the lower limb.

6.1.1 Musculoskeletal coordinators

MSCs were employed from a variety of clinical backgrounds to implement the service delivery model. Senior physiotherapists performed the role at RMH and DH, a nurse at GVH and a clinician at WH. A research assistant assisted with components of this process at RMH, DH and WH.

6.1.2 Participant recruitment

Patients were recruited from the OWL at each hospital. Those recorded as being from non-English speaking backgrounds and those having a revision of a previous joint replacement were excluded. The remaining patients were mailed a letter outlining the project and inviting them to take part (see Appendix 9). They were then phoned and asked whether they were willing to participate.

A total of 548 patients were contacted across three sites (data were not collected from GVH) and 272 (49.6 per cent) agreed to participate. The mean age of participants was 68.3 years (range: 35.0–86.9 years) (see Table 21).

Table 21: Participation rates and mean age of participants at each site

<table>
<thead>
<tr>
<th></th>
<th>RMH</th>
<th></th>
<th>DH</th>
<th></th>
<th>WH</th>
<th></th>
<th>GVH</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number contacted</td>
<td>246</td>
<td>100</td>
<td>186</td>
<td>100</td>
<td>116</td>
<td>100</td>
<td>n/a</td>
<td>-</td>
<td>n/a</td>
<td>272</td>
</tr>
<tr>
<td>Number agreed to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>participate</td>
<td>108</td>
<td>43.9</td>
<td>84</td>
<td>45.2</td>
<td>40</td>
<td>34.5</td>
<td>40</td>
<td>n/a</td>
<td>272</td>
<td></td>
</tr>
</tbody>
</table>

| Mean age (range)     | 68.6 (37.4–86.9) | 67.5 (38.0–86.5) | 67.2 (35.0–85.6) | 70.3 (36.6–85.9) | 68.3 (35.0–86.9) |

1 Data not collected at GVH
2 As data was not collected on number contacted at GVH, these figures could not be calculated

At RMH and WH, the main reason patients declined to participate was difficulty accessing the hospital, closely followed by a disinterest in participating (see Table 22). At DH, 23.5 per cent of patients contacted had already had their procedure, indicating that the OWL is not up to date. While only patients who listed English as their first language were contacted, across the three sites a further 10.4 per cent were unable to participate due to limited English-speaking skills, the highest being at WH (19.7 per cent).
Table 22: Reasons for non-participation at each site

<table>
<thead>
<tr>
<th>Reason for non-participation</th>
<th>RMH n</th>
<th></th>
<th>%</th>
<th>DH n</th>
<th></th>
<th>%</th>
<th>WH n</th>
<th></th>
<th>%</th>
<th>Total n</th>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult to access hospital</td>
<td>27</td>
<td>19.6</td>
<td>15</td>
<td>14.7</td>
<td>26</td>
<td>34.2</td>
<td>68</td>
<td>21.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not interested</td>
<td>23</td>
<td>16.7</td>
<td>8</td>
<td>7.8</td>
<td>23</td>
<td>30.3</td>
<td>54</td>
<td>17.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language barrier</td>
<td>12</td>
<td>8.7</td>
<td>6</td>
<td>5.9</td>
<td>15</td>
<td>19.7</td>
<td>33</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JRS already completed</td>
<td>5</td>
<td>3.6</td>
<td>24</td>
<td>23.5</td>
<td>0</td>
<td>0.0</td>
<td>29</td>
<td>9.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Booked for surgery</td>
<td>0</td>
<td>0.0</td>
<td>11</td>
<td>10.8</td>
<td>9</td>
<td>11.8</td>
<td>20</td>
<td>6.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not in position to participate</td>
<td>18</td>
<td>13.0</td>
<td>10</td>
<td>9.8</td>
<td>0</td>
<td>0.0</td>
<td>18</td>
<td>5.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobility problems</td>
<td>5</td>
<td>3.6</td>
<td>9</td>
<td>8.8</td>
<td>0</td>
<td>0.0</td>
<td>14</td>
<td>4.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unwell and cannot travel</td>
<td>6</td>
<td>4.3</td>
<td>6</td>
<td>5.9</td>
<td>0</td>
<td>0.0</td>
<td>12</td>
<td>3.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transferred through ESAS</td>
<td>11</td>
<td>8.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>11</td>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family member ill</td>
<td>4</td>
<td>2.9</td>
<td>3</td>
<td>2.9</td>
<td>0</td>
<td>0.0</td>
<td>7</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No longer having procedure</td>
<td>0</td>
<td>0.0</td>
<td>6</td>
<td>5.9</td>
<td>0</td>
<td>0.0</td>
<td>6</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anticipates surgery imminent</td>
<td>5</td>
<td>3.6</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>1.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In hospital for other condition</td>
<td>4</td>
<td>2.9</td>
<td>1</td>
<td>1.0</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>1.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant cancelled appoint.</td>
<td>5</td>
<td>3.6</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>1.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>9.4</td>
<td>13</td>
<td>12.7</td>
<td>3</td>
<td>3.9</td>
<td>29</td>
<td>9.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data not collected at GVH

Those who agreed to participate were allocated an appointment time. Information about the project was posted along with a consent form, the MAPT and an outline of where to go and what to bring with them to their appointment (see Appendix 10 and Appendix 11). They were requested to either post back the consent form and MAPT prior to their appointment or bring them in on the day.

RMH and DH had the largest number of participants as they were larger hospitals and had more patients listed on the OWL. In addition, these sites had a research assistant supporting the MSC which increased participant recruitment. The accessibility of these hospitals (RMH is well serviced by public transport and DH has good car parking) may also have contributed.

### 6.1.3 MSC assessment

In order to guide and standardise the assessment of the MSC, an MSC assessment package and accompanying protocol was developed (see Appendix 12 and Appendix 13). Appointments generally lasted between 30 and 60 minutes, depending on the severity of the participant’s condition and/or the individual style of the MSC. The MSC assessment consisted of an interview component including demographics, pain and mobility, medical/surgical history, social history and analgesia/arthritis medication and an objective component including range of motion. Other objective examinations were undertaken as required.

If the MSC identified conservative management gaps a referral to the appropriate service provider was made (see Appendix 14). Referral options included physiotherapy, hydrotherapy, occupational therapy, dietetics, or a review by a GP or orthopaedic surgeon.

Participants were provided with a patient management plan which outlined the service/s they were being referred to and the processes involved (see Appendix 15). A letter was sent to their GP to inform them of the outcome of the assessment as well as an information flyer on the project (see Appendix 16 and Appendix 17).
6.1.4 Participant demographics

There were a greater number of male than female participants (55.5 per cent) (see Table 23). Almost half of participants (44.5 per cent) travelled less than 10 km to reach their respective hospital, with the highest proportion at DH (66.7 per cent). Participants travelled the greatest distance to reach GVH with 10 per cent travelling greater than 80 km.

Almost all participants lived at home (99.3 per cent) and of these, almost three-quarters lived with others (72.8 per cent). The majority of participants had not been in the workforce in the past six months (59.2 per cent); however, 11 per cent were currently working with the highest proportion at GVH (20 per cent). Some participants had to give up working because of their hip or knee problem (2.6 per cent). The exact proportion of participants in the workforce is not known because this information was not initially collected in the MSC assessment. Just over a tenth (10.7 per cent) of participants were carers, such as cared for a sick or disabled partner or family member however, again, the exact proportion is not known.

Table 23: Demographic features of participants at each site

<table>
<thead>
<tr>
<th>Demographic feature</th>
<th>Site</th>
<th>RMH</th>
<th>DH</th>
<th>WH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>49</td>
<td>50</td>
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<td>151</td>
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<tr>
<td>Female</td>
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<td>59</td>
<td>34</td>
<td>14</td>
<td>121</td>
</tr>
<tr>
<td>Distance from hospital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–10 km</td>
<td></td>
<td>36</td>
<td>56</td>
<td>14</td>
<td>121</td>
</tr>
<tr>
<td>10.1–20 km</td>
<td></td>
<td>43</td>
<td>24</td>
<td>18</td>
<td>88</td>
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<tr>
<td>20.1–30 km</td>
<td></td>
<td>12</td>
<td>2</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>30.1–40 km</td>
<td></td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>14</td>
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<td>40.1–50</td>
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<td>3</td>
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<td>0</td>
<td>6</td>
</tr>
<tr>
<td>50.1–60</td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>&gt; 80</td>
<td></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Living arrangements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House</td>
<td></td>
<td>108</td>
<td>82</td>
<td>40</td>
<td>270</td>
</tr>
<tr>
<td>Alone</td>
<td></td>
<td>30</td>
<td>19</td>
<td>13</td>
<td>69</td>
</tr>
<tr>
<td>With others</td>
<td></td>
<td>78</td>
<td>61</td>
<td>26</td>
<td>198</td>
</tr>
<tr>
<td>Significant carer</td>
<td></td>
<td>16</td>
<td>2</td>
<td>4</td>
<td>29</td>
</tr>
<tr>
<td>Significant carer</td>
<td></td>
<td>30</td>
<td>25</td>
<td>6</td>
<td>74</td>
</tr>
<tr>
<td>In workforce past six months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes and still working</td>
<td></td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>Yes and no longer working</td>
<td></td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>65</td>
<td>48</td>
<td>29</td>
<td>161</td>
</tr>
<tr>
<td>Not collected*</td>
<td></td>
<td>30</td>
<td>25</td>
<td>6</td>
<td>74</td>
</tr>
</tbody>
</table>

* Data not initially collected in the MSC assessment
6.1.5 Health status of participants

More than half (56.6 per cent) of participants used a gait aid for assistance with mobility (see Table 24). The majority of participants experienced moderate pain when resting (40.4 per cent); however, this was as high as 60.0 per cent at WH. Only a small proportion experienced severe pain (8.5 per cent) and extremely severe pain (2.6 per cent). Some participants experienced no limitation to walking (2.9 per cent); however, 40.1 per cent reported being able to walk for about 10 to 15 minutes before pain stops them. Half of the participants were able to look after themselves (50 per cent) and 26.1 per cent found it ‘moderately difficult’ to enjoy their life.

Table 24: Health status of participants at each site

<table>
<thead>
<tr>
<th>Aspect</th>
<th>RMH n=108</th>
<th>RMH % (100)</th>
<th>DH n=84</th>
<th>DH % (100)</th>
<th>WH n=40</th>
<th>WH % (100)</th>
<th>GVH n=40</th>
<th>GVH % (100)</th>
<th>Total n=272</th>
<th>Total % (100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gait aid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>46</td>
<td>42.6</td>
<td>34</td>
<td>40.5</td>
<td>18</td>
<td>45</td>
<td>20</td>
<td>50</td>
<td>118</td>
<td>43.4</td>
</tr>
<tr>
<td>Walking stick</td>
<td>53</td>
<td>49.1</td>
<td>41</td>
<td>48.8</td>
<td>19</td>
<td>47.5</td>
<td>16</td>
<td>40</td>
<td>129</td>
<td>47.4</td>
</tr>
<tr>
<td>Walking frame</td>
<td>5</td>
<td>4.6</td>
<td>9</td>
<td>10.7</td>
<td>3</td>
<td>7.5</td>
<td>2</td>
<td>5</td>
<td>19</td>
<td>7.0</td>
</tr>
<tr>
<td>Wheelchair</td>
<td>2</td>
<td>1.9</td>
<td>1</td>
<td>1.2</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1.1</td>
</tr>
<tr>
<td>Electronic wheelchair</td>
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<td>3.7</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>2.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Crutch(s)</td>
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<tr>
<td>Missing</td>
<td>2</td>
<td>1.9</td>
<td>1</td>
<td>1.2</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1.1</td>
</tr>
<tr>
<td>Pain when resting</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None or mild pain</td>
<td>16</td>
<td>14.8</td>
<td>32</td>
<td>38.1</td>
<td>6</td>
<td>15.0</td>
<td>6</td>
<td>15.0</td>
<td>60</td>
<td>22.1</td>
</tr>
<tr>
<td>Moderate pain</td>
<td>50</td>
<td>46.3</td>
<td>21</td>
<td>25.0</td>
<td>24</td>
<td>60.0</td>
<td>15</td>
<td>37.5</td>
<td>110</td>
<td>40.4</td>
</tr>
<tr>
<td>Severe pain</td>
<td>8</td>
<td>7.4</td>
<td>6</td>
<td>7.1</td>
<td>4</td>
<td>10.0</td>
<td>5</td>
<td>12.5</td>
<td>23</td>
<td>8.5</td>
</tr>
<tr>
<td>Extremely severe pain</td>
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<td>5.6</td>
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<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>2.5</td>
<td>7</td>
<td>2.6</td>
</tr>
<tr>
<td>Cannot bear the pain</td>
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<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
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<td>0.0</td>
</tr>
<tr>
<td>Missing</td>
<td>28</td>
<td>25.9</td>
<td>25</td>
<td>29.8</td>
<td>6</td>
<td>15.0</td>
<td>13</td>
<td>32.5</td>
<td>72</td>
<td>26.5</td>
</tr>
<tr>
<td>Limitation to walking</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not limited</td>
<td>3</td>
<td>2.8</td>
<td>4</td>
<td>4.8</td>
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<td>0</td>
<td>1</td>
<td>2.5</td>
<td>8</td>
<td>2.9</td>
</tr>
<tr>
<td>&gt; 30 minutes</td>
<td>18</td>
<td>16.7</td>
<td>15</td>
<td>17.9</td>
<td>4</td>
<td>10.0</td>
<td>6</td>
<td>15.0</td>
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<td>10–15 minutes</td>
<td>42</td>
<td>38.9</td>
<td>33</td>
<td>39.3</td>
<td>22</td>
<td>55</td>
<td>12</td>
<td>30</td>
<td>109</td>
<td>40.1</td>
</tr>
<tr>
<td>Short time</td>
<td>16</td>
<td>14.8</td>
<td>7</td>
<td>8.3</td>
<td>8</td>
<td>20</td>
<td>8</td>
<td>20</td>
<td>39</td>
<td>14.3</td>
</tr>
<tr>
<td>Cannot walk</td>
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<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Missing</td>
<td>28</td>
<td>25.9</td>
<td>25</td>
<td>29.8</td>
<td>6</td>
<td>15.0</td>
<td>13</td>
<td>32.5</td>
<td>72</td>
<td>26.5</td>
</tr>
<tr>
<td>Ability to look after self</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can look after self</td>
<td>39</td>
<td>36.1</td>
<td>45</td>
<td>53.6</td>
<td>28</td>
<td>70.0</td>
<td>24</td>
<td>60.0</td>
<td>136</td>
<td>50.0</td>
</tr>
<tr>
<td>Cannot do some things</td>
<td>35</td>
<td>32.4</td>
<td>11</td>
<td>13.1</td>
<td>4</td>
<td>10.0</td>
<td>3</td>
<td>7.5</td>
<td>53</td>
<td>19.5</td>
</tr>
<tr>
<td>Cannot do many things</td>
<td>5</td>
<td>4.6</td>
<td>3</td>
<td>3.6</td>
<td>2</td>
<td>5.0</td>
<td>0</td>
<td>0.0</td>
<td>10</td>
<td>3.7</td>
</tr>
<tr>
<td>Cannot do most things</td>
<td>1</td>
<td>0.9</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Cannot look after self</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Missing</td>
<td>28</td>
<td>25.9</td>
<td>25</td>
<td>29.8</td>
<td>6</td>
<td>15.0</td>
<td>13</td>
<td>32.5</td>
<td>72</td>
<td>26.5</td>
</tr>
<tr>
<td>Enjoyment of life</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not affected or only a little</td>
<td>15</td>
<td>13.9</td>
<td>16</td>
<td>19.0</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>35</td>
<td>12.9</td>
</tr>
<tr>
<td>Moderately difficult to enjoy</td>
<td>27</td>
<td>25.0</td>
<td>20</td>
<td>23.8</td>
<td>13</td>
<td>32.5</td>
<td>11</td>
<td>27.5</td>
<td>71</td>
<td>26.1</td>
</tr>
<tr>
<td>Very difficult to enjoy</td>
<td>22</td>
<td>20.4</td>
<td>14</td>
<td>16.7</td>
<td>8</td>
<td>20</td>
<td>7</td>
<td>17.5</td>
<td>51</td>
<td>18.8</td>
</tr>
<tr>
<td>Extremely difficult to enjoy</td>
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<td>11.1</td>
<td>6</td>
<td>7.1</td>
<td>11</td>
<td>27.5</td>
<td>2</td>
<td>5</td>
<td>31</td>
<td>11.4</td>
</tr>
<tr>
<td>Cannot enjoy</td>
<td>2</td>
<td>1.9</td>
<td>3</td>
<td>3.6</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>2.6</td>
</tr>
<tr>
<td>Missing</td>
<td>30</td>
<td>27.8</td>
<td>25</td>
<td>29.8</td>
<td>6</td>
<td>15</td>
<td>16</td>
<td>40</td>
<td>77</td>
<td>28.3</td>
</tr>
</tbody>
</table>

a Some participants used more than one type of gait aid
b Such as while sitting down
c Such as walking from one room to another
d Such as washing themselves, getting dressed, going to the toilet
6.1.6 MSC three-month assessment

Three months after the completion of their initial MAPT, participants were invited to attend the hospital for a second appointment with the MSC in order to assess whether there had been any change in their condition and whether further management was required. In the instances where there was significant deterioration, the MSC assessed whether an appointment with the orthopaedic surgeon was necessary in order to re-prioritise them on the OWL. The MSC assessment package and protocol were similar to the initial assessment; however, they did not include information on previous service usage. The participant’s GP was once again sent a letter outlining the outcome of their assessment.

A total of 85 (31.3 per cent) participants attended a three-month review with the MSC. The timeframe for the project did not permit all participants to be offered three-month reviews. The MSC at DH saw the highest proportion of participants for a review (35, 41.7 per cent), followed by WH (14, 35.0 per cent) and RMH (36, 33.3 per cent). No review assessments were performed at GVH.

6.2 Impact of service delivery model on patients

6.2.1 Referrals for further management (initial assessment)

Following their initial assessment, the MSC indicated whether referral to specific services for further patient management would be beneficial (see Table 25). The MSC also indicated whether the referrals were made. In the instances that referrals were indicated but not made, the MSC specified the reason for this. It should be noted that types of referrals recommended were related to the professional background of the MSC and the availability of local services.

Physiotherapy
The MSC indicated that 112 participants (41.2 per cent) would benefit from physiotherapy and 96 (35.3 per cent) were referred. The main reason for non-referral (despite potential benefit) was participants declining, followed by difficulty in accessing the service due to transport and/or monetary concerns. Others stated they would self-refer.

Hydrotherapy
Hydrotherapy was recommended to 89 participants (32.7 per cent) and 70 (25.7 per cent) were referred. The highest rates were at DH and GVH (53.5 per cent and 55 per cent respectively) and the lowest at WH (15 per cent). The main reason for non-referral was again due to participants declining, with one commenting that they were already receiving physiotherapy and felt that was adequate. Others cited lack of time and that the distance to travel was an issue. A number of participants were to self-refer. One participant required clearance from their GP regarding their blood pressure.

Dietitian
Dietetic advice was recommended to 31 participants (11.4 per cent) and 28 (10.3 per cent) were referred. The majority of referrals came from DH (26.2 per cent). One participant was already receiving advice via a course for another condition, while another was simply not interested.
**GP review**
Of the 28 of participants (10.3 per cent) for whom a GP review was recommended, all were referred and all these referral were made from DH or GVH. The main reason for referral was for pain management review (which may have also involved referral to a rheumatologist), followed by consultation regarding comorbidities and a blood pressure check (which may have been necessary for referral to a hydrotherapy program). X-rays were required for a few participants, with one to assess whether a current prosthesis was loosening (patients requiring revision JRS were excluded; this patient had previously had JRS in the other joint) and another to determine how their OA had progressed in the past three years. Two GPs were contacted to request assistance with the referral of their patient to a private physiotherapy provider (through the Medicare Plus program). Another three were contacted regarding referral to the participant’s orthopaedic surgeon as they had either not been reviewed in over 12 months or the MSC was concerned that their other limb required more urgent surgery.

**Arthritis self-management program**
Only half of the 18 participants (6.6 per cent) for whom an arthritis self-management program was recommended were referred. All were from RMH or DH. Of the nine participants who were not referred, eight were to self-refer while one declined.

**Orthopaedic surgeon**
Of the 17 participants (6.3 per cent) for whom an orthopaedic surgeon review was recommended by the MSC, all were referred. All were from DH or GVH. The main reason for referral was to highlight the participant’s increased disability and/or pain. One participant was finding it increasingly difficult to perform work duties, while another could not benefit from conservative management. The circumstances of these participants were regarded by the MSC as requiring the patient to be reprioritised for surgery. Two other participants were referred regarding more severe pain in the limb not listed for surgery. One participant was referred due to concern about surgery because of their comorbidities.

**Occupational therapy**
Referral to occupational therapy was recommended to 14 participants (5.1 per cent) and 12 were referred (4.4 per cent). Most referrals came from DH. One participant stated that their family member will do the required tasks while another was to self-refer.

**Falls and balance assessment**
Of the 12 participants (4.4 per cent) for whom a falls and balance assessment was recommended, all were referred. All were from RMH or DH.

**Pain management clinic**
Of the six participants (2.2 per cent) for whom an appointment with the pain management clinic was recommended, all were referred and all came from RMH.

**Rheumatologist**
Referral to a rheumatologist was recommended to six participants (2.2 per cent) and five were referred (1.8 per cent). The one participant who declined referral, did not think it would be beneficial. All referrals came from DH.
Other referral recommendations included home help, participation in an exercise class, an appointment with a podiatrist, an assessment by a cardiologist/clinician and psychological counselling. All referrals were made.

Table 25: Number of referrals indicated and number of referrals made for further management at each site

<table>
<thead>
<tr>
<th>Service</th>
<th>RMH n (%)</th>
<th>DH n (%)</th>
<th>WH n (%)</th>
<th>GVH n (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicated</td>
<td>37 (34.3)</td>
<td>45 (53.6)</td>
<td>7 (17.5)</td>
<td>23 (57.5)</td>
<td>112 (41.2)</td>
</tr>
<tr>
<td>Referred</td>
<td>23 (21.3)</td>
<td>45 (53.6)</td>
<td>6 (15.0)</td>
<td>22 (55.0)</td>
<td>96 (35.3)</td>
</tr>
<tr>
<td>Hydrotherapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicated</td>
<td>38 (35.2)</td>
<td>33 (39.3)</td>
<td>11 (27.5)</td>
<td>7 (17.5)</td>
<td>89 (32.7)</td>
</tr>
<tr>
<td>Referred</td>
<td>26 (24.1)</td>
<td>30 (35.7)</td>
<td>9 (22.5)</td>
<td>5 (12.5)</td>
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</tr>
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</table>

* Home help, exercise class, podiatry, cardiologist/clinician, psychological counselling

6.2.2 Uptake of and satisfaction with services

A subgroup of 150 participants (55.1 per cent) were contacted via telephone by either the MSC or research assistant and asked about their use of services (see Table 26). Participants were selected based upon the criterion that three months had elapsed since completion of their initial MAPT. Information collected included whether they had taken up the service, how long they waited to obtain an initial appointment, the subsequent number of appointments attended, whether they were continuing with the service, barriers to continued use, whether they were satisfied with the service and any adverse events they may have experienced.
Table 26: Number of participant interviews regarding service usage at each site

<table>
<thead>
<tr>
<th>Site</th>
<th>RMH</th>
<th>DH</th>
<th>WH</th>
<th>GVH</th>
<th>Total</th>
</tr>
</thead>
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Data on referral and uptake of services for the subgroup of 150 participants are outlined in Table 27 and Table 28.

**Physiotherapy**

Of the 55 participants (36.7 per cent) referred for physiotherapy, 41 (74.5 per cent) utilised this service. The most common reason for non-uptake was due to participants not having heard from the service. This was followed by participants not keen to pursue physiotherapy, with reasons being a general disinterest, lack of time, the travelling distance, already undertaking an exercise regime, and the belief that surgery was imminent. One participant stated that they were coping well on glucosamine and have since been taken off the OWL.

The majority of participants who utilised a physiotherapy service stated they were scheduled an appointment within one week or that they ‘didn’t wait long’. Few participants waited for more than four weeks. Most participants used the service only once, while others stated they made either two, three to four visits. Only two participants made more than 10 visits. The majority of participants were prescribed home exercises and a selection referred to hydrotherapy. Other outcomes included fitting with a gait aid and strapping of the knee. One participant was enrolled into an exercise program.

A mix of both positive and negative comments was received regarding use of physiotherapy. Some found it ‘good’, ‘excellent’, ‘enjoyable’ and ‘beneficial’. Four commented that they were continuing with their exercises at home. One participant stated that it helps with mobility and pain and another that it has been building up strength. Three participants, however, stated they were informed that physiotherapy would be of no benefit. Two commented that it was ‘painful’, with one informed that they should undertake exercises in the pool. Other comments received were that it was a ‘waste of time’ as they were given a walking frame they couldn’t manage, and that the group sessions didn’t seem to be offering much benefit. One commented that they still have the same level of pain and that it has not helped with walking or sleeping. Another two commented that the knee brace or strapping was not beneficial.

Although the majority were no longer using the service, they were satisfied with the number of visits made.

**Hydrotherapy**

Of the 36 participants (23.8 per cent) referred for hydrotherapy, 11 (30.6 per cent) utilised this service. The most common reason for non-uptake was due to participants not having heard from the service. This was followed by participants not keen to pursue hydrotherapy with reasons being lack of time and a dislike of group activities and still water. Participants also stated that they were unable to access the service with reasons being that no classes were offered in their area and that the waiting period was up to one year. Travel issues were also mentioned as well as comorbidities. One participant stated that the physiotherapist didn’t think it was necessary.
The majority of participants who utilised the hydrotherapy service stated they were scheduled an appointment within one week or that they ‘didn’t wait long’. Participants were initially required to undertake an assessment with a physiotherapist prior to commencing the program. Few participants waited greater than one month. The number of visits varied greatly; however, the most frequent was six, followed by a range between two and eight. Few went to greater than 10 sessions.

Comments regarding the use of hydrotherapy were predominately positive. Participants stated that it was ‘excellent and beneficial’, it offered ‘good relief’, they ‘felt better after sessions’ and it ‘enabled them to walk more freely afterwards’. One commented that it offered relief while in the pool, however, not when they get out. One participant stated that they commenced group classes, however, were now continuing on their own as they were concerned about holding up the group. One could not continue as it exacerbated a current medical condition, while another was not impressed with the service.

While the majority were no longer using the service, they were satisfied with the number of visits made. Two participants were continuing with hydrotherapy on their own.

**Dietician**

Of the 15 participants (9.9 per cent) referred to a dietician, 10 (66.7 per cent) utilised this service. Reasons for non-uptake included a lack of interest, the inability to leave the house due to pain, and that they were self-managing their weight. One participant had not heard from the service.

Participants waited a varying amount of time before an appointment was scheduled, with the majority of times varying between less than a week (or ‘not long’) and two to four weeks. One participant waited three months. The most frequent number of visits was one, with the remainder varying between two and eight. All participants gave positive feedback regarding the service, primarily because they had lost weight. Half were no longer using the service, however, were satisfied with the number of visits made.

**GP review**

Of the 13 participants (8.7 per cent) referred for a GP review, three (23.1 per cent) visited their GP to follow up on the recommendations of the MSC. Some participants stated that they visit their GP on a regular basis; however, they did not discuss the issues raised by the MSC. Others simply did not follow up with appointments for reasons unknown. Two participants visited their GP to obtain a referral for X-rays, while another had their blood pressure checked and discussed pain management.

**Falls prevention assessment**

Of the six participants (4.0 per cent) referred for a falls prevention assessment, only one (16.7 per cent) utilised this service. The most common reason for non-uptake was not having heard from the service. One participant stated that they were informed they were on the waiting list. The participant who used this service made one visit and felt there was no outcome. They did not attend again due to transport difficulties.
Orthopaedic surgeon
Of the five participants (3.3 per cent) referred to their orthopaedic surgeon, two (40 per cent) had a review appointment. The outcome of one review was the participant’s reclassification from a category 3 to category 2. The other was referred due to concern with OA in their non-OWL limb and as a result, placed on the OWL for that limb.

Occupational therapy
Of the five participants (3.3 per cent) referred to an occupational therapist, four (80 per cent) utilised this service. One participant did not hear from the service. Participants who utilised the service had an appointment scheduled within two weeks, with their one appointment involving a home visit. While two participants commented that it was ‘beneficial’ and ‘very helpful’, another was dissatisfied as they were informed they did not qualify for further assistance. One participant was indirectly referred to an occupational therapist by their physiotherapist and stated that their advice had been beneficial as they were now able to sleep with greater ease.

Pain management clinic
Of the two participants (7.7 per cent) referred to a pain management clinic, one (50 per cent) utilised this service. Reason for non-uptake was not having heard from the service. The participant stated that they were unsure whether their GP sent off the referral (the referral pathway usually involves referral from a GP). The participant who used this service was advised to take strong medications, which they disliked because of the side effects and preferred to suffer the pain.

Exercise class
Neither of the two participants (7.7 per cent) in which an exercise class was suggested utilised this service, citing that they did not think the referral was sent by the GP.

Home help
None of the two participants (7.7 per cent) for whom home help was suggested utilised this service. One participant stated they were informed the council could not give help for lawn mowing and they do not need help around the house. The other was informed they could not access this service as they did not qualify.

Arthritis self-management program
The one participant (0.7 per cent) referred to an arthritis self-management program did not utilise this service, stating they did not have the time. One participant, however, was indirectly referred to a program by their physiotherapist and attended the entire eight-week program. No comment was provided as to whether they were satisfied with the program.

Rheumatologist
The one participant (0.7 per cent) in which an assessment by a rheumatologist was recommended did not utilise this service due to their GP not having sent the referral.

Psychological counselling
The one participant (0.7 per cent) referred for psychological counselling did not utilise this service, stating they had not been contacted by the agency.
Podiatrist
The one participant (0.7 per cent) referred to a podiatrist utilised the service. They waited between five to six weeks for their single appointment and were pleased with the service received.

Table 27: Number of further management referrals (from subgroup) at each site

<table>
<thead>
<tr>
<th>Service</th>
<th>RMH</th>
<th>%</th>
<th>DH</th>
<th>%</th>
<th>WH</th>
<th>%</th>
<th>GVH</th>
<th>%</th>
<th>Total</th>
<th>%</th>
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</thead>
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Table 28: Number of further management referrals taken up (from subgroup) at each site

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<th>WH</th>
<th>%</th>
<th>GVH</th>
<th>%</th>
<th>Total</th>
<th>%</th>
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</tr>
<tr>
<td>Podiatrist</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>100.0</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* Two participants could not be contacted

6.2.3 Referrals for further management (three-month assessment)

Following participants’ three-month review assessment, the MSC again indicated whether referral to specific services for further patient management would be beneficial (see Table 29). In the instances where referrals were indicated but not made, the MSC specified the reason for this.

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There was a great reduction in the number of referrals at three months compared with the initial assessment. The average number of referrals made per participant was 1.08 and 0.42 respectively. Reasons for the difference in referrals may be due to the participant having already undertaken some form of further management following their initial appointment therefore additional referrals were not required. Referrals at three months may be the result of a change in participants’ condition or their agreement to try services that were initially suggested; however, they were not willing to undertake at the time.

A GP review was the most common form of referral (12.9 per cent). The main reason for referral was for review of participant’s pain management, which may have also involved referral to a rheumatologist. GPs were also contacted regarding the deterioration of their patient’s condition. Other reasons for referral were to address comorbidities, organise X-rays for preadmission and to suggest referral to the orthopaedic surgeon to assess the non-OWL limb.

Table 29: Number of referrals indicated and number of referrals made for further management at each site (three-month review)

<table>
<thead>
<tr>
<th>Service</th>
<th>RMH n (%)</th>
<th>DH n (%)</th>
<th>WH n (%)</th>
<th>GVH n (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP review</td>
<td>1 (2.8)</td>
<td>10 (28.6)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>11 (12.9)</td>
</tr>
<tr>
<td>indicated</td>
<td>1 (2.8)</td>
<td>10 (28.6)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>11 (12.9)</td>
</tr>
<tr>
<td>referred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrotherapy</td>
<td>7 (19.4)</td>
<td>3 (8.6)</td>
<td>1 (7.1)</td>
<td>– (–)</td>
<td>11 (12.9)</td>
</tr>
<tr>
<td>indicated</td>
<td>5 (13.9)</td>
<td>1 (2.9)</td>
<td>1 (7.1)</td>
<td>– (–)</td>
<td>7 (8.2)</td>
</tr>
<tr>
<td>referred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>5 (38.9)</td>
<td>3 (8.6)</td>
<td>1 (7.1)</td>
<td>– (–)</td>
<td>9 (10.6)</td>
</tr>
<tr>
<td>indicated</td>
<td>4 (38.9)</td>
<td>3 (8.6)</td>
<td>1 (7.1)</td>
<td>– (–)</td>
<td>8 (9.4)</td>
</tr>
<tr>
<td>referred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthopaedic surgeon</td>
<td>2 (16.7)</td>
<td>3 (8.6)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>5 (5.9)</td>
</tr>
<tr>
<td>indicated</td>
<td>2 (16.7)</td>
<td>3 (8.6)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>5 (5.9)</td>
</tr>
<tr>
<td>referred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietitian</td>
<td>3 (22.2)</td>
<td>1 (2.9)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>4 (4.7)</td>
</tr>
<tr>
<td>indicated</td>
<td>1 (8.3)</td>
<td>1 (2.9)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td>referred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological counselling</td>
<td>1 (8.3)</td>
<td>1 (2.9)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td>indicated</td>
<td>1 (8.3)</td>
<td>1 (2.9)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td>referred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthotist/podiatrist</td>
<td>1 (8.3)</td>
<td>1 (2.9)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td>indicated</td>
<td>1 (8.3)</td>
<td>1 (2.9)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td>referred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheumatologist</td>
<td>0 (0.0)</td>
<td>1 (2.9)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>indicated</td>
<td>0 (0.0)</td>
<td>1 (2.9)</td>
<td>0 (0.0)</td>
<td>– (–)</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>referred</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Also of note, is that five participants (5.9 per cent) were referred back to their orthopaedic surgeon. Referrals from RMH were made due to the participant suffering financially due to their condition. They were of working age and their ability to work was impaired. The MSC sought for their priority to be raised from a category 3 to a category 2. At DH, one referral was made to highlight that the participant’s non-OWL limb required assessment. Two participants were referred due to the detection of deterioration by the MSC and to highlight their high priority for surgery.
6.2.4 Participant satisfaction with OWL model

Participant satisfaction with the service delivery model was investigated using semi-structured telephone interviews, conducted by two interviewers. A purposeful sample of participants who had completed a three-month interview was selected from across the four hospital sites. The majority of participants contacted had visited the MSC clinic for an initial assessment and a three-month review. A total of 58 participants were interviewed, with 15 from each of RMH, DH and GVH and 13 from WH. The mean age of respondents was 68 years (range 39–85 years), with an equal number of males and females. The main issues addressed were the service delivery process, communication and the provision of information.

Service delivery process
Of the 58 participants interviewed, 41 (71 per cent) felt there was benefit in seeing the MSC, with the most common benefit stated being referral to allied health services, closely followed by having someone to talk to who had the time to listen and who understood their problem. Reassurance, psychological support, confidence building and having a contact for assistance were also mentioned. Some respondents, who saw an MSC who was also a physiotherapist, cited being given an exercise program as a benefit. Of those respondents who felt that seeing the MSC was of no benefit (26 per cent), the most commonly cited reason was that their condition was too severe to benefit from conservative intervention. Others felt that they were managing adequately themselves without any outside help. Two respondents (three per cent) were unsure of the benefit provided by the MSC.

All respondents stated they were happy to be sent the MAPT to monitor their condition; however, one felt that three-monthly intervals was too frequent, while another commented that monthly would be better as it was easy to forget how one had felt three months previously. A comment was made that as their condition varied from day to day, the answers to the questionnaire would vary accordingly.

Communication
The majority of respondents (93 per cent) stated that nothing further required explanation following their visit to the MSC. Many commented that everything was fine, clear and comprehensive and that all of their questions were answered. Of the seven per cent who felt more explanation was required, one person commented that knowledge of their position on the OWL would have been useful.

Of the 64 per cent of respondents referred to other services such as physiotherapy or hydrotherapy, all were clear when they left their appointments as to what to do next, that is, whether they would be contacted by the services or whether they themselves had to make the appointment.

Provision of information
The provision of information on arthritis and JRS by the MSC was not a mandatory component of the assessment; however, as most of the MSCs did provide information to patients at their appointments, data has been collected to assess the adequacy of information provision.

Information about arthritis was provided to just over half the respondents (55 per cent), with the majority of these (88 per cent) finding it useful and easy to
understand. Some of this information was given in the form of brochures from AFV and the remainder verbally. While the majority of those who received information (69 per cent) felt it was comprehensive and adequate, the remainder would have liked further updated information or even suggestions on other types of medication available. Of those who did not receive information, less than half (42 per cent) would have liked some, while the others felt they already had enough.

Information about JRS was provided by the MSC to just over a third (36 per cent) of respondents, with the majority of these (90 per cent) finding it useful and easy to understand (see Table 30). Again, some of this information was given in the form of AFV brochures and the remainder verbally. Of those who received information, the majority (67 per cent) would have liked even more, particularly about any new procedures or trials, time frames for their stay in hospital and rehabilitation procedures. Of those who did not receive information, less than half (41 per cent) would have liked some. Those not interested included people who had already attended preadmission clinics, while others had had previous JRS or been informed earlier by the GP or surgeon.

Table 30: Provision of information on joint replacement surgery

<table>
<thead>
<tr>
<th>Received information</th>
<th>Useful and easy to understand</th>
<th>Further information required</th>
<th>Would have liked information</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (58)</td>
<td>% (100)</td>
<td>n (21)</td>
<td>% (100)</td>
</tr>
<tr>
<td>Yes</td>
<td>21</td>
<td>36</td>
<td>19</td>
</tr>
<tr>
<td>No</td>
<td>37</td>
<td>64</td>
<td>2</td>
</tr>
</tbody>
</table>

Other
Referrals to allied health services were also regarded as a positive outcome from the MSC visit and suggestions on what they could do themselves to improve their situation were reported as useful. Other respondents mentioned the benefit of receiving information on arthritis and having a source of answers for their questions. The benefits of prioritisation and monitoring were also noted by some. The majority of those interviewed (88 per cent) had no difficulty getting to appointments with the MSC. The main issue was with parking.

Overall satisfaction
All 58 respondents stated that they would recommend this service to others in a similar situation to themselves. Overall comments on their experience were all positive. Respondents were very happy with the service, felt it was beneficial, that they had learnt a lot, had built up their confidence and had been psychologically helped. Some comments made were:

‘Took my fear away’    ‘Good to have a contact’
‘Gives you a mental boost’    ‘Reassurance’
‘Gives you confidence’    ‘A comfort that someone cares’
‘Takes the worry out of the whole thing’    ‘You’re not on your own’
‘Someone to lean on’    ‘A fantastic service’
‘Everyone should have access to it’    ‘Was a joy to do it’
6.3 Impact of service delivery model on other services

6.3.1 Views of community and hospital-based allied health staff

Aim and objectives
The project team sought to determine the suitability of the service delivery model to community and hospital-based services. The three objectives were to:
- determine the appropriateness of the proposed service delivery model
- elicit information on the existing services provided for people with arthritis
- determine the overall impact of the model on the services.

Methods
Representatives from three community health centres and/or hospital-based allied health services were selected for interviews from each of the four sites if they had been referred patients who had participated in the project. Twelve participants from the sites (three allied health managers and nine physiotherapists) were contacted and all agreed to participate in a telephone interview. Semi-structured interviews were conducted by two interviewers and information collected was thematically analysed and summarised.

Main findings

The proposed service delivery model
Respondents (physiotherapists/managers of allied health) were asked to give their opinion about the appropriateness of the information sent to them by the MSC and the relevance of the referrals for further conservative management.

Of the 12 respondents interviewed, three were not aware of the information sent by the MSC at the time the referral was made for the patients. The reasons given were: ‘sometimes the referrals go directly to the intake workers’ or ‘SCOTT forms [Service coordination tool templates: an online referral tool] were used to make referrals and hence could not identify the study patients’. Other respondents said that they ‘were aware that the referrals were made but did not read the information personally’.

Those that were aware of the project felt that the information provided to them by the MSCs regarding the study patients was ‘clear and concise’. Some physiotherapists commented that the format of the MSCs referral letter was ‘simple to understand’. Faxed referrals were preferred: ‘Faxed referrals go straight to physiotherapy department, whereas electronic referrals go to the intake worker’. Some suggested the use of SCOTT form along with the referral letters as ‘it would help provide baseline data and streamline the process’.

There was a general consensus that the referrals for further conservative management (for example, physiotherapy, hydrotherapy, occupational therapy) made by the MSC were ‘relevant to the client’s condition and appropriate to the services referred’. There were generally positive comments received from the physiotherapists about the role of the MSC: ‘It is an encouraging service, the client’s behaviour becomes more positive as they are better informed about their condition’. Some suggested ‘monitoring is very beneficial for patients waiting for their surgery and is an effective way of dealing with chronic conditions’.
All nine respondents commented positively on the relevance of the information sent to them by the MSCs and the appropriateness of the referrals made for the patients.

Existing services for people with arthritis
Respondents were asked about the types of services available for people with arthritis, along with the waiting time and the limits for the use of these services.

Services available
- Individual/group physiotherapy classes
- Individual/group hydrotherapy classes
- Tai Chi
- Occupational therapy
- Podiatry
- Dietician
- Counselling
- Exercise group programs
- Self-management programs
- Arthritis education program
- Balance and strength training program
- Chronic pain exercise classes
- Orthotics
- Social services

The type of services offered was dependent on the client’s condition and ‘the issues they were facing’. Initially all clients are individually assessed by the physiotherapist and later allocated to the appropriate programs (group/individual). Most of the services are offered at the community health centres/hospitals but are held at local council owned venues such as the town hall.

Waiting times
The waiting times varied from site to site, with the waiting period to initial assessment ranging from one to 12 weeks: ‘Waiting period is much shorter for clients post surgery than for people waiting for their surgery’. Another physiotherapist commented on the waiting time at their community health centre being dependent on the client’s condition: ‘For an acute condition there is a one week waiting period to be initially assessed, for a subacute condition there is a two- to three-week waiting period and for a chronic condition there is a one- to two-month waiting period’.

Following the initial assessment there is around a six- to 12-week waiting period for enrolling into various programs (for example, physiotherapy, hydrotherapy and dietetics).

In general the programs were limited to a six- to eight-weekly session. The majority of physiotherapists encouraged informal self-management after the initial one-two sessions with the clients: ‘The clients are educated and given home exercise programs to do independently that are tailored to suit their condition’. The focus is more on ‘clients managing their condition themselves’. Most of them commented that even though the majority of the services were limited to people belonging to the catchment area, they were ‘not rigid’ about accepting clients from other areas provided they could travel. Priority for
enrolling into the program was also given to healthcare card holders and those from a lower socioeconomic background.

**The impact of the service delivery model on services**
The respondents were asked about the impact of the proposed model on their service capacity and to highlight some of the strategies they could use to increase its capacity to cope with a potential increased number of referrals.

All 12 respondents suggested that their organisation did not have the capacity to deal with a significant increase in the number of referrals, suggesting that an increase of more than two to three referrals per week would result in increased waiting times.

Some of the strategies highlighted by the respondents as to how their organisation could increase capacity to cope with an increased number of referrals were:

- grouping clients with same condition together and providing group programs, which was thought to be 'more cost effective' than individual programs
- the need to communicate and link with other organisations and health professionals such as private physiotherapists and GPs; for example, GPs could provide a GP management plan under the Medicare funding scheme
- the need to link with local community centres 'run by council' and help organise services in these centres, for example, the physiotherapists could train community volunteers to provide some of the programs in the community setting
- increased resources would provide additional skilled staff and education and training of junior staff to help 'lighten the burden for the senior physios'
- increased resources to deal with 'acute shortage' of staff (both administration and allied health staff): 'More funding is required to oversee efficient work practices and smooth operation of day-to-day client intake'; and 'More staff are needed to cope with the growing problem of chronic disease and its management'
- increased resources to improve the infrastructure of the community health centre because 'at present there is no space to accommodate clients on a regular basis’. Others were of the opinion that there is a 'growing need' for a well-resourced and -equipped gym in the community health centre.

**Other issues**
Respondents were also asked about their views on the effectiveness of group versus individual programs. All 12 respondents commented that clients are assessed 'on a one-to-one basis' before being allocated into group/individual sessions and that it was dependent upon the client's condition 'but given a choice would prefer group sessions'. Others said that group sessions had the added benefit of social interaction: 'Clients benefit socially as they do not feel isolated, it also motivates them'. Others suggested that it was easier to educate clients in a group session and was 'good economically'.

**6.3.2 Views of referring GPs**

**Aim and objectives**
The project team sought to determine the suitability of the service delivery model to GPs and their service. The objectives were to:

- determine the appropriateness of the proposed model including the role of the MSC and MAPT for monitoring purposes
determine the potential for the MAPT to be integrated into general practice to guide referrals.

Methods
Seventeen GPs were selected from across the four sites based on the criteria that they had either referred patients to the orthopaedic surgeon at their respective site or one or more of their patients had been involved in the project. Of the 17 GPs contacted, 13 agreed to a telephone interview. The main reason for refusal to participate was lack of time (two GPs), or lack of interest (two GPs). Two interviewers conducted semi-structured interviews and the information collected was thematically analysed and summarised.

The GPs were asked to give their opinion on:
- the information that was sent to them by the MSCs
- the appropriateness of the referrals made for further management
- the overall usefulness of the role of the MSC in assisting their patients and referring them for further management such as physiotherapy.

Main findings

The MSC role
The majority of the GPs (nine) reported to have received information about their patients from the MSCs. Around four GPs could not remember reading the information. The main reason given was lack of time to go through the paperwork. It was generally felt that the information provided was sufficient and appropriate. Around eight GPs emphasised that due to lack of time they would prefer to receive ‘short, concise and to the point letters’. One of the GPs suggested that it would be more useful to receive information about the patient’s current status on the waiting list and also the length of the waiting list at the relevant hospital.

Eight GPs were reasonably satisfied with the appropriateness of the referrals made for their patients. There was, however, one GP who thought that the referral made at the time was not appropriate for the patient due to a certain phobia that they would have had to face had they taken up the referral. Overall the referrals were thought to be ‘useful for the patients’. One GP commented that ‘patients felt good that they had talked to someone and that they were not forgotten in the system’.

There was a general agreement among the group that the role of an MSC in assessing and monitoring patients and providing them with advice and education about their condition, and if required, referring them for conservative management was ‘highly appropriate’. One GP commented that a nurse/physiotherapist would be adequately qualified to make referrals for conservative management. All agreed that providing assistance in any form during the long wait was beneficial both for the patient and the GP: ‘The patients feel confident and aware of their situation and are better informed’. Some GPs wanted to be kept informed of all the management issues regarding their patients.

One GP commented that ‘the role actually provided a good contact point between the GPs and the hospital’. There was, however, one GP who indicated that the MSCs role was ‘doubling up’ because it was thought that most GPs already offered monitoring and proper conservative management to their patients.
Overall the GPs reported that it was a ‘useful model’ and that the MSC had an important facilitator role to play.

**Use of the MAPT for monitoring purposes**
Overall, all the 13 GPs interviewed commented positively about the usefulness of the MAPT for monitoring purposes. Three to four GPs questioned the duration of monitoring. Some GPs (10–11) felt that three- to four-month intervals were sufficient for monitoring a patient’s condition, while others felt that this was too short a timeframe and that the duration could be tailored to suit individual patients. One GP suggested that patients simply filling in the MAPT is not sufficient monitoring: ‘It should be combined with clinical assessment’. Patients could exaggerate their condition through marking highly on the MAPT just for the purposes of ‘fast tracking their surgery’. One GP remarked that ‘the tool should be easy for older population to read and answer’. The majority of GPs felt the MAPT to be a ‘good robust tool’ in monitoring and maintaining patient contact regularly.

**Integration of the MAPT into the general practice setting**
The GPs were asked about their views on using the MAPT in their day-to-day consultations to help guide them in their referrals to hospital outpatient clinics.

The majority of the GPs (12) reported that they were willing to incorporate the MAPT into their referral system as long as it was validated and endorsed by the hospital staff. Most wanted the tool to be simple and easy to fill in: ‘GPs are under pressure to complete paperwork and there is no time left to do anything extra’. This comment was strongly endorsed by the GPs in rural settings (GPs from Shepparton) due to lack of support, staff and time. Many agreed that the MAPT questions were important and that most of them already use similar questions during their consultations. The majority of the GPs (10–11) encouraged the use of the MAPT as a computer template since filling in paperwork was thought to be ‘ tiresome and time consuming’. One GP suggested a type of reminder system on the computer to complete the MAPT. Overall the great majority commented positively on the use of the MAPT in general practice: ‘It is a good tool to help streamline the patient’s condition’.

**The proposed service delivery model**
The GPs were asked about their views on the appropriateness of the care team approach where patients with chronic conditions were managed by a team of health professionals (such as GPs, surgeons, specialists and allied health staff) and the appropriateness of a triage model where a skilled nurse or physiotherapist assessed patients and referred them if required, to other services instead of the surgeon. Monitoring and feedback would be provided to the patient’s GP.

Generally most agreed that the care team approach is the way to manage patients with chronic conditions. There was a general agreement about the need for the GPs to be kept informed about their patients management decision at all times.

There was a mixed reaction from the GPs regarding the role of a skilled nurse/physiotherapist in triaging patients to other services. Around 50 per cent of the GPs thought it to be useful as long as the GPs were kept ‘in the loop’ and the patient’s position on the waiting list was not compromised. One GP thought it
to be a ‘great model as it is good for the patients to be monitored and managed while waiting for their surgery as it helps them deal with their condition in a positive manner’. Another had ‘no objection’ to the proposed model and was open to others making clinical decisions and managing the patients. Counselling was suggested as an important part of the MSC role to inform and educate the patients about their condition: ‘If someone talks to them it helps them deal with pain in a better way, GPs do not have enough time to provide counselling’. One suggested that the model could ‘lighten the burden for the GPs’.

The other 50 per cent of GPs questioned the relevance of the model. They indicated that if a referral was made by them for a patient to consult a surgeon, then this should be ‘followed through’. Most GPs also questioned the expertise and training of the nurse/physiotherapist mainly regarding clinical decision making and managing the patient’s condition. One GP commented that, ‘if I refer patients for surgery they should be seen by a surgeon’ and that they were ‘not comfortable with anyone else meddling with the decision’. Another GP questioned the therapeutic benefit for the patient to be referred ‘elsewhere’. Some were of the opinion that patients should be referred back to their GP for a review if a change of management was thought necessary.

6.4 Views of MSCs on their roles

Semi-structured interviews were conducted with the MSCs at each site. The purpose of these interviews was to assist with providing recommendations as to how the proposed model of service delivery could be implemented within the healthcare setting. Qualitative information from these interviews was summarised and thematically analysed. The main themes to come out of the interviews included the following.

Influence of professional background: While the MSCs administered a standardised assessment (Appendix 12), the emphasis of the assessment was strongly influenced by the professional background of the MSC with the MSCs concentrating their assessment and management on their professional area of expertise. The MAPT provides a global standardised assessment irrespective of the health professional administering it.

Staffing: Any model that includes an MSC will need to include resources for administrative support or build capacity for administration into the role.

Location: Accessibility of services needs to be weighted against the optimal use of resources. Consideration needs to be given to the availability of space at some hospitals, and the potential for communication between musculoskeletal health professionals.

Target group: It was generally felt that all patients on the OWL were appropriate for the service particularly if conservative management options were provided.

Skills required: The MSC role could be undertaken by an experienced physiotherapist or nurse. Given the protocol they were required to follow throughout the project there was little apparent advantage to the MSC having a medical background. The role could be rotated among appropriately qualified staff members and they would need administrative support.

Service links: Effective articulation with other services is essential for the optimal functioning of the service. Services and programs varied from site to site.
7.0 A proposed service delivery model

Summary

- Two options for the proposed service delivery model have been developed based on information collected through the evaluation of the MSC service delivery model described in section 6 and from consultation with stakeholders through workshops held at each of the four project sites.
- The workshops found that one of the major sources of frustration with the current system was difficulties encountered with patient flow through the system, which resulted in long waits for outpatient clinic appointments and surgery.
- There was overwhelming support for use of the MAPT to prioritise patients for outpatient appointments as well as for surgery. Incorporating the MAPT into GP referral letters to outpatient clinics was also raised and widely supported.
- Improved information technology (IT) systems and increased clinic space were identified as resources required to implement the models into current practice.
- Participants from all sites were supportive of having an MSC who could assess patients and refer them to conservative management.
- The ideal service delivery model is designed to provide equitable access to surgical services based on a dynamic system that responds to clinical and social ‘need’ for surgery, including time waited for treatment.
- The proposed models of service delivery attempt to address patient waiting times at two points in their care path: the wait for an outpatient appointment and the wait for surgery. The service delivery models are designed to enable the implementation of an OA model of care for best practice management of OA, with clinical decision making supported by the MAPT.
- There are a number of potential options for service delivery, two of which have been described. Option 1 is an administrative model that enables data collection and waiting list prioritisation of patients through hospital administrative systems but does not enable the implementation of an OA model of care (see Figure 6). Option 2 includes an MSC embedded in the administrative model above and who dynamically manages waiting list prioritisation of patients, as well as upstream triage of referrals from GPs and subsequent referral of patients to other services for the best practice management of OA (see Figure 7).
- Principles of care and guidelines for implementation of the preferred model are provided and include principles of engagement of stakeholders, infrastructure requirements, personnel, process issues, target group, reporting and evaluation.

7.1 Consultation process – the workshops

Key stakeholders were invited to attend a workshop at each of the project sites. The purpose of the workshops was to determine how the MAPT could be integrated into hospital systems, with the aim of developing an equitable and efficient service delivery model for managing and prioritising people with hip and knee joint disease. The group was invited to provide feedback on the current service, a proposed service delivery model and how this new model could be implemented. A summary of key findings from each of the workshops can be found in Appendix 18.
It was difficult to generalise widely from the workshop data, as the workshop outcomes were somewhat dependent on the individuals who were present on the day. Participants were presented with a proposed service delivery model (see Figure 6). Some groups undertook the task of developing a strategy to implement this model, while others built on this model to develop a comprehensive arthritis management system. Participants’ knowledge of how to implement change and belief in the likelihood of success of any proposed changes to care delivery differed markedly from site to site.

Participants at the GVH workshop expressed a keen interest in undertaking a pilot of a new multidisciplinary clinic for arthritis. They were able to outline the processes they would use to achieve their aims and how they would work together. Rural sites, due to the smaller numbers of professionals involved, may encounter fewer barriers to implementation than larger metropolitan sites.

Participants at all sites thought that patients received good medical care in the current system, but difficulties were encountered with patient flow through the system, which impacted upon them having their surgery in a timely manner. Long waits for outpatient clinic appointments and surgery were major sources of frustration.

There was overwhelming support for use of the MAPT to prioritise patients for outpatient appointments as well as for surgery. Incorporating the MAPT into GP referral letters to outpatient clinics was also raised and widely supported.

Some specific resources were identified as needed for implementation of a new model (the level was dependent on the ‘vision’ at each site). Improved IT systems and increased clinic space were common requirements.

All the sites were supportive of having an MSC who could assess patients and refer them to conservative management, although some sites clearly placed more emphasis on this aspect of the role than others. Sites where participants were more familiar with the MSC within their organisations (GVH and DH) appeared to be the most supportive.

### 7.2 Description of proposed service delivery models

#### 7.2.1 Defining proposed service delivery models

The following proposed models of service delivery attempt to address patient waiting times at two points in their care path: the wait for an outpatient appointment and the wait for surgery. The service delivery models are designed to enable the implementation of an OA model of care for best practice management of OA, with clinical decision making supported by the MAPT.

The focus of the following proposed service delivery models is on equity of access to surgeons and surgery primarily based on clinical ‘need’, with consideration also given to ‘time waited’. The service delivery models are designed to enable the implementation of comprehensive care of people with OA.
For the purposes of clarity the following is a brief outline of the differences between a model of care and a model of service delivery.

An OA model of care would incorporate the following major components:
- risk stratification
- assessment
- management
- monitoring
- review.

The proposed service delivery models incorporate the following major components (which would differ according to individual organisational factors):
- access
- workforce roles
- access for review
- communication between healthcare professionals and between healthcare sectors.

### 7.2.2 Health professionals involved in the proposed models

**General practitioners**
The GP is the key healthcare provider and coordinator of care, as well as the gatekeeper to specialists through the initiation of specialist referrals.

**Rheumatologists**
While the GP should act as the primary medical care coordinator in OA management, a shared care approach with the specialists can assist the management for patients with more complex needs. Rheumatologists are experts in pain management and they are trained to manage OA within the broader context of a patient’s overall medical problems.

**Orthopaedic surgeons**
Orthopaedic surgeons are, in practice, the end point for OA management and provide surgery, including arthroscopy, osteotomy, partial, total and revision of joint replacements. For this model, orthopaedic surgeons are the final decision-makers in the allocation of patients to waiting lists for JRS.

**Allied health professionals**
Allied health professionals involved in OA management include physiotherapists, dieticians, occupational therapists and orthotists, with physiotherapy playing the largest role of the allied health professionals in the management of patients with OA.

**Elective surgery liaison nurse**
Also known as clinical liaison nurse, this role includes coordinating and monitoring of waiting lists, scheduling of operating lists, coordinating the preadmission process and streamlining the elective admission process including pre-operative assessment of patients, multidisciplinary liaison, discharge planning and patient education.
7.2.3 Options for building a comprehensive service delivery model

The ideal service delivery model is designed to provide equitable access to surgical services based on a dynamic system that responds to clinical and social ‘need’ for surgery, including time waited for treatment. This is a contrast to the current system, which is primarily based on time waited and broadly rather than specifically defined clinical and administrative components. There are a number of potential options for service delivery, two of which are presented for consideration. The specifics of the implementation of these models will vary from site to site according to contextual needs and resources.

Option 1 is an administrative model that enables data collection and waiting list prioritisation of patients through hospital administrative systems but does not enable the implementation of an OA model of care (see Figure 6). Option 2 includes an MSC embedded in the administrative model above and who dynamically manages waiting list prioritisation of patients, as well as upstream triage of referrals from GPs and subsequent referral of patients to other services for the best practice management of OA (see Figure 7).

Option 1 Administrative model: waiting list prioritisation only through hospital systems

1. GP refers patient to hospital orthopaedic clinic for consultation regarding hip or knee JRS (potentially using MAPT).
2. Patient is sent the MAPT (if not already completed as part of GP referral).
3. The patient’s MAPT score is used to prioritise them for an outpatient appointment.
4. At regular intervals the MAPT is sent to the patient to monitor their condition while they wait for an outpatient appointment. The timing of the interval may vary between hospitals depending on resources and clinical guidelines established by the hospital. It is our recommendation that it be a minimum of three months and a maximum of six.
5. Patient is re-prioritised if MAPT score indicates deterioration.
6. Patient completes the MAPT prior to surgeon consultation unless it has already been completed within the previous three months.
7. Patient sees surgeon. Surgeon undertakes a clinical assessment and reviews MAPT score.
8. If clinically appropriate, patient is placed on OWL and prioritised according to MAPT score. Patients not placed on OWL will be referred back to their GP for management.
9. While on the OWL the patient is monitored using the MAPT at quarterly intervals.
10. Patient is considered for re-prioritisation on the OWL if MAPT score indicates substantial deterioration.
11. Patient has surgery the timing of which is based on the MAPT score, with a weighting for time waited on the waiting list and in certain circumstances related to when the patient is available for surgery.

Resources required
- Development of a database for outpatient appointments and surgery waiting lists to compute MAPT scores and prioritise patients.
- Administrative support to collect and process initial and quarterly MAPTs.
- Training of administrative staff.
• Development of a service provision algorithm (balance between the number of patients, their severity and time waited).
• Integration of MAPT data into local IT systems.
• Education, training and support for GPs (if referrals are made using the MAPT).

Benefits
• Minimal resources required to implement prioritisation.
• People with the greatest need receive more timely care.
• All those referred to outpatient clinics with likely OA are monitored at three-to six-monthly intervals and all those on the OWL are monitored at quarterly intervals to reduce the adverse effects of waiting-related deterioration.
• Equity of care is established.
• Risk of individual patient gaming is reduced.
• Surgeons and treating institutions less susceptible to external pressures to alter waiting times for particular patients at the expense of others.
• MAPT is applied across all hospitals and linked to number of patients and waiting time to estimate disease burden and hospital resource requirements.
• Individual surgeon waiting lists can be documented and composition (number of patients, priority, time waiting) managed.

Disadvantages
• No change in overall number of people waiting for surgery.
• Minimal review of MAPT results.
• No mechanism for ensuring patient has received adequate conservative management while waiting (either for outpatient appointment or surgery).
• People not added to the OWL will be referred back to the community, where there is currently no systematic way of monitoring their condition, leading to potential delays in seeing a surgeon should their condition rapidly deteriorate.
Figure 6: Option 1 – Administrative model: Waiting list prioritisation through hospital systems

- Patient sent MAPT if not already completed as part of referral. MAPT score used to prioritise patient for outpatient appointment.

- Patient sent MAPT every three to six months and reprioritised if MAPT score indicates deterioration.

- Patient completes MAPT prior to surgeon consultation if not already completed in previous three months. Surgeon reviews MAPT score.

- Patient placed on OWL is prioritised according to MAPT score.

- Patient sent MAPT every three months and reprioritised if MAPT score indicates deterioration.
Option 2. Waiting list prioritisation plus triage of patients referred to orthopaedic outpatient clinics (MSC model).

1. GP refers patient to hospital orthopaedic clinic for consultation regarding hip or knee JRS (potentially using MAPT).
2. Patient is assessed by the MSC in MSC clinic and referred onto most appropriate service. At this stage, some patients will be identified as not requiring a surgical consultation.
3. If surgical consultation is indicated, the patient’s MAPT score and clinical assessment is used to prioritise them for an outpatient appointment with the surgeon.
4. Every three to six months the MAPT is sent to the patient to monitor their condition. If their repeat MAPT score indicates deterioration the patient is assessed by the MSC and referred to further services and/or re-prioritised for an appointment with the surgeon. This assessment could involve initial contact by phone followed up by a face-to-face consultation if required.
5. Patient completes the MAPT prior to surgeon consultation unless it has already been completed within the previous three months.
6. Surgeon reviews patient and reviews MAPT score.
7. If clinically appropriate, patient placed on OWL and prioritised according to MAPT score. Patients not placed on OWL will be referred back to their GP for management.
8. Every three months the MAPT is sent to the patient to monitor their condition. If their repeat MAPT score indicates deterioration the patient is assessed by the MSC, and referred to other services and/or re-prioritised, if necessary.
9. Patient has surgery the timing of which is based on the MAPT score, with a weighting for time waited.

Resources required
- Development of a database for outpatient appointments and surgery waiting lists to compute MAPT scores and prioritise patients.
- Administrative support to collect and process initial and quarterly MAPTs.
- Training of administrative staff.
- Development of a service provision algorithm (balance between the number of patients, their severity and time waited).
- Integration of MAPT data into local IT systems.
- Employment and training of staff for the MSC role (to monitor those with hip and knee OA who are waiting for an outpatient appointment or on the OWL).
- Education, training and support for GPs in use of the MAPT for referral.
- Possible development of community capacity to adequately service referred patients.

Benefits
- People with greatest need receive more timely care.
- All those referred to outpatient clinics with likely OA are monitored at three- to six-monthly intervals and all those on the OWL are monitored at quarterly intervals by an MSC to reduce waiting-related deterioration.
- Equity of care is established.
- Surgeons and treating institutions less susceptible to external pressures to alter waiting times for particular patients at the expense of others.
- MAPT is applied across all hospitals and linked to number of patients and waiting time to estimate disease burden and hospital resource requirements.
• All those referred to outpatient clinic with likely OA are assessed early by an MSC and referred to other services, if required. Patients will be assisted to access services, if required.
• Following MSC assessment and treatment facilitation, some patients will be identified as not yet needing a surgical consultation resulting in increased efficiency in orthopaedic outpatient clinics.
• Some patients receiving early conservative management of their condition may not need surgery or may be able to delay it. Improved conservative management may also have a positive impact on recovery from surgery and long-term outcomes.
• Surgery is less likely to be cancelled due to comorbidities some risks associated with surgery (obesity) may be reduced.
• Reduces possibility of gaming as well as the possibility of stoic patients being neglected.

Disadvantages
• People not added to the OWL will be referred back to the community, where there is currently no systematic way of monitoring their condition, leading to potential delays in seeing a surgeon should their condition rapidly deteriorate.
• Greater resources required.

Musculoskeletal coordinator
The MSC is a new role that has been developed as part of the service model. The aim of the role is to coordinate the monitoring and management of patients referred to orthopaedic outpatient clinics and patients on the OWL. The role could be undertaken by either a physiotherapist, nurse or other allied health professional but the MSC must be competent in administering the standardised musculoskeletal assessment as this is the main competency required for the role. The competency training required to undertake this role will vary in duration and scope depending on the discipline chosen for the role.

A standardised MSC assessment and assessment protocol have been developed, which outline the main elements of the MSC assessment. The MSC assessment has been outlined in detail in section 6 and also Appendix 12 and Appendix 13.
In summary, the components of the assessment include clinical interview and examination, provision of information and referral. The level of expertise required may depend on the model adopted and the resources available at individual sites. Three broad options are presented in Table 31.

Table 31: Options for MSC role

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 2 physiotherapist</td>
<td>Nurse or physio with additional training or nurse and physio working together</td>
<td>Nurse practitioner or extended scope physio or option 2 plus GP or rheum</td>
</tr>
</tbody>
</table>

Competencies
- Assessment of OA
- Referral to OA services
- Home exercises
- Education re: OA and JRS
- Monitoring of OA
- Resource for GPs
- Resource for patients

Competencies
- Assessment of OA
- Referral to OA services
- Home exercises
- Education re: OA and JRS
- Monitoring of OA
- Resource for GPs
- Resource for patients

Competencies
- Assessment of OA
- Referral to OA services
- Home exercises
- Education re: OA and JRS
- Monitoring of OA
- Resource for GPs
- Resource for patients

- Assessment of comorbidities
- Ordering and interpretation of diagnostic tests
- Pharmacological pain management
Figure 7: Option 2 – Waiting list prioritisation plus triage of patients referred to orthopaedic outpatient clinics (MSC model)

- Patient sent MAPT if not already completed as part of referral. MAPT score used to prioritise patient for outpatient appointment.
- Patient assessed by MSC and referred to other services if appropriate. Patient MAPT score reviewed and used to prioritise patient for outpatient appointment.
- Patient sent MAPT every three to six months and reprioritised if MAPT score indicates deterioration.
- Patient completes MAPT prior to surgeon consultation if not already completed in previous three months. Surgeon reviews MAPT score.
- Patient placed on OWL is prioritised according to MAPT score.
- Patient sent MAPT every three months and reprioritised if MAPT score indicates deterioration.
7.2.4 Guiding principles for the OWL project

The following principles of care and guidelines for implementation are provided as a guide only. Some of the guidelines are dependent upon which model of service delivery is preferred. It is proposed that the next phase of the project will trial the service delivery model and refine guidelines for wider implementation based on information gathered during the trial phase.

Principles of care

- Treatment should be timely and appropriate.
- Provision of care should be equitable.
- Care should be based on best available evidence.
- Care should be consumer-focused and support self-management.
- Care should be multidisciplinary and support communication between care providers.
- Management of OA should be undertaken early and include regular monitoring.

Guidelines for implementation

Engagement principles

- An executive sponsor is responsible for all OWL and MAPT processes.
- An implementation group exists that oversees implementation and is committed to project success. The implementation group should include (but not be limited to) representatives from the following areas: orthopaedics, ambulatory care (outpatient department), preadmission clinic, general practice, rheumatology, physiotherapy, consumer representation, community health, theatre, IT and administration.
- The department of orthopaedics is engaged and mandates that patients receive queue positions based on the MAPT and outpatient appointments are prioritised according to the MAPT.
- The department of orthopaedics endorses MSC protocols for triage and works in partnership with the MSC in developing MSC protocols for triage.
- Each pilot site harmonises all developed protocols with other pilot sites to support the development of core protocols and, where necessary, site-specific protocols.
- The pilot sites fully engage with the OWL coordinating team (led by Dr Osborne) in any process evaluation, upskilling workshops and outcome evaluation.

Infrastructure

- Space is made available for the MSC to run clinics (requires information on expected numbers of patients).

Personnel

 Appropriately skilled staff are made available to operationalise all aspects of the pilot. This will include:
- collection and collation of MAPT data on all relevant patients referred to outpatients
- collection and collation of MAPT scores of all patients currently on OWL
- development of MSC protocols and policy
- triage by an MSC using MAPT scores for orthopaedic outpatient appointments
- OWL queue position assignment based on MAPT
provision of MAPT scores where required, to all those involved in the care of relevant patients, including orthopaedic surgeons
liason across sectors, including but not limited to GPs, outpatients, orthopaedics, allied health, preadmission and anaesthetics.

**Process**
- Mechanisms are developed to ensure the MSC can refer a patient for a review with the orthopaedic surgeon.
- Processes are developed so that the MSC can refer to conservative management options.
- Open communication with patient’s GP.
- Mechanisms are developed for the MSC to be able to influence, in partnership with orthopaedics, the reprioritising of patients on the OWL.
- All MSC decisions are supported by the MAPT score.
- The MSC is accessible to GPs by phone.
- The MSC has access to or develops a database of the range of services available for referral.
- The MSC role is undertaken by adequately qualified staff.
- Capacity is available for administrative support (for sending out letters, data entry, sending and receiving MAPTs).
- MAPTs are completed: on referral; at three- to six-monthly intervals while waiting for an outpatient appointment; at least three months prior to surgeon appointment; and at six-monthly intervals while on OWL.
- Mechanisms are developed to ensure the model is understood by all involved including MAPT scores.
- IT systems support MAPT application and data collection.

**Target group**
- The service be applied to all patients referred to orthopaedic outpatient clinics with an identified hip or knee problem.
- At present, the model has only been trialled on those who speak English and patients requiring initial JRS. Seek surgeon's advice on whether the MAPT score will provide information that supports clinical decision making for patient requiring revision JRS.

**Reporting**
- Data collection and reporting be established such that program activity can be identified with accuracy.

**Evaluation**
The evaluation should include process and outcome measures and could include but not be limited to:
- proportion of patients completing MAPTs
- proportion of patients assessed for suitability for conservative management
- proportion of patients at the time of surgery with high MAPT scores
- proportion of patients with marked decreases (higher priority) in their MAPT scores who are re-assessed by the MSC
- number of patients whose place on the OWL is adjusted based on MAPT review scores
- surgery conversion rates (number of orthopaedic surgeon consultations that are subsequently waitlisted for surgery).
8.0 Suggestions for transition phase

Summary

- A potential difficulty with prioritisation based only on patient urgency without consideration of time waited is that those patients who have low priority but definitely need JRS may never get their surgery because patients with greater urgency are always entering the system.
- This could be addressed by undertaking dynamic modelling of the waiting list through incorporating local policy decisions regarding the proportion of weekly operating lists that should be dedicated to those with most severe disease and those who have waited the longest with mild/moderate disease.

8.1 Strategic management of waiting lists

A potential difficulty with prioritisation based on patient urgency only without consideration of time waited is that unless additional resources become available, those patients who have stable low priority (but definitely need JRS) may never get their surgery because people who are worse off may always entering the system.

The MAPT weighting does not include a weight for time waited as this variable is highly dependent on the local environment and the acceptability of length of time waiting is somewhat intangible. Figure 7 highlights the dilemma of breadth of priority and workload. A potential strategy to reduce the net burden is to undertake dynamic modelling of the waiting list through incorporating local policy decisions regarding the proportion of weekly operating lists that should be dedicated to those with most severe disease and those who have waited the longest with mild/moderate disease.

For example, the throughput of a health service may be 20 cases per week and a local policy decision might be derived to ensure that each week: eight patients with the worst score (90+) have their surgery; eight patients with medium to high scores (MAPT 30 to 80) and who have waited at least three months have their surgery; and four patients who have waited 12 months or more have their surgery. Consideration would also have to be given to local needs such as teaching, availability of specific surgical skills and the competition of operating theatre space with emergency cases.

The ‘acceptable’ proportion of the list to allocate to waiting time categories and MAPT severity category might be developed through consultation with the community and also through mathematical modelling. The aim of the modelling would be to identify the best mix of patients to reduce the burden in the shortest possible time. Community values about acceptability of waiting times according to disease severity (MAPT score) would an important input into the modelling.
Figure 7: Conceptual diagram of management of people with low, medium and high MAPT priority

- **Lowest priority**
- **Middle priority**
- **Highest priority**

- Surgery "now"
- Surgery "later", but not forgotten

MAPT Priority score (100=worst health state)
Appendix 1: Working group membership

Annie Murphy  Nurse Co-ordinator for Ambulatory and Continuing Care, RHM (Royal Park Campus)
Clayton Prentice  Project Manager, Statewide Elective Surgery Program, DHS
Debbie Munro  Physiotherapy Manager, RMH (City Campus)
Jim Doumteses  Project Officer, Access and Metropolitan Performance, DHS
Leonie Carberry  Outpatients Manager, RMH (City Campus)
Liz Bongetti  Principal Health Professional, Arthritis Foundation Victoria
Maree Roberts  Manager, Statewide Elective Surgery Program, DHS
Marilyn Peck  Administration Officer for Ambulatory and Continuing Care, RMH (Royal Park Campus)
Dr Mark Santini  General Practitioner
Norma Valelezuela  Consumer representative
Dr Ralph Audehm  General Practitioner Liaison Officer, RMH
Shadi Hanna  Allied Health Manager, Moreland Community Health Service
Dr Stephen Lew  General Practitioner Liaison Officer, WH
Tracie Andrews  Director of Clinical Services, Moreland Community Health Service
Dr Jennifer Critchley  Musculoskeletal Research Fellow, The University of Melbourne
Mr Richard de Steiger  Director of Orthopaedics, RMH (City Campus)
Mr Chris Haw  Director of Orthopaedics, WH
Mr Rob Pianta  Orthopaedic Surgeon, WH
Mr Ian Critchley  Orthopaedic Surgeon, GVH
Mr Stan O’Loughlin  Director of Orthopaedics, DH
Appendix 2: Osteoarthritis clinical pathway model of care

OA Clinical Pathway Model of Care

Phase 2 - Disease Management

Interventions
- Symptom Control
- Limit disease progression
- Maintenance of functional status

Documentation of Process

Decide appropriate management option(s):
- Determine failed therapies
- Non pharmacological
- Pharmacological
- Referral to a specialist

Previous therapies & outcomes
- Management plan & dates of referrals

Develop Patient Action Plan
- Plan A - to do now
- Plan B - to do when an acute flare of pain & symptoms
- Establish Continuity of Care Framework

Review Progress
- Including medication, allergies, intolerance, & adverse effects
- Update to treatment &副主任 to practice
- Medication, intolerance & effectiveness

Review Patient Action Plan

Referrals:
- Allied Health
  - Physiotherapy
  - Exercise therapy, gait aids, patellar taping, & electrotherapy
  - Dietitian
    - Nutritional advice for weight loss/gain
  - Occupational Therapist
    - Assessment of AIDS & assistive equipment
  - Prosthetics

Pharmaceuticals:
- Simple analgesics, NAIDs, COX-2, & non-steroidal

 Framework for continuity of care
- Telephone support
- Structured review protocols
- Investigation tracking

Non-pharmacological
- Exercise program
- Assessment of gait & activities of daily living (ADLs)
- Social & psychological assessment
Appendix 3: Concept mapping workshops – methods

The workshops involved having participants generating ‘concepts’ related to the seeding statement (section 4.2, page 38). Each participant is asked to volunteer one concept in turn, and they are typed into a computer and projected on a screen for all to see. Once the participants have presented all their ideas, they are all printed onto small cards and distributed to the participants for ‘grouping’ into whatever groups they think fit. The rules for this process were:

- There has to be more than one pile.
- There has to be fewer piles than there are cards.
- Piles with only one card are OK.
- There must not be a ‘miscellaneous’ or ‘other’ pile. Cards that cannot be sorted should be treated as **piles of one card**.
- Once the cards are sorted think of a name for each pile.
- On one of the spare pieces of paper write a name for the pile and clip all the cards together with the name tag on top.

Once this process is complete, the participants rate each concept on an importance scale from 1 = unimportant to 5 = highest importance.

Concepts are then grouped into like domains using statistical criteria (cluster analysis). The ‘likeness’ is statistically ascertained by the similarities of the groupings generated from the participants. The number of concepts generated in each workshop ranged from 26 to 56, and the number of clusters ranged from six to 11.
Appendix 4: Draft MAPT items

Think about how your hip or knee has been affecting you over the past three months. Tick one box only for each question

1. Pain

1.1. Sleep disturbance

1.1.1. Do you have hip or knee pain when you first go to bed at night that stops you going to sleep?
1  No or rarely
2  I have pain that sometimes stops me going to sleep
3  I have pain that often stops me going to sleep
4  I have pain that stops me going to sleep most of the time
5  I have pain that stops me going to sleep all the time

1.1.2. Do you get hip or knee pain at night that wakes you and keeps you awake?
1  No, or it rarely keeps me awake
2  Yes, and the pain sometimes makes it difficult for me to go back to sleep
3  Yes, and the pain often makes it difficult for me to go back to sleep
4  Yes, and most of the time the pain makes it difficult for me to go back to sleep
5  Yes, and the pain always makes it difficult for me to go back to sleep

1.1.3. Do you get hip or knee pain that wakes you and stops you from sleeping?
1  Never or rarely
2  About once a fortnight (two weeks)
3  1 to 2 nights a week
4  3 to 4 nights a week
5  5 or more nights each week it wakes me and stops me from sleeping

1.1.4. Do you get hip or knee pain that wakes you at night?
1  Never or rarely
2  About once a fortnight (two weeks)
3  1 to 2 nights a week
4  3 to 4 nights a week
5  5 or more nights each week pain wakes me and stops me from sleeping

1.1.5. Do you get hip or knee pain that stops you from sleeping at night?
1  Never or rarely
2  1 to 2 nights each week
3  3 to 4 nights each week
4  5 to 6 nights each week
5  Every night of the week pain wakes me and stops me from sleeping
1.2. **Rest pain**

1.2.1. **After walking for a few minutes do you have severe hip or knee pain when you stop and rest?**

1. No or rarely
2. Yes, but it improves after a short rest
3. Yes, but it improves after about 15–30 minutes of rest
4. Yes, but it improves after about an hour of rest
5. I have severe hip or knee pain that never improves

1.2.2. **After activities (such as walking for a short time) do you have hip or knee pain that improves with rest?**

1. I do not have pain after activities
2. Yes, and the pain improves after a few minutes
3. Yes, and the pain improves after about 15–30 minutes
4. Yes, and the pain takes about 30–60 minutes to improve
5. Yes, and the pain takes more than an hour to improve

1.2.3. **Do you have hip or knee pain that is severe and does not get better even when you rest (that is while sitting or lying down)?**

1. None or mild pain
2. Moderate pain
3. Severe pain
4. Extremely severe pain
5. The pain is so severe that I cannot bear it

1.3. **Pain related to movement**

1.3.1. **Do you get hip or knee pain when walking from room to room in your home?**

1. None or mild pain
2. Moderate pain
3. Severe pain
4. Extremely severe pain
5. The pain is so severe that I cannot walk at all

1.3.2. **Do you have hip or knee pain that limits your walking?**

1. My walking is not limited by hip or knee pain
2. I can walk for about 30 minutes before pain stops me
3. I can walk for about 10–15 minutes before pain stops me
4. I can only walk for a short time (such as walking from one room to another room)
5. I am not able to walk at all because of my hip or knee pain

1.3.3. **Do you worry that you may get sudden, sharp hip or knee pain that makes you stop what you are doing?**

1. Never or rarely
2. It worries me some of the time
3. It worries me a moderate amount of the time
4. It worries me a large amount of the time
5. It worries me almost all of the time
1.3.4. Do you get sudden, sharp hip or knee pain that makes you stop what you are doing?
1 Never or rarely
2 Some of the time
3 A moderate amount of the time
4 Most of the time
5 Almost all of the time

1.3.5. If you walk a short distance (such as in your home) do you get hip or knee pain?
1 None or mild pain
2 Yes, moderate pain
3 Yes, severe pain
4 Yes, extremely severe pain
5 The pain is so severe that I am unable to walk

2. Limitations to daily activities

2.1. Impairment of mobility

2.1.1. After sitting at a table for a meal, does your hip or knee make it difficult for you to stand up?
1 I have no difficulty
2 It is a little difficult but I manage on my own
3 It is moderately difficult but I manage on my own
4 It is extremely difficult but I manage on my own
5 I cannot get up from the chair on my own

2.1.2. Does your hip or knee affect how long you can walk?
1 Not at all or very little
2 I can walk for about 30 minutes
3 I can walk for about 10–15 minutes
4 I can only walk for a very short time (such as the time it takes to get from one room to another)
5 I am unable to walk because of my hip or knee

2.2. Ability to self-care

2.2.1. Do you have a hip or knee problem that affects your ability to look after yourself (such as dressing and washing yourself, going to the toilet)?
1 I can look after myself without difficulty
2 It is sometimes difficult for me to look after myself
3 It is often difficult for me to look after myself
4 Most of the time it is difficult for me to look after myself
5 Because of my hip or knee I cannot look after myself

2.2.2. Do you have a hip or knee problem that makes it difficult for you to look after yourself (such as washing yourself, going to the toilet)?
1 No, I can look after myself without difficulty
2 There are some things I cannot do for myself
3 There are many things I cannot do for myself
4 I cannot do most things for myself
5 I cannot look after myself because of my hip or knee
2.2.3.  Do you have difficulty with washing and drying yourself because of your hip or knee?
1  I have no difficulty
2  It is a little difficult but I can do it on my own
3  It is moderately difficult but I can do it on my own
4  It is extremely difficult but I can do it on my own
5  I cannot do it on my own

2.2.4.  Do you have difficulty putting on socks, stockings or pantyhose because of your hip or knee?
1  I have no difficulty
2  It is a little difficult but I can do it on my own
3  It is moderately difficult but I can do it on my own
4  It is extremely difficult but I can do it on my own
5  I cannot do it on my own

2.2.5.  Does your hip or knee affect you using the toilet?
1  I have no difficulty using the toilet
2  It is a little difficult for me but I can manage on my own
3  It is moderately difficult but I can manage on my own
4  It is extremely difficult but I can manage on my own
5  I cannot use the toilet without help from someone

2.2.6.  Do you have difficulty with doing jobs around your home because of your hip or knee?
1  No, I can do all the jobs
2  There are some jobs I cannot do
3  There are many jobs I cannot do
4  I cannot do most jobs
5  I cannot do any jobs around my home because of my hip or knee

2.3.  Level of domestic support

2.3.1.  Do you get enough help with **day-to-day jobs** that you cannot do because of your hip or knee?
1  I do not need any help, or I get as much help as I need
2  Most of the time I get enough help
3  Some of the time I get enough help
4  I rarely get enough help
5  I do not get enough help with jobs around my home

2.3.2  Do you need help with looking after yourself (such as washing yourself, dressing, or going to the toilet) because of your hip or knee?
1  I do not need help, or I get all the help I need
2  Yes, and I usually get help
3  Yes, and I sometimes get help
4  Yes, and I rarely get help
5  I need help, and I can never get help
2.3.3 Do you need other people to help you to look after yourself (such as getting dressed or washed) because of your hip or knee?
1 I do not need anyone to help me look after myself
2 Sometimes I need help
3 I often need help
4 Most of the time I need help
5 I always need help to look after myself

2.3.4 Do you have a hip or knee problem that makes it difficult for you to look after yourself (such as getting dressed and washing yourself)?
1 No or I do not need help to look after myself
2 I need help and I usually get help when I need it
3 I need help and I sometimes get help when I need it
4 I need help and I rarely get help when I need it
5 I need help and I cannot get help to look after myself

2.4 Carer roles

2.4.1 Does your hip or knee affect your ability to look after people who need your care (such as a sick or disabled husband or wife, dependent children or grandchildren, elderly parents)?
1 No, or I do not need to look after anyone
2 I sometimes find it difficult to look after them
3 I often find it difficult to look after them
4 I very often find it difficult to look after them
5 I cannot look after people who need me to care for them

2.4.2 Does your hip or knee affect your ability to look after people who need your care (such as a sick or disabled husband or wife, dependent children or grandchildren, elderly parents)?
1 No, or I do not need to look after other people
2 I can look after them but it is moderately difficult
3 I can look after them but it is very difficult
4 I can look after them but it is extremely difficult
5 I cannot look after people who need me to care for them

3. Psychosocial health impact

3.1 Psychological effect of disability

3.1.1 Does your hip or knee affect your enjoyment of life?
1 No, or only a little
2 It makes it moderately difficult for me to enjoy my life
3 It makes it very difficult for me to enjoy my life
4 It makes it extremely difficult for me to enjoy my life
5 I cannot enjoy my life at all because of my hip or knee
3.1.2. Does your hip or knee affect your enjoyment of things that are important to you?
1 I am able to enjoy all of the things that are important to me
2 I cannot enjoy some things that are important to me
3 I cannot enjoy many things that are important to me
4 I cannot enjoy most things that are important to me
5 I cannot enjoy any of the things that are important to me because of my hip or knee

3.1.3. Do you feel very sad or depressed because of your hip or knee?
1 No or rarely
2 It sometimes makes me feel very sad or depressed
3 It often makes me feel very sad or depressed
4 Most of the time it makes me feel very sad or depressed
5 All of the time I feel very sad or depressed because of my hip or knee

3.1.4. Does your hip or knee make you feel like staying away from other people?
1 No
2 Sometimes I want to stay away from other people
3 I often want to stay away from other people
4 Most of the time I want to stay away from other people
5 All the time I want to stay away from other people because of my hip or knee

3.1.5. Do you have a hip or knee problem that makes you feel as though you are a burden to other people?
1 No, I do not feel like I am a burden to other people
2 I occasionally feel like I am a burden to other people
3 I often feel like I am a burden to other people
4 Most of the time I feel like I am a burden to other people
5 All of the time I feel like I am a burden to other people because of my hip or knee

3.1.6. Do you have a hip or knee problem that makes you worry about how you will cope from day to day?
1 No, or I am not worried about how I will cope
2 It sometimes makes me worry about how I will cope
3 It often makes me worry about how I will cope
4 Most of the time it makes me worry about how I will cope
5 All the time it makes me worry about how I will cope

3.2. Social effect of disability

3.2.1. Do you have a hip or knee problem that stops you from spending time with other people?
1 I spend as much time as I like with other people
2 Sometimes it stops me from spending time with other people
3 Often it stops me from spending time with other people
4 Most of the time it stops me from spending time with other people
5 All of the time my hip or knee stops me from spending time with other people
3.2.2. Do you have a hip or knee problem that stops you from being with people who are important to you (such as family, friends, workmates, club members)?

1 I spend as much time as I like with other people
2 Sometimes it stops me from being with other people
3 Often it stops me from being with other people
4 Most of the time it stops me from being with other people
5 All of the time my hip or knee stops me from being with other people

3.2.3. Do you have a hip or knee problem that stops you from going to social activities that are important to you (such as family events, clubs and meetings, and other gatherings)?

1 I go to all the social activities that I want to
2 It sometimes stops me from going to social activities
3 It often stops me from going to social activities
4 Most of the time it stops me from going to social activities
5 All of the time my hip or knee stops me from going to social activities that are important to me

3.2.4. Does your hip or knee affect your relationships with people close to you (such as wife, husband, children and close friends)?

1 No, it does not affect my relationships
2 It sometimes causes difficulties with my relationships
3 It often causes difficulties with my relationships
4 Most of the time it causes difficulties with my relationships
5 All of the time my hip or knee causes difficulties with my relationships

3.2.5. Do you have a hip or knee problem that makes you feel lonely and isolated?

1 No, I do not feel lonely and isolated because of my hip or knee
2 It sometimes makes me feel lonely and isolated
3 It often makes me feel lonely and isolated
4 Most of the time it makes me feel lonely and isolated
5 I feel lonely and isolated all the time because of my hip or knee

4. Economic impact

4.1. Interference with ability to work

4.1.1. Do you have a hip or knee problem that causes you financial difficulties (such as reduced ability to do paid work, buying medicines, paying for help around the home)?

1 No, it does not cause me financial difficulties
2 It causes me little financial difficulty
3 It causes me moderate financial difficulty
4 It causes me a great deal of financial difficulty
5 I cannot manage financially because of my hip or knee
4.1.2. Do you have a hip or knee problem that interferes with your ability to do paid work?
1 No, or I do not do paid work
2 It has **slightly** reduced my ability to do paid work
3 It has **moderately** reduced my ability to do paid work
4 It has **greatly** reduced my ability to do paid work
5 I have had to **stop** paid work because of my hip or knee

4.2. Financial provider for others

4.2.1. Does your hip or knee affect your ability to financially support others (such as dependent family members)?
1 No
2 It **slightly** reduces my ability to financially support others
3 It **moderately** reduces my ability to financially support others
4 It **greatly** reduces my ability to financially support others
5 I am **not able** to financially support others because of my hip or knee

4.2.2. Does your hip or knee affect your ability to work to financially support people who depend on you?
1 No, or I do not support anyone
2 It makes it a **little** difficult for me to work as much as I need to
3 It makes it **moderately** difficult for me to work as much as I need to
4 It makes it **very** difficult for me to work as much as I need to
5 I **cannot** work enough to support others who depend on me financially because of my hip or knee

4.2.3. Do you have a hip or knee problem that affects your ability to financially support others?
1 No, or I do not support anyone
2 It makes it **slightly** difficult for me to financially support others
3 It makes it **moderately** difficult for me to financially support others
4 It makes it **very** difficult for me to financially support others
5 It **stops** me from financially supporting others

4.2.4. Do you have a hip or knee problem that make it difficult for you to financially support others?
1 No, or I do not support anyone
2 It **sometimes** makes it difficult for me to provide for others
3 It **often** makes it difficult for me to provide for others
4 It **very often** makes it difficult for me to provide for others
5 All the **time** it is difficult for me to provide for others who depend on me

5. Recent deterioration

5.1. Overall, is your hip or knee problem different now compared with how it was six months ago?
1 It is **better** now compared with six months ago
2 It is about the **same** as six months ago
3 It is a **little worse** now compared with six months ago
4 It is **moderately worse** now compared with six months ago
5 It is **very much worse** now compared with six months ago
5.2. Due to your hip or knee, is your sleeping different now compared with how it was six months ago?
1 My sleeping is better now compared with six months ago
2 My sleeping is about the same as six months ago
3 My sleeping is a little worse now compared with six months ago
4 My sleeping is moderately worse now compared with six months ago
5 My sleeping is very much worse now compared with six months ago

5.3. Is your hip or knee pain different now compared with how it was six months ago?
1 My pain is better now compared with six months ago
2 My pain is about the same as six months ago
3 My pain is a little worse now compared with six months ago
4 My pain is moderately worse now compared with six months ago
5 My pain is very much worse now compared with six months ago

5.4. Due to your hip or knee, is your ability to walk different now compared with how it was six months ago?
1 My walking is better now compared with six months ago
2 My walking is about the same as six months ago
3 My walking is a little worse now compared with six months ago
4 My walking is moderately worse now compared with six months ago
5 My walking is very much worse now compared with six months ago

5.5. Due to your hip or knee, is your ability to look after yourself different now compared with how it was six months ago?
1 My ability to look after myself is better now compared with six months ago
2 My ability to look after myself is about the same as six months ago
3 My ability to look after myself is a little worse now compared with six months ago
4 My ability to look after myself is moderately worse now compared with six months ago
5 My ability to look after myself is very much worse now compared with six months ago

5.6. Due to your hip or knee, is your ability to cope with day-to-day living different now compared with how it was six months ago?
1 My ability to look after myself is better now compared with six months ago
2 My ability to look after myself is about the same as six months ago
3 My ability to look after myself is a little worse now compared with six months ago
4 My ability to look after myself is moderately worse now compared with six months ago
5 My ability to look after myself is very much worse now compared with six months ago

5.7. Due to your hip or knee, is your ability manage financially different now compared with how it was six months ago?
1 My ability to manage financially is better now compared with six months ago
2 My ability to look after myself is about the same as six months ago
3 My ability to look after myself is a little worse now compared with six months ago
4 My ability to look after myself is moderately worse now compared with six months ago
5 My ability to look after myself is very much worse now compared with six months ago
Appendix 5: Interview schedule for pre-testing the MAPT in an outpatient clinic

Recruiting and obtaining consent

- Introduce yourself to the patient and confirm with them that they are here to see the doctor about a hip or knee problem.
- Tell them briefly about the research project and ask them if they are willing to participate in the study.

My name is ____________________ . I am part of a research team from The Royal Melbourne Hospital and we are conducting a study to develop better ways to care for people who have hip and knee disease, particularly those who are on waiting lists for joint replacement surgery. We have developed a questionnaire that could be used to check the health and wellbeing of these people. We need help from people with hip or knee problems to make sure the questions we have written are easy to understand and that we have included the things that are important. Would you be able to help us by completing a few questions from this questionnaire, and then talking to us about your answers? It should take about 20 minutes. The information that you give us will be kept confidential.

- If they agree give them the information sheet to read and explain that you will put a notice on their medical records so they won’t miss their appointment while they are talking to you.

Here is some more information about the research. Have a read of it while I put a notice on your medical record so the nurse will know where you are and you don’t miss your doctor’s appointment. Then we will go into this room because it’s a bit quieter there.

- Go to where the histories of people who have arrived at clinic are kept. Place a notice on the front of the folder.
- If the person’s history is at the front do not interview them immediately. Go back and ask if they would mind being interviewed after their appointment as they will be seeing the doctor soon.
- Take the patient into the allocated room.
- If some patients would prefer to be interviewed after their appointment we can offer to interview them at a time that is convenient to them either in outpatients or in 7 East.

The interview

Thank you for your willingness to help with this research.

Do you have any questions from the information sheet?

As you probably read on the information sheet, participation in this research is voluntary and will not affect your care at the hospital in any way. The information you provide is confidential and will not be made available to your doctors and other healthcare professionals.

I will begin by asking you a few questions about yourself:

- What is your cultural background?
Orthopaedic Waiting List (OWL) project, June 2006

- What is the main language you speak at home?
- What is your age?
- What suburb do you live in?

Now I will be asking you a set of questions that are related to your physical symptoms, psychological wellbeing and your social situation. These questions are about the important issues an orthopaedic surgeon would consider when assessing a person with hip or knee problems.

We will start with questions from the XXX part of the questionnaire. There are five responses to each question and we would like you to tick the box with the response that is most appropriate to you. Please ask me if there is something you do not understand.

- Initially there will be two researchers present at the site. One will actually conduct the interview while the other will be a note taker or an observer.
- For each answer on a paper-based questionnaire the interviewer will remind the respondent of his or her answer.
- The main prompt will be ‘Can you tell me more about that answer?’ the other two prompts can be ‘How did you come to see it that way?’ and ‘Is there anything else you would like to say about that?’.
- Avoid using leading questions or additional probes such as why not?
- Look for answers such as ‘Yes’, ‘definitely’, ‘true’ what does this mean?.

Closure

- Ask the participant to give general comments on the questionnaire:
  - How easy was it to understand the questions?
  - What would you suggest to improve the questions included?
  - Is the layout of the questionnaire easy to read?
  - What would you suggest to make it more reader friendly?
  - Do you have any other suggestions or comments you would like to make?

- Thank the participants for their time and valuable feedback.
- Make sure all the papers are in order and close the room.

At the end of the last interview, thank the staff in charge and leave the room as you found it.
Appendix 6: Analytical methods for construction phase

- Confirmatory Factor Analysis (CFA) using Lisrel 8.5 was used to determine whether the hypothesised latent variables (priority for JRS) loaded on the specified items within each of the domains. A sequence of one-factor models were fitted to the data. The one-factor and pair-wise models were fitted following the method for the analysis of ordinal data using weighted least squares (WLS) and polychoric correlations recommended by Jöreskog.64
- Item Response Theory (IRT) analysis using RUMM2020 was conducted to explore item characteristics and extent to which items/scales conform to the Rasch model. IRT was used to make judgements about the ‘scalability’ of items and standard error mean (SEM) criteria were used to select the items that fitted reasonably well their corresponding scales. Item fit was assessed using the size and uniqueness of items’ factor loadings on the hypothesised factors.
- IRT models were also generated using multiple logistic regression to provide further insight into item and dimension characteristics.

An overarching criterion was ‘clinimetrics’, where the combination of candidate items had to have face validity from the clinical (orthopaedic) perspective.

The candidate items were sent to surgeons at each of the pilot sites for them to rank the items from the perspective of relative importance for placing people on waiting lists. Fourteen surgeons provided detailed feedback on each item and this assisted with item selection.
Appendix 7: Multi-attribute Arthritis Prioritisation Tool

(a) Name: _________________________

(b) Today’s date: ___ / ___ / ___

(c) Date of birth: ___ / ___ / ___

(d) Gender: ☐ Male  ☐ Female

Instructions:
For the following questions, think about how your hip or knee has been affecting you over the past three months when taking your usual medication or using your usual aids (for example, walking stick, frame or handrails). Please tick one box only for each question.

1. Do you have hip or knee pain that does not get better even when you rest (for example, while sitting)?
   ☐ None or mild pain
   ☐ Moderate pain
   ☐ Severe pain
   ☐ Extremely severe pain
   ☐ The pain is so severe that I cannot bear it

2. Do you have hip or knee pain when you first go to bed at night that stops you going to sleep?
   ☐ No or rarely
   ☐ I have pain that sometimes stops me going to sleep
   ☐ I have pain that often stops me going to sleep
   ☐ I have pain that stops me going to sleep most of the time
   ☐ I have pain that stops me going to sleep all the time

3. Do you have hip or knee pain that limits your walking?
   ☐ My walking is not limited by hip or knee pain
   ☐ I can walk for at least 30 minutes before pain stops me
   ☐ I can walk for about 10–15 minutes before pain stops me
   ☐ I can only walk for a short time (such as walking from one room to another room)
   ☐ I am not able to walk at all because of my hip or knee pain

4. Does your hip or knee make it difficult for you to look after yourself (such as washing yourself, getting dressed, going to the toilet)?
   ☐ No, I can look after myself → Go to Question 6 (over the page)
   ☐ There are some things I cannot do for myself
   ☐ There are many things I cannot do for myself
   ☐ I cannot do most things for myself
   ☐ I cannot look after myself because of my hip or knee

5. Do you get enough help with looking after yourself (such as washing yourself, getting dressed, going to the toilet)?
   ☐ I get as much help as I need
   ☐ Most of the time I get enough help
   ☐ Some of the time I get enough help
   ☐ I rarely get enough help
   ☐ I do not get enough help with looking after myself

Please answer the questions over the page.
6. Does your hip or knee affect your enjoyment of life?
- No, or only a little
- It makes it moderately difficult for me to enjoy my life
- It makes it very difficult for me to enjoy my life
- It makes it extremely difficult for me to enjoy my life
- I cannot enjoy my life at all because of my hip or knee

7. Does your hip or knee cause difficulties with your relationships with people close to you (such as wife, husband, children and close friends)?
- No, it does not cause difficulties with my relationships
- It sometimes causes difficulties with my relationships
- It often causes difficulties with my relationships
- Most of the time it causes difficulties with my relationships
- All of the time my hip or knee causes difficulties with my relationships

8. Does your hip or knee make it difficult for your household (yourself, family and others) to manage financially?
- No, it does not affect my household finances
- It makes it slightly difficult to manage financially
- It makes it moderately difficult to manage financially
- It makes it extremely difficult to manage financially
- My household cannot manage financially at all because of my hip or knee

9. Have you been in paid work in the past six months?
- No
- Yes, my hip or knee does not make it difficult for me to work
- Yes, but it is moderately difficult for me to continue to work because of my hip or knee
- Yes, but it is very difficult for me to continue to work because of my hip or knee
- Yes, but I have had to stop work because of my hip or knee
- Yes, but working is difficult for me for other reasons

10. Do you need to look after people who require your care (such as a sick or disabled partner or family member)?
- No
- Yes, my hip or knee does not make it difficult for me to look after them
- Yes, but it is moderately difficult for me to look after them because of my hip or knee
- Yes, but it is very difficult for me to look after them because of my hip or knee
- Yes, but I am unable to care for them because of my hip or knee
- Yes, but it is difficult for me to look after them for other reasons

11. Overall, is your hip or knee problem different now compared with how it was six months ago?
- It is better now
- It is about the same now
- It is a little worse now
- It is moderately worse now
- It is very much worse now

Thank you for taking the time to answer these questions
Appendix 8: Discrete choice experiments (DCE) application

Methods

Design

Nine of the 11 attributes have five response options and two have six. The levels in each attribute were reduced to four, except for one item, which had three relationships. This was to make the design more tractable. The levels representing less severe health states were merged to form three or four levels. The levels represent increasing levels of severity. The attributes and corresponding levels are shown in Table 32 together with their coding for the regression analysis.

Each design therefore had a possible $4^9 = 1,024$ different combinations of attribute levels. With a full factorial design, it is not possible to present all 1,024 scenarios to each respondent. A fractional factorial design was therefore produced generating 16 scenarios for each design.6 This design assumes that there are no interaction effects between the attributes. This possibility was also minimised in the distribution of the 11 attributes across the three designs. For example, there are three attributes relating to pain and each was assigned to a different design.

Each of the three designs consisted of 15 discrete choices. In each design, the levels of one scenario (scenario A) remained fixed across all 15 discrete choices. The other scenario (scenario B) was always compared with scenario A, and in scenario B, the attributes were allowed to vary. The fixed scenario A was chosen out of the 16 that were generated for the orthogonal design because it typically had two attributes at each of the extremes (one attribute level was one, another attribute level was four), and the remaining three attributes were between these. The reason for choosing this in a fixed scenario is to force respondents to make trade-offs, and to make this trade-offs apparent. The attributes contained within each of the three designs are shown in Table .

There are three relevant principles of efficient choice designs that need to be satisfied. Orthogonality (when attribute levels vary independently of each other) is satisfied because within each design, one attribute being set at a certain level does not imply that any other attribute has to be fixed at a certain level. In fact, each attribute in the fixed scenario is always compared with all three remaining attribute levels within each design. Level balance (when the levels of each attribute appear with equal frequency) is satisfied by using the fractional factorial design (this design generated equal frequencies of each attribute). Minimal overlap (when the alternatives within each choice set have non-overlapping attribute levels) is satisfied because each of the levels appear with equal frequency and the fixed scenario is always compared with all three remaining attribute levels (because orthogonality and level balance are satisfied). This results in minimal overlap because it minimises the number of times that the difference between the fixed scenario and all other scenarios in each design is zero.
### Table 32: MAPT attributes and modified levels

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Level</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pain</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain with rest</td>
<td>I have none to moderate pain</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>I have severe pain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>I have extremely severe pain</td>
<td>3</td>
</tr>
<tr>
<td>Pain and sleep</td>
<td>The pain is so severe that I cannot bear it</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>I do not, rarely, or sometimes experience pain</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>I have pain that often stops me going to sleep</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>I have pain that stops me going to sleep most of the time</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I have pain that stops me going to sleep all of the time</td>
<td>4</td>
</tr>
<tr>
<td>Pain with walking</td>
<td>My walking is not limited or I can walk for at least 30 minutes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>I can walk for about 10–15 minutes</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>I can only walk for a short time</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I am not able to walk at all</td>
<td>4</td>
</tr>
<tr>
<td><strong>Limitations to daily activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Looking after self</td>
<td>I can look after myself</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>There are some or many things I cannot do for myself</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>I cannot do most things for myself</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I cannot look after myself</td>
<td>4</td>
</tr>
<tr>
<td>Providing care</td>
<td>I get as much help as I need, or most of the time I get enough help</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Some of the time I get enough help</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>I rarely get enough help</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I do not get enough help</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>I do not look after, or experience no difficulty looking after, dependents</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>It is moderately difficult looking after dependents</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>It is very difficult looking after dependents</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I am unable to look after dependents</td>
<td>4</td>
</tr>
<tr>
<td><strong>Psychosocial health impact</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enjoyment of life</td>
<td>It does not affect, or causes little affect to, my enjoyment of life</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>It makes it moderately or very difficult for me to enjoy my life</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>It makes it extremely difficult for me to enjoy my life</td>
<td>3</td>
</tr>
<tr>
<td>Relationships</td>
<td>I cannot enjoy my life at all</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>It does not cause, or sometimes causes, difficulties with my</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>relationships</td>
<td></td>
</tr>
<tr>
<td></td>
<td>It often or most of the time causes difficulties with my relationships</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>All of the time it causes difficulties with my</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>relationships</td>
<td></td>
</tr>
<tr>
<td><strong>Economic impact</strong></td>
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<td></td>
</tr>
<tr>
<td>Household finances</td>
<td>It does not or it makes it slightly difficult for my household to manage financially</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>It makes it moderately difficult for my household to manage financially</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>It makes it extremely difficult for my household to manage financially</td>
<td>3</td>
</tr>
<tr>
<td>Paid work</td>
<td>My household cannot manage financially</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>I have not been in paid work or I am in paid work and it is not difficult to continue</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>I am in paid work and it is moderately difficult to continue</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>I am in paid work and it is very difficult to continue</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I have been in paid work, however, have had to stop working</td>
<td>4</td>
</tr>
<tr>
<td><strong>Recent deterioration</strong></td>
<td>Change in problem</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall, my problem is better or about the same</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Overall, my problem is a little worse</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Overall, my problem is moderately worse</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Overall, my problem is very much worse</td>
<td>4</td>
</tr>
</tbody>
</table>
Table 33: Attributes contained within each of the three designs

<table>
<thead>
<tr>
<th>Design</th>
<th>Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Providing care</td>
</tr>
<tr>
<td></td>
<td>Pain and sleep</td>
</tr>
<tr>
<td></td>
<td>Enjoyment of life</td>
</tr>
<tr>
<td></td>
<td>Enough help looking after self</td>
</tr>
<tr>
<td></td>
<td>Household finances</td>
</tr>
<tr>
<td>2</td>
<td>Providing care</td>
</tr>
<tr>
<td></td>
<td>Pain with rest</td>
</tr>
<tr>
<td></td>
<td>Enjoyment of life</td>
</tr>
<tr>
<td></td>
<td>Paid work</td>
</tr>
<tr>
<td></td>
<td>Looking after self</td>
</tr>
<tr>
<td>3</td>
<td>Providing care</td>
</tr>
<tr>
<td></td>
<td>Pain with walking</td>
</tr>
<tr>
<td></td>
<td>Enjoyment of life</td>
</tr>
<tr>
<td></td>
<td>Relationships</td>
</tr>
<tr>
<td></td>
<td>Change in problem</td>
</tr>
</tbody>
</table>

Analysis
A random effects probit model was used to analyse these binary responses. The random effects were used to account for correlations across observations caused by each surgeon filling out at least 15 choices. The dependent variable was either 0 or 1, depending on which scenario the respondent chose. The independent variables were the differences between the levels of scenario A and scenario B, and two dummy variables that indicated which design was used. For example, if attribute six of scenario A was set at level three, and attribute six of scenario B was set at level one, then the value independent variable was equal to B – A = –2.

Data from the three experimental designs, each containing different attributes apart from two that were common to all three designs, were pooled into one dataset. Since there were 11 attributes, but only five of these were presented in each discrete choice, zero values for the remaining six attribute differences were imputed in the data. An observation for individual one who filled out the first discrete choice and who was only presented with five attributes, contained the five attribute differences for these attributes and zero values for the remaining six attributes. Since respondents were told that the patients were exactly the same in every respect except in terms of the five attributes, this is a reasonable assumption. The regression model therefore had 11 attributes as independent variables.

Prediction of utility scores
All types of discrete choice models are grounded in random utility theory, which is the discrete choice analogue to consumer theory. If an individual chooses scenario B over scenario A, it is assumed that the utility of B is greater than A, although the actual utility cannot be observed, only the ordinal ranking. The coefficients from the probit model were used to predict rankings of individual patients who vary in terms of attribute levels. In generating the predictions from the models, the values of scenario A were set to equal the ‘best’ possible health state. Since scenario B will always be ‘worse’ than A, this anchors the predicted probabilities to the ‘best’
health state. The predicted probabilities can therefore be interpreted as the utility scores, bounded between zero and one, from a comparison of the patient’s actual health state to the best possible health state. Any combination of the attributes of the MAPT can be used to evaluate the model at specific points, allowing prioritisation of a wide spectrum of patients. A higher utility score (predicted probability) means that patients are in a worse health state. In terms of assigning priority, a higher score therefore means that the individual is given a higher priority. The predicted probabilities are obtained from the linear prediction of the probit model evaluated using a standard normal distribution. The predictions therefore depend on the distribution (mean and variance) of the linear prediction from the probit model. This implies that as new patients are put on the waiting list, the priority ranking of the whole list has to be re-calculated. This may mean that some patients may never reach the top of the list, and so raises issues about how the ranking will be used in practice. For example, it may need to be weighted by the length of time spent on the list.

The same method was repeated for a logit model to ensure that the probit and logit would give the same rankings. Since there were no outliers in the data that might affect the results, this turned out to be true and so the probit model was chosen.

Results
Presented below is part of the output from the probit model, showing the number of observations and groups as well as some test statistics and Table 35 presents the results from the probit regression.

<table>
<thead>
<tr>
<th>Coefficient associated with</th>
<th>Coefficient (βi)</th>
<th>SE</th>
<th>P &gt; z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain with rest</td>
<td>0.2248661</td>
<td>0.030874</td>
<td>0</td>
</tr>
<tr>
<td>Pain and sleep</td>
<td>0.6400614</td>
<td>0.0635924</td>
<td>0</td>
</tr>
<tr>
<td>Pain with walking</td>
<td>0.3533524</td>
<td>0.0315899</td>
<td>0</td>
</tr>
<tr>
<td>Looking after self</td>
<td>0.106901</td>
<td>0.0625219</td>
<td>0.087</td>
</tr>
<tr>
<td>Enough help looking after self</td>
<td>0.3661639</td>
<td>0.0555738</td>
<td>0</td>
</tr>
<tr>
<td>Enjoyment of life</td>
<td>0.6485441</td>
<td>0.0504006</td>
<td>0</td>
</tr>
<tr>
<td>Relationships</td>
<td>0.1391425</td>
<td>0.0507926</td>
<td>0.006</td>
</tr>
<tr>
<td>Household finances</td>
<td>0.2358608</td>
<td>0.0545326</td>
<td>0</td>
</tr>
<tr>
<td>Paid work</td>
<td>0.6910283</td>
<td>0.051637</td>
<td>0</td>
</tr>
<tr>
<td>Providing care</td>
<td>0.0791394</td>
<td>0.0680867</td>
<td>0.245</td>
</tr>
<tr>
<td>Change in problem</td>
<td>0.4368356</td>
<td>0.0490193</td>
<td>0</td>
</tr>
<tr>
<td>Dummy for design 2</td>
<td>−0.9127686</td>
<td>0.2118856</td>
<td>0</td>
</tr>
<tr>
<td>Dummy for design 3</td>
<td>−0.3566985</td>
<td>0.2229547</td>
<td>0.11</td>
</tr>
<tr>
<td>Constant</td>
<td>0.5804655</td>
<td>0.1658348</td>
<td>0</td>
</tr>
<tr>
<td>/lnsig2u</td>
<td>−1.660593</td>
<td>0.2758254</td>
<td>0</td>
</tr>
<tr>
<td>sigma_u</td>
<td>0.43592</td>
<td>0.0601189</td>
<td></td>
</tr>
<tr>
<td>rho</td>
<td>0.1596824</td>
<td>0.0370113</td>
<td></td>
</tr>
</tbody>
</table>
The β's are the coefficients associated with each of the 11 attributes of the original questionnaire, and represent their relative importance. In the probit model, the dependent variable is the probability that \( y = 1 \), and the independent variables are positive when \( A > B \) and negative when \( B > A \). \( A \) represents the attributes of the fixed scenario and \( B \) represents the attributes of the individual patients. Hence, a higher coefficient in the former case \( (A > B) \) means a higher probability value, which means that patient has higher priority. In the latter case \( (B > A) \), a higher coefficient means a lower probability value, which means that patient has less priority. By order of magnitude, having been in paid work had the most influence on the priority score, while looking after others had the least, and this was also insignificant. \( \alpha \) is a constant.

Rho is a test of the significance of the random effects, and assesses whether or not the same consultants answering more than one design had an effect on their answer. Rho is significant, so answering more than one design affected the answers.

These coefficients and the constant were used to evaluate the model at different attribute levels. For each attribute, the attribute differences range from –3 to +3, so some of the evaluations will be out-of-sample predictions.

An example using 10 different scenarios (or individuals) has been applied to illustrate how the process works. Table 34 shows the attribute levels for 10 individuals.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td>Pain with rest</td>
<td>4 4 2 4 1 2 3 1 3 4</td>
</tr>
<tr>
<td>Pain and sleep</td>
<td>4 3 3 2 2 3 2 2 2</td>
</tr>
<tr>
<td>Pain with walking</td>
<td>4 2 2 4 3 2 3 1 4 2</td>
</tr>
<tr>
<td>Looking after self</td>
<td>4 1 3 3 1 2 3 2 2 1</td>
</tr>
<tr>
<td>Enough help looking after self</td>
<td>4 4 2 4 2 3 3 1 3 1</td>
</tr>
<tr>
<td>Enjoyment of life</td>
<td>4 3 3 1 2 3 2 4 3</td>
</tr>
<tr>
<td>Relationships</td>
<td>4 2 2 4 2 2 3 1 3 3</td>
</tr>
<tr>
<td>Household finances</td>
<td>4 1 3 4 2 3 2 4 4</td>
</tr>
<tr>
<td>Paid work</td>
<td>4 4 3 4 2 3 1 3 4</td>
</tr>
<tr>
<td>Providing care</td>
<td>4 1 2 3 1 2 3 1 2 3</td>
</tr>
<tr>
<td>Change in problem</td>
<td>4 2 2 4 2 2 3 2 3 3</td>
</tr>
</tbody>
</table>

Predicted values represent a probability on a standard normal distribution (or a logistic distribution for the logit model) at a specific point. That specific point is the sum of the differences of the independent variables (vis-à-vis the fixed scenario) plus a constant, weighted by the coefficients from the probit model. Hence, the independent variables are the attribute levels assigned to a particular individual less the attribute levels of the fixed scenario. So, for example, for individual 2:

\[
x_1 = 4, x_2 = 3, x_3 = 2, x_4 = 1, x_5 = 4, x_6 = 3, x_7 = 2, x_8 = 1, x_9 = 4, x_{10} = 1, x_{11} = 2
\]

\[
\Rightarrow d_1 = 4 - 1 = 3, d_2 = 3 - 1 = 2, d_3 = 1, d_4 = 0, d_5 = 3, d_6 = 2, d_7 = 1, d_8 = 0, d_9 = 3, d_{10} = 0, d_{11} = 1
\]
Therefore for each individual, the linear prediction $\hat{y}$

$$\hat{y} = \alpha + \sum_{i=1}^{11} d_i \beta_i \quad i = 1, \ldots, 11$$

Each of these points is then evaluated on the standard normal distribution, yielding a utility score. Table 35 outlines the linear prediction, utility score and ultimate priority ranking for each of the 10 individuals. The same ranking is derived when the logit model is used.

Table 35: Linear prediction, utility score and priority ranking for each of the 10 individuals

<table>
<thead>
<tr>
<th>Individual</th>
<th>Linear Prediction $(y)$</th>
<th>Utility Score (Prob.)</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12.35</td>
<td>0.95</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>7.93</td>
<td>0.56</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>6.82</td>
<td>0.41</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>10.64</td>
<td>0.86</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>4.96</td>
<td>0.19</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>4.5</td>
<td>0.15</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>8.42</td>
<td>0.63</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>2.65</td>
<td>0.05</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>8.84</td>
<td>0.68</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>7.64</td>
<td>0.52</td>
<td>6</td>
</tr>
</tbody>
</table>
Dear Mr/Mrs/Miss/Ms ____________

The departments of Surgery and Medicine at The Royal Melbourne Hospital are undertaking research to develop better ways to care for people with severe hip and knee disease and who might be waiting for joint replacement surgery.

This project involves finding out the most important issues that orthopaedic surgeons should consider when determining a person's priority for joint replacement surgery. To do this, we are developing a questionnaire that can be used to check the health and wellbeing of people who have hip or knee disease. This questionnaire could be used by health professionals, such as nurses and physiotherapists, to monitor people at regular intervals while they are on waiting lists for an outpatient's appointment or for joint replacement surgery. We are currently testing this new system of monitoring people while they are on orthopaedic waiting lists. As you are currently on a waiting list for joint replacement surgery at The Royal Melbourne Hospital I am writing to ask you for your assistance with this research.

Participation in this research project is voluntary and will not affect your care at the hospital in any way. The information you provide is to inform research that will be used to develop better care for other people in the future. Only your orthopaedic surgeon and the researchers will have access to any information that you give us.

If you choose to take part, it will involve answering questions over the phone and in written questionnaires. It will also involve one extra visit to The Royal Melbourne Hospital for a physical assessment of your hip or knee by a physiotherapist or nurse. The questions you will be asked will be about your physical symptoms, psychological wellbeing and your social situation. This should take about 30 minutes. Overall, the questions are about things that an orthopaedic surgeon might consider when a person is being assessed for hip or knee joint replacement. You will also be asked about any treatments and medications you have tried for your knee or hip problem. You may be asked if you would like to try some other services for your knee or hip problem. Questionnaires containing similar questions will be mailed to you three or four more times over the next 12 months, or until you have joint replacement surgery. The questionnaires will take about 20 minutes to complete each time.

A member of the research team will be phoning you in the next week to give you more information about this research. Her name is ____________ and she can be contacted on ____________.

Yours sincerely,
Mr Richard de Steiger
Director, Department of Orthopaedics
The Royal Melbourne Hospital
Appendix 10: Participant information and consent form

Participant information and consent form
Version 2: Dated 2 December 2004
Departments of Surgery and Medicine, The Royal Melbourne Hospital

Full project title: Development and implementation of a model for prioritisation and management of orthopaedic waiting lists
Principal researcher: Prof. Stephen Graves
Associate researchers: Dr Richard Osborne, Prof. Ian Wicks, Dr Caroline Brand, Mr Richard de Steiger

This participant information and consent form is six pages long. Please make sure you have all the pages.

1. Your consent
You are invited to take part in this research project.

This participant information contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project before you decide whether or not to take part in it.

Please read this participant information carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend or your local health worker. Feel free to do this.

Once you understand what the project is about and if you agree to take part in it, you will be asked to sign the consent form. By signing the consent form, you indicate that you understand the information and that you give your consent to participate in the research project.

You will be given a copy of the participant information and consent form to keep as a record.

2. Purpose and background
People with severe knee and hip disease often experience symptoms such as pain and limitations and the disease leads to reduced quality of life. For many people hip or knee joint replacement surgery is an appropriate treatment that can greatly relieve their symptoms. Unfortunately, there are often long waiting lists in public hospitals in Victoria and people may have to wait many months before they are able to receive the surgery. Currently, people who need joint replacement surgery are placed in three broad categories that indicate how urgently they need surgery, but there is limited opportunity to review changes in health while people wait.

This research project aims to develop and implement a system that monitors people on waiting lists and prioritises them according to a broad range of needs so that people with greater need have joint replacement surgery more quickly. A further aim is to find out what factors make hip and knee disease worsen over time.

It is important that we clearly identify all the issues that determine how quickly a person should have joint replacement surgery. This project involves interviews, workshops and questionnaires with a wide range of people including patients who might require or have had joint replacements, doctors and other health professionals, hospital administrators and community health workers. Overall, about 1,400 people with hip or knee disease will
participate in this project. You have been invited to participate because you have sought medical care for hip or knee problems at The Royal Melbourne Hospital.

3. **Procedures**

Participation in this study involves answering questions over the phone and in questionnaires. It may also involve a physical assessment of your hip or knee by a physiotherapist or nurse at The Royal Melbourne Hospital. The questions you will be asked will be about your physical symptoms, psychological wellbeing and your social situation. This should take about 30 minutes. Overall, the questions are about things that an orthopaedic surgeon might consider when a person is being assessed for hip or knee replacement. You will also be asked about any treatments and medications you have tried for your knee or hip problem. Questionnaires containing similar questions will be mailed to you three or four more times over the next 12 months, or until you have joint replacement surgery. The questionnaires will take about 20 minutes to complete each time.

Some people may be invited to take part in a 20-minute interview that will be either face-to-face or by telephone. This interview will involve discussions about whether the questions in the survey were written in a way that made them easy or hard for you to understand, and to check whether we have covered the things you think are important for people with hip or knee problems.

4. **Possible benefits**

There are no direct benefits to you if you take part in this study although your participation is likely to help people in the future. Your participation will help us to develop a questionnaire to improve the prioritisation and care of people who might need joint replacement surgery.

5. **Possible risks**

It is not anticipated that there will be any risks or side effects associated with your participation in this research.

6. **Alternatives to participation**

You do not have to participate in this research to receive the medical care you require for your condition. If you choose not to participate in this research project, you will receive your medical care as planned.

7. **Privacy, confidentiality and disclosure of information**

Any information obtained in connection with this project and that can identify you will remain confidential. It will be made available to your orthopaedic surgeon, but will not be disclosed to anyone else without your permission, except as required by law.

The researchers may review your medical record to obtain information such as the reason for your referral to The Royal Melbourne Hospital, the type of surgery or treatment you require, or the type of surgery or treatment that you have received.

Information from this research will be stored inside a locked office within the Centre for Rheumatic Diseases. Only the researchers will have access to this office. Personal identifying information (your name, address and phone number) will be stored separately from any notes or recordings related to the meeting. This information will be stored for a period of seven years and then destroyed.

In any publication, information will be provided in such a way that you cannot be identified.
In accordance with relevant Australian and/or Victorian privacy and other relevant laws you have the right to access the information collected and stored by the researchers about you. You also have the right to request that any information with which you disagree be corrected. Please contact one of the researchers named in section 9 below if you would like to access your information.

8. Results of project
In about two years when the whole project is completed, the results of this research will be published in a report to the Department of Human Services and in articles in medical journals. They will also be available by contacting the Centre for Rheumatic Diseases on (03) 9342 7634.

9. Further information or any problems
If you require further information or if you have any problems concerning this project you can contact the principal researcher, Professor Stephen Graves, or the project manager, Kerry Haynes. The researchers responsible for this project are:

Professor Stephen Graves
Director, Orthopaedic Research
Department of Medicine
The University of Melbourne
Mobile: 0409 567 786

Dr Richard Osborne
Senior Lecturer
Centre for Rheumatic Diseases
The University of Melbourne
7 East, The Royal Melbourne Hospital, Parkville 3050
Phone: (03) 8344 3148
Fax: (03) 9342 7632
Mobile phone: 0498 330 229

Ms Kerry Haynes
Project Manager
Centre for Rheumatic Diseases
The University of Melbourne
7 East, The Royal Melbourne Hospital, Parkville 3050
Phone: (03) 8344 3143
Fax: (03) 9342 7632

10. Other issues
If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

Dr Angela Watt
Manager, Human Research Ethics Committee
Melbourne Health
Phone: (03) 9342 8530

You will need to tell Dr Watt the name of one of the researchers given in section 9 above.

11. Participation is voluntary
Participation in any research project is voluntary. If you do not wish to take part you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage.
Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your routine treatment, your relationship with those treating you or your relationship with The Royal Melbourne Hospital. It will not affect your place on the orthopaedic surgery waiting list.

Before you make your decision, a member of the research team will be available to answer any questions you have about the research project. You can ask for any information you want. Sign the consent form only after you have had a chance to ask your questions and have received satisfactory answers.

12. Ethical guidelines
This project will be carried out according to the *National statement on ethical conduct in research involving humans* (June 1999) produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

The ethical aspects of this research project have been approved by The Royal Melbourne Hospital Human Research Ethics Committee.

13. Reimbursement for your costs
You will not be paid for your participation in this project.
Consent form

Consent form
Version 2: 2 December 2004
Site: The Royal Melbourne Hospital

Full project title: Development and implementation of a model for prioritisation and management of orthopaedic waiting lists

I have read, or have had read to me, and I understand the participant information version 2 dated 2 December 2004.

I freely agree to participate in this project according to the conditions in the participant information.

I will be given a copy of the participant information and consent form to keep.

The researcher has agreed not to reveal my identity and personal details if information about this project is published or presented in any public form.

Participant’s name (printed) ............................................................
Signature ................................................. Date

Name of witness to participant’s signature (printed) ..................................
Signature ................................................. Date

Researcher’s name (printed) ..........................................................
Signature ................................................. Date

Note: All parties signing the consent form must date their own signature.
Revocation of consent form

(To be used for participants who wish to withdraw from the project.)

Department of Surgery and Medicine, The Royal Melbourne Hospital

Revocation of consent form

Full project title: Development and implementation of a model for comprehensive prioritisation and management of orthopaedic waiting lists

I hereby wish to withdraw my consent to participate in the research proposal described above and understand that such withdrawal will not jeopardise any treatment or my relationship with The Royal Melbourne Hospital.

Participant’s name (printed) ..............................................................

Signature                      Date
Appendix 11: Confirmation of clinic appointment letter
(Printed on hospital letterhead)

Mr/Mrs/Miss/Ms ____________
Street address ____________
Suburb, state, postcode

Dear Mr/Mrs/Miss/Ms ____________,

Thank you for agreeing to participate in the Orthopaedic Waiting List project. As discussed on the telephone, an appointment has been made for your assessment with the musculoskeletal coordinator. Her name is ____________________.

Details of your assessment are:

**Date:** Day, date, month

**Time:** Time (am/pm). Please allow one hour for your appointment.

**Location:** ____________ Hospital
Street address, suburb
Location within hospital

Enclosed is further information about the project as well as a consent form. Please read this information and sign the consent form to confirm your willingness to participate. Also enclosed is a questionnaire for you to complete at home. **Please return these to me in the reply paid envelope prior to your appointment.** You will be given a copy of the participant information and consent form to keep as a record.

**Please bring with you to your appointment:**

- your local doctor’s contact details
- a list of your current medications and dosage.

If you have any further questions regarding the project or your assessment with the coordinator please contact me on ____________.

Thank you once again for your participation in the project.

Yours sincerely,

Name
Research Assistant/Musculoskeletal Coordinator
Orthopaedic Waiting List project
Appendix 12: Musculoskeletal coordinator assessment

Study no: [Blank]
Hospital UR no: [Blank]

Date: ___/___/____
Name: ___________________________________
Address: ___________________________________
_________________________________________
Postcode: ______
Phone number: ( ) __________
Date of birth: ___/___/_____ Gender (M/F): ___

Additional contact person: ___________ Phone number: ( ) __________

GP name and phone number: ______________________ ( ) __________
GP address: ____________________________________________

Consultant name: ____________________________

Language spoken most at home: ☐ English ☐ Other___________

Part A: Interview assessment

1. Pain and mobility

<table>
<thead>
<tr>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>How long has the patient had this problem?</td>
</tr>
<tr>
<td>Walking time: ______________</td>
</tr>
<tr>
<td>Gait aid ☐ Yes ☐ No</td>
</tr>
<tr>
<td>Type(s) of aid: ______________</td>
</tr>
<tr>
<td>Pain when resting ☐ Yes ☐ No</td>
</tr>
<tr>
<td>Pain that stops the patient getting to sleep ☐ Yes ☐ No</td>
</tr>
<tr>
<td>Has the problem changed over the past six months?</td>
</tr>
</tbody>
</table>

Referral details

(a) Hip Knee
☐ Left ☐ Right
☐ Left ☐ Right
(b) On waiting list
☐ Yes ☐ No
(c) Consultation
☐ Initial ☐ Review

Patient identification label

DRAFT OWL MAPT 6 May 05. NOT FOR DISTRIBUTION
2. Medical/surgical history

- Medical history:


- Surgical history:


3. Social history

- Living arrangements
  - Home: → □ Alone □ With others
  - Residential care


- Managing at home
  - Looking after themselves □ Yes □ No
  - Home maintenance □ Yes □ No
  - Enough support □ Yes □ No □ N/A


- Significant carer □ Yes □ No
### Social History (continued)

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently working</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worked in past six months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does hip or knee affect the patient’s ability to work?</td>
<td></td>
<td></td>
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<tr>
<td>Has hip or knee affected patient’s finances, or likely to in future?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Relationships affected</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Enjoyment of life affected</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4. Analgesia/arthritis medications

<table>
<thead>
<tr>
<th>Analygic medication</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug name (product/generic name)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose/frequency</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Arthritis medication</th>
<th>Yes</th>
<th>No</th>
<th>Cannot take anti-inflammatory drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug name (product/generic name)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dose/frequency</td>
<td></td>
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</tbody>
</table>

### 5. Other current medications

<table>
<thead>
<tr>
<th>Drug name (product/generic name)</th>
<th>Drug name (product/generic name)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>6.</td>
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<tr>
<td>2.</td>
<td>7.</td>
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<td>3.</td>
<td>8.</td>
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<td>4.</td>
<td>9.</td>
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<tr>
<td>5.</td>
<td>10.</td>
</tr>
</tbody>
</table>
### Part B: Objective examination

#### 1. Range of motion – hip and knee

<table>
<thead>
<tr>
<th>ROM (degrees)</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extension/flexion (e.g. 10–0–140)°</td>
<td></td>
<td></td>
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<tr>
<td>Hip</td>
<td></td>
<td></td>
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<tr>
<td>Flexion (e.g. 0–120)°</td>
<td></td>
<td></td>
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<tr>
<td>Abduction/adduction (e.g. 45–0–40)°</td>
<td></td>
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<tr>
<td>External/internal rotation (e.g. 60–0–40)°</td>
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</table>

**Comments:**

#### 2. Optional assessments: please provide details

<p>| | | |</p>
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</tbody>
</table>
### Part C: Recommendations

<table>
<thead>
<tr>
<th></th>
<th>Used in the past</th>
<th>Needs referral now</th>
<th>Reason(s) for non-referral when referral is recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hydrotherapy</td>
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<td></td>
<td></td>
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<tr>
<td>Pain management clinic</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Arthritis self-management program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP review</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rheumatologist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthopaedic surgeon</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Dietician</td>
<td></td>
<td></td>
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<tr>
<td>Occupational therapy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Home help</td>
<td></td>
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<tr>
<td>Meals on Wheels</td>
<td></td>
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<tr>
<td>Other: _____________</td>
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<tr>
<td>Other: _____________</td>
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</tbody>
</table>

**Comments:**

---

**Current self-care activities:**

---

DRAFT OWL MAPT 6 May 05. NOT FOR DISTRIBUTION
Part D: Coordinator derived patient MAPT

1. Do you have hip or knee pain that does not get better even when you rest (for example, while sitting)?
   - None or mild pain
   - Moderate pain
   - Severe pain
   - Extremely severe pain
   - The pain is so severe that I cannot bear it

2. Do you have hip or knee pain when you first go to bed at night that stops you going to sleep?
   - No or rarely
   - I have pain that sometimes stops me going to sleep
   - I have pain that often stops me going to sleep
   - I have pain that stops me going to sleep most of the time
   - I have pain that stops me going to sleep all the time

3. Do you have hip or knee pain that limits your walking?
   - My walking is not limited by hip or knee pain
   - I can walk for at least 30 minutes before pain stops me
   - I can walk for about 10 to 15 minutes before pain stops me
   - I can only walk for a short time (such as walking from one room to another room)
   - I am not able to walk at all because of my hip or knee pain

4. Does your hip or knee make it difficult for you to look after yourself (such as washing yourself, getting dressed, going to the toilet)?
   - No, I can look after myself → Go to Question 6
   - There are some things I cannot do for myself
   - There are many things I cannot do for myself
   - I cannot do most things for myself
   - I cannot look after myself because of my hip or knee

5. Do you get enough help with looking after yourself (such as washing yourself, getting dressed, going to the toilet)?
   - I get as much help as I need
   - Most of the time I get enough help
   - Some of the time I get enough help
   - I rarely get enough help
   - I do not get enough help with looking after myself

6. Does your hip or knee affect your enjoyment of life?
   - No, or only a little
   - It makes it moderately difficult for me to enjoy my life
   - It makes it very difficult for me to enjoy my life
   - It makes it extremely difficult for me to enjoy my life
   - I cannot enjoy my life at all because of my hip or knee
7. **Does your hip or knee cause difficulties with your relationships with people close to you (such as wife, husband, children and close friends)?**
   - [ ] No, it does not cause difficulties with my relationships
   - [ ] It sometimes causes difficulties with my relationships
   - [ ] Most of the time it causes difficulties with my relationships
   - [ ] All of the time my hip or knee causes difficulties with my relationships

8. **Does your hip or knee make it difficult for your household (yourself, family and others) to manage financially?**
   - [ ] No, it does not affect my household finances
   - [ ] It makes it slightly difficult to manage financially
   - [ ] It makes it moderately difficult to manage financially
   - [ ] It makes it extremely difficult to manage financially
   - [ ] My household cannot manage financially at all because of my hip or knee

9. **Have you been in **paid** work in the past six months?**
   - [ ] No
   - [ ] Yes, my hip or knee does not make it difficult for me to work
   - [ ] Yes, but it is moderately difficult for me to continue to work because of my hip or knee
   - [ ] Yes, but it is very difficult for me to continue to work because of my hip or knee
   - [ ] Yes, but I have had to stop work because of my hip or knee
   - [ ] Yes, but working is difficult for other reasons

10. **Do you need to look after people who require your care (such as a sick or disabled partner or family member)?**
    - [ ] No
    - [ ] Yes, my hip or knee does not make it difficult for me to look after them
    - [ ] Yes, but it is moderately difficult for me to look after them because of my hip or knee
    - [ ] Yes, but it is very difficult for me to look after them because of my hip or knee
    - [ ] Yes, but I am unable to care for them because of my hip or knee
    - [ ] Yes, but it is difficult for me to look after the for other reasons

11. **Overall, is your hip or knee problem different now compared with how it was six months ago?**
    - [ ] It is better now
    - [ ] It is about the same now
    - [ ] It is a little worse now
    - [ ] It is moderately worse now
    - [ ] It is very much worse now
Part E: Communication with the patient's GP and surgeon

Has a letter regarding the findings from this assessment been sent to the patient's GP?

☐ Yes (date letter sent) __/__/_____
☐ Copy sent to Health Information Services

Signed: ________________________________ Date: ___/___/_____
Print name: _____________________________

Musculoskeletal Coordinator
Orthopaedic Waiting List project
Appendix 13: Protocol for completion of the musculoskeletal coordinator assessment: initial

Purpose: The various components of the MSC assessment aim to assist with validation of the patient MAPT and determining appropriate forms of further management for the patient.

Part A: Interview assessment

1. Pain and mobility

1a. How long the patient has had this problem

Purpose 1: To provide information about whether the condition is OA.

Procedure: If the condition is severe and they say that they have had it for less than six months, it may not be OA. Referral for further medical advice through their GP is recommended.

Purpose 2: To assist with validating item 11 of the patient MAPT.

1b. Walking time

Purpose: To validate item 3 of the patient MAPT.

Procedure: Ask the patient the length of time they can walk for before the pain stops them. If they can only answer in terms of distance, attempt to transfer this into time. Ask what stops them from walking further. This is to determine whether it is hip or knee pain that limits their walking ability or another condition (for example, breathing difficulties). Emphasise that the length of time they can walk for should be considered given they have taken their usual medications and they are using their prescribed walking aids.

1c. Gait aid

Purpose: To determine whether that patient’s current gait aid is appropriate and/or whether they require to be fitted with a gait aid.

Procedure: If the patient uses a gait aid, note the type and whether it is appropriate. To determine if the gait aid is appropriate observe the patient’s gait on ambulating into the clinical assessment room.

- Is the gait aid the correct height, that is, handles at level of wrist when patient is standing with their elbow slightly flexed and wrist extended?
- Is the gait aid being used correctly, that is, SPS on contra lateral side to the affected limb?
- Are the stoppers adequate?
- Standing posture: Is the patient able to stand upright when using a gait aid?
- Weightshift and weightbearing to the affected side
- Is stride length equal on both sides?
- Is the patient able to take an appropriate amount of weight through arms when using gait aid?
- Safety when standing from a chair, walking and turning
If the patient does not use a gait aid, the MSC should use their clinical judgement to determine whether an aid is necessary. The objective examination (Part B) will assist with determining this.

If the gait aid is not appropriate or it is necessary to organise a gait aid, consider referral to an occupational therapist or physiotherapist.

1d. Pain when resting

Purpose: To validate item 1 of the patient MAPT

Procedure: Ask whether the patient experiences pain that does not get better even when they rest, that is, when sitting down. Emphasise that this should be considered given they have taken their usual medications.

1e. Pain that stops the patient from getting to sleep

Purpose: To validate item 2 of the patient MAPT

Procedure: Ask whether the patient experiences pain that stops them from getting to sleep. Emphasise that this should be considered given they have taken their usual medications.

1f. Has the problem changed over the past six months?

Purpose: To validate item 11 of the patient MAPT

Procedure: Ask how the hip or knee problem has changed over the previous six months. The response should be considered in conjunction with 1a, which will enable a more accurate indication of whether the problem has changed.

2. Medical/surgical history

Purpose: An understanding of medical and surgical history will assist with determining the appropriateness of referrals for further management.

2a. Medical history

Procedure: List major health problems in point form such as:
- asthma
- diabetes
- hypertension
- renal impairment
- depression/anxiety
- heart disease.

2b. Surgical history

Procedure: List relevant previous surgery in point form. This section can be used as a validation of the medical history.

3. Social history

3a. Living arrangements

Purpose: To determine the level of support the patient has, that is, availability of assistance with everyday tasks.

Procedure: If they live with others, ask who they live with.
3b. Managing at home

- **Looking after themselves**
  
  Purpose: To validate item 4 of the patient MAPT.

  Procedure: Ensure the emphasis is on basic tasks such as washing themselves, getting dressed and going to the toilet.

- **Home maintenance**
  
  Purpose: To determine how well they are able to maintain their home.

- **Enough support**
  
  Purpose 1: To assist with determining whether referral to an appropriate service provider is necessary.

  Procedure: Form a judgement as to whether referral is necessary based on the patient’s response to their living arrangements, ability to look after themselves and maintain their home and whether they get enough help looking after themselves.

  Purpose 2: To validate item 5 of the patient MAPT.

3c. Significant carer

Purpose: To validate item 10 of the patient MAPT

Procedure: If the patient answers ‘yes’, determine:

- Whether the person cares for someone else because that person needs their care, rather than because they enjoy it.
- How often the care is required such as daily, weekly.
- The type of care required (physical requirements). This will assist with determining if this would be difficult for someone with a hip or knee problem to undertake.

3d. Income source

- **Currently working**
- **Worked in the past six months**
- **Affect on ability to work**
- **Affect on finances**

Purpose: To validate items 8 and 9 of the patient MAPT.

Procedure: If the patient is in paid work determine whether they are at risk of losing their job or has lost their job because of their hip or knee (if so, find out how recently). Also, determine whether the patient’s hip or knee problem has affected their household finances (regardless of whether they do paid work), or if it is likely to in the future (for example, if they were forced to reduce their hours of work or resign because of their hip or knee).

3e. Relationships

Purpose: To validate item 7 of the patient MAPT.

Procedure: Ask if the person’s relationships are affected because of their hip or knee problem. If so, ask them to explain.
3f. Enjoyment of life

Purpose: To validate item 6 of the patient MAPT.

Procedure: Ask if their enjoyment of life is affected because of their hip or knee problem. If so, ask them to explain.

4. Analgesia/arthritis medication

Purpose: To highlight those patients who appear to be taking inappropriate analgesic or arthritis medications or inappropriate doses of those medications (such as analgesics being taken more often than recommended, or no analgesia and the patient is reporting severe pain on the patient completed MAPT). Alternatively, it would be useful for the MSC to know if the patient had tried all medication options without benefit. This would assist with determining whether referral for further management of their pain is required.

Procedure: Patients are asked to bring with them to their appointment a list of current medications and dosage (see attached).

4a. Analgesic medication

- List all analgesic medication with dose and frequency.

4b. Arthritis medication

- List all anti-inflammatory medication with dose and frequency. Indicate whether the patient is unable to take anti-inflammatory drugs.
- List all complementary medications with dose and frequency such as glucosamine or fish oil.

Assessment of the patient’s pain management includes:

- Is the patient taking appropriate analgesia and appropriate dose/frequency of this analgesia?
- Are they using any other pain management strategies?
- Are they reporting that there pain is currently controlled?
- Have they attended a formal pain management course? If no, would they benefit from attending? Are they willing to attend?

If the coordinator believes the patient’s medication could be improved, they should request their GP reviews their pain management. Alternatively, they could suggest to the GP that the patient may benefit from referral to a formal pain management course.

5. Other current medications

Purpose: To obtain an indication of other current medications, which will assist with validating the patient’s medical history.

Procedure: List names of other medications. There is no need to record the dose or frequency.
**Part B: Objective examination**

Purpose 1: To assist with validating item 11 of the MAPT, particularly in the follow-up assessments. The initial assessment provides the baseline for which a comparison can be made.

Purpose 2: To assist with determining appropriate forms of further management for the patient.

1. **Range of motion**

Procedure: All range of motion is to be measured using a universal goniometer. Range of motion should be recorded as $(x \rightarrow y \rightarrow z^\circ)$ such as extension/flexion $(10^\circ-0^\circ-140^\circ)$. Only the appropriate limb should be examined (both left and right).

- **Knee flexion:**
  - Start position: patient supine and lower limbs in neutral position.
  - Goniometer axis: lateral aspect of tibio-femoral joint line.
  - Stationary arm: parallel to the lateral aspect of the femur pointing to the greater trochanter of the hip.
  - Movable arm: parallel to the lateral aspect of the fibula.
  - Patient instructed to 'slide heel along bed towards bottom as far as you can to bend your knee.' Patient asked at end of active range, 'What is stopping you from going any further?'
  - End position: knee flexed to the limit of motion with the heel kept in contact with the bed.

- **Knee extension:**
  - Start position: patient supine, lower limbs in neutral position.
  - Goniometer axis: lateral aspect of tibio-femoral joint line.
  - Stationary arm: parallel to the lateral aspect of the femur pointing to the greater trochanter of the hip.
  - Movable arm: parallel to the lateral aspect of the fibula.
  - Patient instructed to 'straighten knee as far as you can by pushing back of knee down towards the bed.' Patient asked at end of active range, 'What is stopping you from going any further?'
  - End position: knee extended to the limit of motion.

- **Hip flexion:**
  - Start position: patient supine, hip and knee on test side in neutral position.
  - Goniometer axis: greater trochanter of the femur.
  - Stationary arm: parallel to the midaxillary line of the trunk.
  - Movable arm: parallel to the longitudinal axis of the femur pointing to the lateral epicondyle.
  - Patient instructed to 'slide heel along bed towards bottom as far as you can to bend your hip and knee.' If patient reaches end of range of knee flexion without any hip symptoms patient instructed to 'lift heel off bed and move knee towards chest to bend hip.' Patient asked at end of active range, 'What is stopping you from going any further?'
  - End position: hip flexed to the limit of motion while flexing the knee. Patient instructed to keep the pelvis on the bed surface.
  - Common trick movement: lumber spine flexion.
• **Hip abduction:**
  - Start position: patient supine, lower extremities in the neutral position.
  - Goniometer axis: anterior superior iliac spine (ASIS) on the side to be measured.
  - Stationary arm: along a line between the two ASISs.
  - Movable arm: parallel to the longitudinal axis of the femur.
  - Patient instructed to 'slide leg out to the side keeping your toes pointed up to the ceiling.' Patient asked at end of active range, 'What is stopping you from going any further?'
  - End position: hip abducted to the limit of motion. Patient instructed to keep their toes pointing to the ceiling throughout the movement.
  - Common trick movement: hip external rotation.

• **Hip external rotation:**
  - Start position: patient sitting, hip and knee in 90 degrees flexion.
    Contralateral hip abducted and foot supported on a stool.
  - Goniometer axis: mid-point of the patella.
  - Stationary arm: perpendicular to the floor.
  - Movable arm: parallel to the anterior midline of the tibia.
  - Patient instructed to 'keep thigh flat on the bed and move your heel in towards the middle.' Patient asked at end of active range, 'What is stopping you from going any further?'
  - End position: hip externally rotated to the limit of motion so that the leg and foot move in a medial direction.

• **Hip internal rotation:**
  - Start position: patient sitting, hip and knee in 90 degrees flexion, neutral hip rotation. Contralateral hip abducted and foot supported on a stool.
  - Goniometer axis: mid-point of the patella.
  - Stationary arm: perpendicular to the floor.
  - Movable arm: parallel to the anterior midline of the tibia.
  - Patient instructed to 'keep thigh flat on the bed and move your heel out away from the middle.' Patient asked at end of active range, 'What is stopping you from going any further?'
  - End position: hip internally rotated to the limit of motion so that the leg and foot move in a lateral direction.

2. **Optional assessment**

Procedure: If the MSC feels that it is useful to perform additional objective assessments (for example, the Timed Up and Go) in order to facilitate referral to other services, record the details in the space provided in this part of the form.

<table>
<thead>
<tr>
<th>Part C: Recommendations</th>
</tr>
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</table>

- **Used in the past**
- **Current self-care activities**

Purpose: To assist with determining appropriate forms of further management for the patient.
Procedure 1: Ask the patient what services they have used in the past for their hip or knee condition. Note those that are relevant and tick the appropriate box. Add the name of the service if not listed.

Procedure 2: Document the patient’s self-care activities such as home exercises, walking, tai chi. It may also be useful to document any non-pharmacological pain management strategies that the patient is using.

If the MSC believes the patient could benefit from referral to services now, tick the appropriate box. Add the name of the service if not already listed. Discuss referral with the patient. If they do not wish to act on the recommendation, list the reason for non-referral. Record in the comments section the name of the service provider the patient will be referred to such as physiotherapy at Moreland Community Health Service.

Record on the patient management plan the service(s) they have been referred to and outline to them the processes involved. Give this to the patient at the conclusion of the appointment.

<table>
<thead>
<tr>
<th>Part D: Coordinator-derived patient MAPT</th>
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</thead>
<tbody>
<tr>
<td>Purpose: To compare the results of the coordinator assessment with the patient completed MAPT. In particular, to consider whether the patient is gaming or being stoic.</td>
</tr>
<tr>
<td>Procedure: At the end of the assessment, complete the coordinator-derived patient MAPT giving the responses that best fit with the assessment of the patient. When completed, compare with the patient-completed MAPT. Comment on any discrepancies.</td>
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</table>

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<thead>
<tr>
<th>Part E: Checklist</th>
</tr>
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<tbody>
<tr>
<td>Purpose: To act as a reminder to send a letter to the patient’s GP outlining details of the assessment (see attached). A copy of the letter should be sent to Health Information Services so it can be stored in the patient’s history.</td>
</tr>
</tbody>
</table>
Appendix 14: Referral letter for further management
(Printed on hospital letterhead)  

Date

Dear Intake worker (or name of allied health professional if known),

Re: Name of participant  
Date of birth  
Address  
Phone

Healthcare card holder: ☐ Yes ☐ No

Referral for (delete appropriate):
Physiotherapy  Hydrotherapy  Group programs  
Falls prevention program  Dietitian  Counselling  
Occupational therapy  Podiatry/orthotics  Other

Thank you for continuing the management of Mr/Mrs/Miss/Ms ________________, a _______ -year-old male/female who was assessed by the musculoskeletal coordinator as part of the Orthopaedic Waiting List project. He/she is currently on the orthopaedic waiting list at _____________ Hospital for a L/R total hip/knee joint replacement. The Orthopaedic Waiting List project is a two-year, government-funded project, which is developing a new system to prioritise and manage patients waiting for hip or knee joint replacement surgery.

Reason for referral (delete appropriate):
Acute exacerbation  Falls risk  BMI (body mass index) > 30  
Gait dysfunction  VMO program  Quadriceps lag  
PF joint dysfunction for patellar taping  Other

Additional notes:
Can you please contact Mr/Mrs/Miss/Ms _________________ to organise a suitable initial appointment time. As part of the project, a questionnaire will be mailed to Mr/Mrs/Miss/Ms ________________ in three months to reassess his/her hip/knee condition. His/Her orthopaedic surgeon will be notified of any significant deterioration in his/her condition. Please contact me on ________________ if you have any further queries or if there is any difficulty in providing the services required by this patient.

Yours sincerely,

Name  
Musculoskeletal Coordinator  
_____________ Hospital
Appendix 15: Patient management plan

Orthopaedic Waiting List project
A research project evaluating the effectiveness of assessment and referral by a musculoskeletal coordinator

Patient name:

Date:

Thank you for attending the clinic to see the musculoskeletal coordinator.

You have been referred to the following services:

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone number</th>
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</table>

You do not need to contact these services, they will contact you to arrange an appointment time.

We will send a letter to your local doctor to tell him or her about your assessment with the musculoskeletal coordinator, and the services you have been referred to.

In three months’ time we will send you another questionnaire. We would appreciate it if you could complete this questionnaire and send it back to us as soon as possible. We will then phone you to talk about your hip or knee problem (at a time that suits you). This should take about 20 minutes.

If you are told that you will be having your joint replacement surgery before we contact you again, could you please phone ____________ on ____________ to let her know.

Thank you for your help with this important research.
Appendix 16: Information letter to GP: initial

(Printed on hospital letterhead)

Date

GP name
Street address
Suburb, state, postcode

Dear Dr ____________,

Re: Name of participant
Date of birth
Address

Mr/Mrs/Ms/Miss ____________ was assessed by the musculoskeletal coordinator at the ____________ Hospital as part of the Orthopaedic Waiting List project. He/she is currently on the orthopaedic waiting list at ____________ Hospital for a L/R total hip/knee joint replacement. The Orthopaedic Waiting List project is a two-year, government-funded project, which is developing a new system to prioritise and manage patients waiting for hip or knee joint replacement surgery (details attached).

Following the assessment and after discussion with Mr/Mrs/Ms/Miss ____________ I have made referral/referrals to the following service/services:
[List services and location if referrals were made. If not, simply outline the details of the assessment].

Additional notes:

As part of the project, a questionnaire will be mailed to Mr/Mrs/Ms/Miss ____________ in three months’ time to reassess his/her knee/hip condition. His/her orthopaedic surgeon will be notified of any significant deterioration in his/her condition. Please contact me on ____________ if you have any further queries.

Yours sincerely,

Name
Musculoskeletal Coordinator
___________ Hospital
Appendix 17: Information flyer to GPs

Orthopaedic Waiting List project

The Royal Melbourne, Western, Shepparton and Dandenong hospitals are undertaking a project to develop a new management and prioritisation system for people waiting for hip and knee joint replacement surgery. Musculoskeletal coordinators have been employed at each of these sites. This is a two-year project funded by the Department of Human Services.

The project has involved developing a questionnaire, based on criteria derived from surgeon and patient preferences, which will be used to prioritise people requiring hip or knee joint replacement surgery. People who are either already on the orthopaedic waiting list or waiting for a hospital outpatient appointment will be asked to complete this questionnaire (the MAPT). A sample of these people will be asked to come into the hospital to be assessed by the musculoskeletal coordinator. The coordinator’s assessment will include a review of the person’s previous conservative management and recommendations for referral to other services.

It is anticipated that the new management system will lead to improved communication between hospitals and GPs for people on the orthopaedic waiting list, as well as facilitating more timely surgery for those in greatest need. The musculoskeletal coordinator will be liaising with GPs regarding:

- the findings of their assessments
- their recommendations for conservative management
- other issues related to the person’s musculoskeletal condition.

Please do not hesitate to contact ______________, Research Assistant/Musculoskeletal Coordinator at ____________ Hospital, if you would like more information about the project.

Phone:
Email:
Appendix 18: Summary of workshop findings

Introduction

Key stakeholders were invited to attend a workshop at each of the project sites. They were also asked to identify other suitable workshop participants. Six to 10 people attended each workshop. The purpose of the workshops was to determine how the MAPT could be integrated into hospital systems, with the aims of developing an equitable and efficient system for the prioritisation and management of people with hip and knee joint disease. Workshops were conducted by an independent facilitator, Jenni Livingston from the Health Program Evaluation Unit at The University of Melbourne. At the workshop a proposed model for implementation was presented and participants were invited to provide feedback.

Main findings

1. The Royal Melbourne Hospital

1.1 The current service

The group was asked to describe the current system. A feature of the current system was that the priority of patients waiting for an outpatients clinic appointment was dependent on the contents of the referral letter and subsequent GP contact, with the clerk and registrar responsible for assigning priority. One participant described how she provided lengthy patient details in her referral letters in order to advocate on the patient’s behalf, highlighting that by the time the referral is made all other treatment options have been exhausted and the patient needs prompt assessment.

When asked if patient needs were currently being met, one participant noted that some patients may have unrealistic expectations. Other participants pointed out that some patients could ‘work the system’ better than others by making numerous phone calls and complaints to the hospital.

There was consensus among the group that the current prioritisation system was inadequate and that the MAPT was preferred. When one participant asked if the MAPT would include a cut-off score so that some patients might not be seen by the surgeon, another commented that this approach was potentially dangerous.

Finally, when the group was asked if there were any components of the current system worth keeping there was silence.

1.2 The proposed model

Participants were asked to consider the proposed new model (see Figure 6). They were then asked to comment on who would need to be involved, potential barriers and enablers, and key features of the implementation strategy.
**Key stakeholders and staff roles**
The key stakeholders were considered to be GPs, patients and their carers and orthopaedic liaison nurses.

When asked who in the hospital should take responsibility for the new model, participants pointed out that it would not be possible to make changes to the current system without additional resources. The role of coordinating the new prioritisation system would be best undertaken by an orthopaedics liaison nurse who could manage the OWL and liaise with registrars and surgeons. There are currently two orthopaedics liaison nurses. If another was employed all three could share the coordination role as well as undertaking their current duties. Important to the success of the model was sharing the new role with existing staff, rather than depending on a new staff member to assume complete responsibility.

**Barriers to change**
One possible barrier to implementing the new model was that managers of the orthopaedic liaison nurses may expect to see a reduction in the waiting list. However, it was pointed out that without additional resources for surgery, implementation of the new model would result in better patient care but not necessarily shorter waiting lists.

**Information requirements**
There was general agreement when the facilitator suggested that a public relations campaign might be required at all levels within the hospital to facilitate implementation. Patients should be given information about the process. A possible strategy for determining the type of patient information required was to consult with the existing outpatients community panel. A discussion about possible information options followed. One suggestion was to tell people their place on the OWL, so they were aware of how many were ahead of them. The usefulness of providing individuals with their MAPT score without additional information was queried. The issue of transparency of the MAPT scoring system was raised and it was felt that the hospital public relations department and DHS should be responsible for providing information to the public.

Other information requirements included providing GPs with treatment plans to assist them in managing their patients while they were waiting for surgery. One participant pointed out that in order to manage patients while they are waiting for treatment, improved information for GPs regarding available community resources was required.

**Services interacting with the model**
GPs, the Royal Australasian College of General Practitioners (RACGP), outpatients clinic, the OAPIC project and rehabilitation services were some of the services identified as needing to interact with the model. One participant suggested a functional clinic, which would include a physio who could assess patients and provide exercises as required. Another enquired whether the MAPT could be used to guide referrals to other services.

It was pointed out that services did not need to be based at Melbourne Health and could be community based. The example of community cardiac rehabilitation programs was given. Another suggestion was the possibility of running programs through the YMCA.
**Involving stakeholders**

Establishment of a steering committee was suggested as a strategy to involve stakeholders, as was appointment of a manager to oversee implementation of the model. Provision of key information to the divisions of general practice was also seen as useful, as well as a checklist for GPs to improve the quality of information provided in outpatient referrals.

**Measures of success**

Participants recognised that implementation of the model may not result in a reduction in the length of the OWL. Possible outcome indicators suggested by the group include:

- reduction in patient complaints regarding waiting time
- higher scoring patients seen in a timely manner
- shorter hospital stay
- shorter rehabilitation time following surgery
- increased patient satisfaction (particularly regarding being informed and having their needs met while waiting)
- improvement in achieving patients’ functional goals
- improvement in the hospital–GP relationship.

**Individual versus pooled OWLs**

The complexity of each surgeon having their own waiting list was raised and the group was asked whether it would be useful to have one OWL for each hospital. One participant commented that this view was not favoured by surgeons. Several participants argued that pooled waiting lists would affect the doctor–patient relationship and may negatively impact on the healing process. Another commented that individual lists could work given adequate IT support. One possible solution was the development of a system that ensures high-priority patients are spread among the surgeons, which could take place at the time of booking the patient’s outpatient appointment. It was pointed out that this currently happens on an ad hoc basis.

**Other issues**

Some participants were concerned that patients who received low MAPT scores would never receive treatment. Richard Osborne suggested that time waited could be included in the equation used to calculate patients’ priority scores, which would involve the development of some critical decision rules about how people could progress through the list.

Another question was whether patients who are not placed on the OWL would receive conservative management and the role of the OAPIC project under this model. It was suggested that these issues should be addressed by the steering committee.

**Funding requirements**

The group stated the following resources were required to support implementation of the model:

- one full-time orthopaedic liaison nurse position (to job share with the current orthopaedic liaison nurses)
- 0.2 EFT manager position to oversee implementation (the requirements for this position are likely to change with time)
- IT support to adapt existing patient databases.
1.3 Key points from the workshop

The main points made during the workshop are presented below.
- The MAPT could be used to prioritise patients for outpatients appointments and for surgery.
- Funding would be required to employ an orthopaedic liaison nurse to share the coordination role.
- A comprehensive public relations campaign is necessary.
- Development of outcome indicators at the outset is essential to monitor progress.

2. Western Hospital

2.1 The current system

When asked about the current system, participants cited a number of concerns, including:
- lack of adequate information in the majority of GP referrals
- the long wait for an outpatients appointment (the next available appointment is in 52 weeks), with some patients waiting two to three years (for example, if a clinic is cancelled the patients who were booked into that clinic may wait another 12 months for an appointment)
- overcrowded clinics that often run over time, with one participant describing them as ‘bedlam’ (long waiting times may lead to frustrated patients and threats to staff)
- some patients being referred to outpatients earlier than necessary (this may be due to GPs feeling they have nowhere else to refer patients, as some community health services have long waiting lists and limited services)
- the system is inequitable (people who complain the most have their surgery faster and some patients come through the emergency department to receive faster attention)
- some inefficiencies in the system, for example, not enough notice given to patients prior to surgery and problems with preadmission clinic appointments resulting in patient cancellations.

The major block in the system was considered to be access to the outpatients department, rather than access to beds or surgeons. One participant commented that the easiest part of the process was surgery, but even when a date was set there could still be delays.

When asked about parts of the current system that people value, the low cost to the patient was raised.

2.2 The proposed model

The MAPT

There was general support for the model, with one participant commenting on the benefits of monitoring patients with the MAPT. However, another felt that monitoring may raise patient expectations of the action that the hospital could take in response. One surgeon commented: ‘The MAPT questions are fantastic … These are the questions that we ask patients’. The MAPT was seen as a good way of providing a structure for referrals, and that most of the information on the MAPT would be included in a well-written referral. GPs would benefit from
knowing what surgeons are looking for and to be able to advocate to the surgeon for their patients.

There were concerns that patients might exaggerate their condition if the new system using the MAPT was introduced, particularly if they had been waiting a long time. There was also a belief that GPs may exaggerate their patients’ MAPT scores in order have them assessed sooner. However, it was thought that GPs might stop this practice once it became obvious that the most severe patients were being given priority.

The group was unsure whether the patient or GP should complete the MAPT, with one person saying that they would send it to the patient, possibly when their referral was received at outpatients, and they could take it to their GP for assistance if they wished.

There was a suggestion that the MAPT be could be used to guide referral to physiotherapy.

**Conservative and medical management**

One participant mentioned that a knee clinic had been suggested previously at Western Hospital. This would ensure that people on the OWL would receive care while they were waiting. At the same time they could also be provided with information about the system. The clinic would employ a physiotherapist, nurse practitioner, rheumatologist/GP/trainee GP, and ideally a social worker and psychologist too.

Another participant suggested that patients’ medical conditions should be addressed while they were waiting, and that there should be improved communication flow between orthopaedics and other departments managing the patient’s condition.

### 2.3 Implementing the proposed model

**What’s needed**

When asked what resources would be needed to implement the proposed model, the following points were raised:

- improved infrastructure
- a new patient database
- more staff
- increased space in outpatients.

**Key stakeholders**

The key stakeholders were seen as being patients and their families, GPs and consultants, as well as outpatients, booking system, preadmission and theatre staff.

The group was asked about the possibility of establishing a steering committee. They felt it should comprise the director of surgery and representation from specialist referral, physiotherapy and occupational therapy, as well as a patient representative. The workshop participants would also be appropriate members.

The group could not provide examples of where steering committees had successfully driven change at the hospital, stating that external people were often employed to undertake this task.
Barriers
Participants commented on the difficulties of implementing new models, and one person stated: ‘There is some defeatism about it, with people accepting the current [unsatisfactory] system as it is’.

There was also concern about implementing the model due to the large numbers of people using the hospital who do not speak English and come from low socioeconomic backgrounds.

Other barriers were seen as the current operation of outpatients overall because it was under-resourced, often overbooked and did not provide enough space.

Some participants were concerned about the MAPT increasing the amount of paperwork and wanted to ensure that certain MAPT scores would automatically trigger particular actions in the system. When queried, the group was given reassurance that the surgeon, rather than the MAPT, would make the final decision regarding a patient’s priority for surgery.

Individual versus pooled OWLs
When the feasibility of pooled OWLs was raised, participants reported that it was not advisable due to the need for the surgeon to discuss important issues with their patient and the resulting lack of continuity. At present, patients may be re-allocated to other surgeons but that surgeon would also examine the patient.

Measuring success
The following were cited as indicators of success:
- fewer patient complaints
- fewer threats to staff from patients
- shorter waiting times for an outpatients appointment
- shorter waiting times in clinic before an appointment
- shorter waiting times for surgery.

Participants noted that the consultations patients received were already of high quality and need not be changed.

As most of the above indicators related to patients being seen faster, the group was asked whether they believed people with greater need should be seen faster. There was general agreement that they should.

2.4 Key points from the workshop
The main points made during the workshop are presented below.
- dissatisfaction with the current system, particularly regarding waiting times for outpatients appointments
- the difficulties associated with making changes to hospital systems
- acceptance of the MAPT as an appropriate tool to refer, prioritise and monitor patients waiting for outpatients appointments and surgery
- concerns about the possibility that patients and GPs using the MAPT would exaggerate a patient’s condition in order to be seen faster
- resources required to implement the new model include improved infrastructure, a new patient database, more staff and increased space in outpatients.
3. Dandenong Hospital

3.1 The current system

The current system was described by participants as follows: the GP makes a referral to an orthopaedic surgeon in their private rooms and, if appropriate, the surgeon completes a request for admission form and sends it to the hospital. The patient is then prioritised on the OWL based on the information provided by the surgeon.

Participants described some of the shortfalls of the current system, including:
- minimal communication between the hospital and GPs about the waiting list
- no means for a GP to assist patients who urgently need to have surgery to have it sooner (apart from sending them to plead with their surgeon or directing them to the emergency department)
- long waiting times (category 2 patients are waiting up to two years, compared with the 90 days specified in DHS guidelines)
- high numbers of patient complaints, with the loudest usually receiving their surgery first.

When asked how numbers of people on the OWL could be reduced, increased beds and theatres were suggested. Participants acknowledged that the number of surgeons at Dandenong Hospital had recently increased.

3.2 The proposed model

Musculoskeletal coordinator role
In many instances, participants spoke about the current system as having a physiotherapist working as an MSC. This had been the case since the OWL project commenced at Dandenong Hospital in 2005.

Participants valued the coordinator role and reported that the coordinator’s work had been beneficial to the hospital, patients and surgeons. One participant commented that the coordinator was in a better position to review cases than the surgeons.

The support offered to patients by the coordinator while they were waiting was regarded as beneficial, with one participant commenting she had noticed a positive change in attitude of patients after they walked away from their visit with the coordinator. Home visits by the coordinator were suggested as a strategy for the coordinator to assess those with limited mobility.

Increased referrals to appropriate conservative management was seen as important. A discussion about whether all those on the OWL actually needed surgery followed. One participant thought that most of the people on the OWL would require surgery if they were called up tomorrow (conservative management was not an alternative to surgery for most people). However, when this point was raised later, there was a view that some of those on the OWL had been placed there too early and were not ready for surgery.
**The MAPT**
The issue of patients gaming using the MAPT was mentioned. There was general agreement that regular reviews undertaken by a coordinator were worthwhile in dealing with patients who were gaming or stoic, and had been successful in identifying patients with the greatest need.

There was concern that using the MAPT for prioritisation may result in some patients never being treated and that the OWL must first be reduced in size.

There was discussion about whether the MAPT would be more appropriate for use in hospitals with outpatients clinics. One participant suggested that GPs could refer to surgeons rooms using the MAPT; however, another felt that this would not offer any benefit to his current practice as a surgeon.

### 3.3 Implementing the proposed model

Participants indicated that one coordinator working two days per week could handle the current workload; however, guidelines for the role would be need to be developed. If the role was expanded – for example, if patients not on the OWL were included – increased coordinator time would be required.

The following resources were seen as necessary to implement the model: increased space, more staff and improved IT systems. Establishment of a steering committee would be dependent on the availability of resources to support it.

The facilitator suggested that DHS could be approached and made aware that the new model could not be implemented unless there was appropriate backfilling of the coordinator’s current position at the hospital. All were in agreement.

One participant made the point that it was essential that hospital processes were structured around the MAPT, and prioritisation should take the form of clinical priority multiplied by the time the patient had spent on the OWL.

**Individual versus pooled OWLs**
The issue of pooling OWLs within the hospital was raised, with one participant commenting this would need to be done before the new model could operate effectively. However, it was reported that most surgeons preferred individual lists as surgeons developed a rapport with patients who expected a more personal service.

One participant commented on the benefits of statewide pooled lists, which would overcome the problem of patients placing themselves on multiple waiting lists. Another argued that there were problems associated with patients having their procedures performed at hospitals some distance from their homes, particularly if there were complications following surgery. In these cases, patients would often return to their original surgeon, rather than present to the hospital where their surgery was performed.
3.4 Key points from the workshop

The main points made during the workshop are presented below.

- There was a high level of support for an MSC to assess, monitor and refer patients to conservative management (as had taken place during the OWL project).
- There was also support for use of the MAPT as a prioritisation tool for those waiting for surgery. As Dandenong does not have outpatient clinics, it did not appear to be useful at an earlier stage.
- Funding to support an MSC, increased space and improved IT systems would be required.

4. Goulburn Valley Health

4.1 The current service

When asked about aspects of the current service that participants were dissatisfied with, the focus of the discussion was on preadmission clinic. There was agreement that untreated comorbidities often resulted in patients having their surgery postponed. At present, patients attend preadmission clinic one week before their scheduled surgery date and this did not allow sufficient time for their comorbidities to be addressed prior to surgery. There was support for the concept of assessing patients’ general health while they were on the OWL, possibly as early as when they attended outpatients clinic. Patients had an occupational therapy assessment in outpatients clinic (something that used to be done in preadmission clinic) and that a medical assessment could also take place then.

Participants were asked to describe the services required in preadmission clinic. They are: administration; ensuring patients are fit for surgery; and developing a discharge plan.

Another cause of surgery postponements was lack of ICU beds, as 30–40 per cent of patients are noted as requiring one. Limited funding had also reduced surgery throughput.

An area of concern was the lack of detail provided in GP referrals to outpatient clinic, in particular information about medications, comorbidities and X-rays. A new staff member has been employed in outpatients to address this issue. Local GPs are often over-worked due to high patient–GP ratios.

When asked about aspects of the current system that are valued, one participant commented on the hospital’s excellent patient outcomes following surgery and that there needed to be a focus on improving the process of getting patients to surgery.

4.2 The proposed model

The MAPT

Participants were asked for their views on the MAPT scoring system. One participant commented that it is clear that the person who gets the highest score has their surgery first. The benefits of conservative management were mentioned, with one person giving the example of a patient on the OWL who had...
been referred to a physiotherapist and, as a consequence, realised they no longer required surgery.

There was consensus that patients could be prioritised for an outpatient appointment using the MAPT and GPs should be required by the hospital to use the MAPT as part of the referral process.

One participant pointed out that some patients may be disadvantaged in using the MAPT because they were illiterate or did not speak English, but another suggested that health professionals could assist them to complete it.

When asked if surgeons would use the MAPT in their clinics one participant commented that the MAPT encompassed most aspects of the surgical assessment and would greatly assist.

The issue of long-waiting patients with low MAPT scores was raised. One participant stated that if someone had been on the OWL for a long time but still had a low score they should not get priority simply due to their waiting time, and suggested that instead consideration should be given to removing them from the OWL.

**Implementing the new service delivery model**

Suggestions for improvements included:

- employment of a nurse and medical registrar to assess patients prior to surgery and refer to appropriate health professionals (the medical registrar could treat patients and assist with their post-surgical care)
- employment of a physiotherapist (0.4 EFT) to assess patients prior to surgery, provide some conservative management and refer to other services (this position would work closely with the surgeons)
- employing a rheumatologist to treat patients.

The group then became enthusiastic about the possibility of an ‘interdisciplinary musculoskeletal unit’ employing the above professionals. The unit would streamline service delivery for patients with arthritis, not just those waiting for a joint replacement. This unit would be established off-site but would need to be collocated with pathology and X-ray services. One potential problem would be obtaining suitable real estate to establish the unit.

When asked about support for this initiative at the organisational level, participants gave it their unanimous support. Establishment of a steering committee was raised and possible membership discussed. Having GP participation was seen as important, although it was acknowledged that it was often difficult to achieve.

The group reiterated its enthusiasm for the new model and asked about the possibility of Shepparton becoming a pilot site. One participant offered to assist with costing implementation of the new model at Shepparton. Participants then highlighted some of the important differences between GVH and other OWL project sites, including:

- GVH is a fee for service hospital, whereas most hospitals are sessional.
- The hospital catchment area is very large.
- Patient support services are limited.
- Travel distances for staff conducting home assessments are large, and hence time consuming and costly.
Participants gave a range of responses when asked why GVH should be given funding in preference to other sites including:
- the high hospital throughput in terms of WEISS
- the demographics of the area, that is, high proportions of people from low socioeconomic and non-English speaking backgrounds
- low numbers of people with private health insurance.

When asked why orthopaedics should be given preference over other specialties such as obstetrics, the response was that the appropriate professionals are available at GVH.

4.3 Key points from the workshop

The main points made during the workshop are presented below.
- The MAPT should be used to prioritise patients for outpatients appointments and for surgery.
- The MAPT should be used by GPs to refer patients to outpatients.
- Patients should attend preadmission clinic earlier, possibly as soon as they are placed on the OWL.
- Treatment of comorbidities and conservative management could be coordinated by an interdisciplinary musculoskeletal unit. This unit would be located off-site and would employ a nurse, physiotherapist, medical registrar and rheumatologist, and would be available to all individuals with arthritis.

Discussion

It is difficult to draw firm conclusions from the workshop data, as the workshops were somewhat dependent on the individuals who were present on the day. Participants were presented with service delivery model 1 (administrative model only). Some groups undertook the task of developing a strategy to implement this model while others built on this model to develop a comprehensive arthritis management system. In other words, responses may have been limited to the imagination and experience of participants because they were not presented with other options to discuss. Differences in participants’ knowledge of how to implement change and belief in their likelihood of success in making changes differed markedly from site to site.

Participants at the GVH workshop expressed a keen interest in undertaking a pilot of a new interdisciplinary clinic for arthritis. They were able to outline the processes they would use to achieve their aims and how they would work together. Rural sites, due to the smaller numbers of professionals involved, may encounter fewer barriers to implementation than larger metropolitan sites.

Participants at all sites agreed that patients received good medical care in the current system but the difficulty was getting them through the system to having their surgery in a timely manner. Long waits for outpatients and surgery were major sources of frustration.

There was overwhelming support for use of the MAPT to prioritise patients for outpatient appointments and surgery. Incorporating the MAPT into GP referral letters to outpatient clinic was also supported.
Additional funding would be required at each site to implement a new model (the level was dependent on the ‘vision’ at each site). Improved IT systems and increased clinic space were common requirements.

All the sites were supportive of having an MSC who could assess patients and refer them to conservative management, although some clearly placed more emphasis on this aspect of the role. Sites where participants were more familiar with the coordinator within their organisations (GVH and DH) appeared to be the most supportive.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AFV</td>
<td>Arthritis Foundation of Victoria</td>
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<td>AH</td>
<td>Austin Hospital</td>
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<tr>
<td>AIHW</td>
<td>Australian Institute of Health and Welfare</td>
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<tr>
<td>ANUM</td>
<td>associate nurse unit manager</td>
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<tr>
<td>AOA</td>
<td>Australian Orthopaedic Association</td>
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<td>APA</td>
<td>Australian Physiotherapy Association</td>
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<tr>
<td>AQoL</td>
<td>Assessment of Quality of Life</td>
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<tr>
<td>CRD</td>
<td>Centre for Rheumatic Diseases</td>
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<tr>
<td>DCE</td>
<td>Discrete Choice Experiment</td>
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<td>DH</td>
<td>Dandenong Hospital</td>
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<td>DHS</td>
<td>Department of Human Services</td>
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<tr>
<td>EQ-5D</td>
<td>EuroQoL – European Quality of Life</td>
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<td>GH</td>
<td>Geelong Hospital</td>
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<td>GP</td>
<td>general practitioner</td>
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<td>GVH</td>
<td>Goulburn Valley Health</td>
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<td>HKPT</td>
<td>Hip and Knee Replacement Priority Criteria Tool</td>
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<td>HRQoL</td>
<td>health-related quality of life</td>
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<td>JRS</td>
<td>joint replacement surgery</td>
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<td>MAPT</td>
<td>Multi-Attribute Arthritis Prioritisation Tool</td>
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<td>MSC</td>
<td>musculoskeletal coordinator</td>
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<tr>
<td>NGCRC</td>
<td>North Geelong Community Rehabilitation Centre</td>
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<td>NZ</td>
<td>New Zealand</td>
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<tr>
<td>OA</td>
<td>osteoarthritis</td>
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<tr>
<td>OWL</td>
<td>orthopaedic waiting list</td>
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<tr>
<td>RA</td>
<td>rheumatoid arthritis</td>
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<tr>
<td>RMH</td>
<td>The Royal Melbourne Hospital</td>
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<tr>
<td>RHH</td>
<td>Royal Hobart Hospital</td>
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<tr>
<td>THR</td>
<td>total hip replacement</td>
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<tr>
<td>TJR</td>
<td>total joint replacement</td>
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<td>total knee replacement</td>
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<td>United Kingdom</td>
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<tr>
<td>WCWL</td>
<td>Western Canada waiting list</td>
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<tr>
<td>WOMAC</td>
<td>Western Ontario and McMasters Universities Arthritis Index</td>
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