Victorian Osteoarthritis Model of Care
Draft, 3 October 2016

For broad consultation
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To be written
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MOVE: muscle, bone & joint health is acknowledged for leading an independent consumer consultation for the Model of Care. All individuals and organisations who participated in the consultation phases are gratefully acknowledged.
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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>ACR</td>
<td>American College of Rheumatology</td>
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<tr>
<td>AOANJRR</td>
<td>Australian Orthopaedic Association National Joint Replacement Registry</td>
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<tr>
<td>AP</td>
<td>Antero-posterior</td>
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<tr>
<td>ASA</td>
<td>Arthroplasty Society of Australia</td>
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<tr>
<td>BMI</td>
<td>Body mass index</td>
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<td>CAM</td>
<td>Complementary and Alternative Medicine</td>
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<td>COAMI</td>
<td>Chronic Osteoarthritis Management Initiative of the United States Bone and Joint Initiative</td>
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<tr>
<td>CPAC</td>
<td>Clinical Priority Assessment Criteria</td>
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<tr>
<td>EULAR</td>
<td>European League Against Rheumatism</td>
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<tr>
<td>EQ-5D</td>
<td>European Quality of Life (EuroQuol™) questionnaire (5 dimensions)</td>
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<td>HOOS</td>
<td>Hip injury and osteoarthritis outcome score</td>
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<td>ICHOM</td>
<td>International Consortium for Health Outcomes Measurement</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>KOOS</td>
<td>Knee injury and osteoarthritis outcome score</td>
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<td>MAPT</td>
<td>Multi-attribute Arthritis Prioritisation Tool</td>
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<td>MRI</td>
<td>Magnetic Resonance Imaging</td>
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<td>MOC</td>
<td>Model of Care</td>
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<td>NHMRC</td>
<td>National Health and Medical Research Council, Australia</td>
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<td>OA</td>
<td>Osteoarthritis</td>
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<td>OACCP</td>
<td>Osteoarthritis Chronic Care Program Model of Care, New South Wales</td>
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<td>OAHKS</td>
<td>Osteoarthritis Hip and Knee Service, Victoria</td>
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<td>OARSI</td>
<td>Osteoarthritis Research Society International</td>
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<td>SF-12</td>
<td>12-item short form quality of life survey</td>
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<td>TJR</td>
<td>Total joint replacement</td>
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Part 1: Context

What is a Model of Care (MoC)?

A Model of Care (MoC) is an evidence- and consultation-informed framework that describes how health services and other resources should be delivered locally to people who live with specific health conditions\(^1\). Generally, a MoC is based on principles of care for a particular condition at a systems level, rather than describing the operational details of care delivery, which are often site-specific. A ‘systems’ level refers to the organisation and delivery of care across a jurisdiction, considering policy, infrastructure, communication, and resourcing. It describes what the components of care should be and how these components of care should be delivered, such that the right care is delivered at the right time, by the right team, in the right place with the right resources\(^2\).

A MoC is not an operational plan or a clinical guideline. Rather, a MoC is comprehensive system-level pathway with supporting resources and recommendations for action.

The aim of the Victorian osteoarthritis MoC is to provide a system-level, best-practice management framework for osteoarthritis that is informed and supported by the health sector. The focus of this MoC is diagnosed hip and/or knee osteoarthritis with service delivery spanning early to advanced stage of the condition, once diagnosed.

Where this initiative fits

The current chronic disease landscape in Australia

Australians have access to one of the best healthcare systems in the world. Like most developed nations, Australia’s healthcare system is now challenged with responding to the increasing burden of chronic diseases\(^3\). About one half of Australians live with a chronic disease, while one in five Australians live with multiple chronic health conditions\(^4\). The most common chronic diseases in Australia are arthritis and cardiovascular disease. The prevalence of chronic diseases is predicted to rise in coming years as the prevalence for chronic disease risk factors rise, including obesity, inadequate physical activity, ageing, smoking and poor nutrition.

Unlike acute health conditions, chronic diseases pose unique challenges for the health system. Consumers with chronic health conditions require more frequent and prolonged use of health resources and often develop co-morbidities, which often makes planning and delivery of care more complex and resource intensive. Despite trends for an increasing prevalence of chronic health conditions in Australia, the health system operates more effectively in service delivery for acute and short-term health conditions and responds less effectively to the health needs of people with chronic health conditions\(^1,5-7\).

Urgent action is required to modify risk factors for chronic diseases and optimise management for people who have established diseases\(^3\), particularly musculoskeletal conditions. Action is required at multiple levels – from the health systems and policy level to the individual’s lifestyle choices\(^8\). Musculoskeletal conditions, including osteoarthritis (OA), have a profound effect on the Australian economy. For example, in 2012 the national cost of back pain, osteoporosis, osteoarthritis and rheumatoid arthritis was conservatively estimated at $55.1 billion with projections indicative that costs will continue to rise\(^9\). By 2030, an estimated 59,000 people will be out of the labour force due to arthritis (the majority due to OA) – an increase of 13% from 2015\(^10\). This would result in less personal income and assets, more welfare
payments and less taxation revenue, reflected as a loss in GDP of $9.4 billion in 2030; an increase of $2.2 billion from 2015. 

Current data suggest the lifetime risk of OA of the knee and hip are 45% and 25% respectively. Victorian data for 2008 suggest that the lifetime risk of total knee joint replacement was 11.9% for females and 10.4% for males, and for total hip joint replacement were 10.9% and 9.9%, respectively; both demonstrating an upward trajectory. By 2030, an estimated 645,898 Victorians will live with OA, representing a 42% increase since 2015. Accordingly, the direct healthcare costs at 2030 are estimated at $693,260,000. The absolute prevalence and direct healthcare costs of OA in Victoria will be second only to those in New South Wales. At the national level, recent research has shown a significant increase in the lifetime risk of total hip replacement and total knee replacement in Australia for both males and females over a 10-year period (from 2003-2013) (research manuscript under review).

**Purpose of the Model of Care (MoC)**

The purpose of this MoC is to describe what care and how care should be organised and delivered to Victorians who have been diagnosed with hip or knee OA. While the burden of OA in other areas, particularly spine, hands and feet OA are recognised, this MoC focuses on hip and knee OA only. However, the principles of care are broadly transferable to OA at other body sites.

The MoC will serve as a platform for service development and improvement in Victoria to improve consumers’ access to care that is accessible, efficient and effective, safe, coordinated and responsive to people’s needs, consistent with the National Health Performance Framework.

We now know that osteoarthritis is partly preventable, it is not an inevitable part of ageing, and we know what works to effectively manage osteoarthritis and improve a person’s quality of life. Despite this knowledge, effective care and accurate information are not consistently provided to consumers. This Model of Care aims to address these issues in Victoria by outlining the right care, at the right time, delivered in the right place by the right team.

**Intended audience**

The MoC is intended as a best-practice guide and resource for individuals or organisations tasked with the planning or delivery of care to Victorians with hip and/or knee OA. It is relevant to policy makers, health administrators, health funders, service delivery organisations, clinicians, consumers and carers across all care settings (public, private and compensable systems).

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§ expressed in 2015 Australian dollars

† direct healthcare costs comprise hospital expenses, out of hospital medical expenses, and costs of pharmaceuticals.
Part 2: The Model of Care

Guiding principles
The MoC should be reviewed and applied in the context of the following guiding principles:

1. The MoC is intended as a platform to improve service planning, delivery and access in Victoria for people with hip and knee OA. The MoC outlines best practice service delivery, as informed by contemporary evidence and local expert experience and consultation. The MoC is not intended to be a clinical practice guideline.

2. The MoC is intended to improve consumer-centred health outcomes and system outcomes.

3. The MoC approaches OA care on a continuum from early disease management to advanced disease management, recognising that consumers will require different components of care at different times.

4. The MoC provides a guide as to how services should be integrated and delivered in the Victorian health system to optimise care for people with hip or knee OA and make best use of health resources.

5. The MoC aligns with best practice evidence and current Australian and international care standards for OA.

Methods and Governance
The MoC was developed under the auspices of the Victorian Musculoskeletal Clinical Leadership Group, supported by the Victorian Department of Health and Human Services. The MoC document should be considered in conjunction with:

- Existing Victorian health policy relating to the continuum from population health and prevention through primary and sub-acute care and specialist clinics, and having particular reference to chronic disease (see Part 4 of this document for summaries of relevant polices and strategies)
- National Strategic Framework for Chronic Conditions (in development)
- Models of Care for OA in other states
- Australian Commission on Safety and Quality in Health Care Clinical Care Standard for knee osteoarthritis (draft)
- National Safety and Quality Health Service Standards
- National Time to Move strategy for osteoarthritis
- Existing Standards of Care for management of OA
- International Consortium for Health Outcomes Measurement (ICHOM) Standard Set for Hip and Knee Osteoarthritis
- Clinical Framework for Delivery of Health Services (Transport Accident Commission and WorkSafe Victoria)

Developing the Model of Care
The MoC was developed by a project team, supported with oversight from a governance subcommittee of the Victorian Musculoskeletal Clinical Leadership Group. The content of the MoC was informed by best evidence at the time of writing, outcomes from MoCs in other jurisdictions, and importantly, Victorian consumers and healthcare experts. A local External Expert Advisory Committee was established to advise the project team and Musculoskeletal Clinical Leadership Group in the development and consultation processes.
Consultation

Organisational and professional consultation

Initial consultation occurred in December 2015–January 2016. This phase involved asking clinical organisations, consumer groups, community rehabilitation organisations, community health organisations, public and private Victorian health services, Primary Care Networks, and policy/strategy units in the Victorian Department of Health and Human Services and WorkSafe Victoria to respond to open questions about the current osteoarthritis healthcare landscape in Victoria.

The initial consultation provided a framework for the MoC, which was iteratively developed by an External Expert Advisory Committee.

Targeted consumer/carer consultation

Consultation with consumers and carers was approached in a number of ways, as summarised below.

- A survey of 50 patients attending Osteoarthritis Hip and Knee Service (OAHKS) clinics across Victoria was undertaken to understand the information and services needs of this group.

- MOVE: muscle, bone & joint health was engaged to lead a consultation with Victorian consumers. This consultation involved in depth interviews with 36 Victorians with hip and/or knee OA residing across Victoria.

- A recent systematic scoping review by Wluka et al that examined consumers’ health information and health services needs related to OA care was also used to inform the components of the MoC.

Based on these consultations and literature, six key aspects of care relevant to consumers with OA were observed:

1. Comprehensiveness and timeliness of assessment and diagnosis
2. Skills and knowledge of health practitioners
3. Coordination of care between health practitioners
4. Provision of accurate and comprehensive information in a variety of modes
5. Availability of information and services for effective pain management
6. Availability, accessibility and affordability of services to enable self-management of OA, especially local services for physical activity and exercise.

Broad consultation phase

Broad consultation across the healthcare sector in Victoria was undertaken between October and November 2016. All organisations that participated in the first consultation were invited to provide feedback on the full draft of the Model of Care using an online survey platform. Organisational-level feedback was further facilitated through the External Expert Advisory Committee and the Victorian Musculoskeletal Clinical Leadership Group.

Standards of Care for management of osteoarthritis

The MoC aligns with established Standards of Care for OA management. Standards of Care are quality statements that reflect the minimum acceptable standards for OA care.

Standards of Care for hand, hip and knee osteoarthritis have recently been published by the European Musculoskeletal Conditions Surveillance and Information Network (eumusc.net). The European Standards align with Australian Standards developed in 2010 and recent draft Clinical Care Standards developed by the Australian Commission on Safety and Quality in Health Care for knee OA. The MoC supports the eumusc.net Standards on the basis of the comprehensive nature of their development, involving a systematic review of clinical guidelines 2002-2010 and a multi-phased consensus development process across 35 European countries.
The Standards include:

1. People with symptoms of OA should have access to a health professional competent in making a differential diagnosis.
2. People with symptoms of OA should be assessed at diagnosis and upon significant worsening for pain, function, physical activity, body mass index, and ability to do their tasks at work.
3. People with OA should receive a treatment plan with a shared treatment target set between them and a health professional(s).
4. People with OA should have access to different health professionals such as occupational therapists and physiotherapists, if needed, to treat their symptoms and achieve optimal functioning in daily life and participation in social roles (including paid work).
5. People with OA should achieve optimal pain control using pharmacological and non-pharmacological means.
6. People with OA should achieve optimal function using pharmacological and non-pharmacological means.
7. People with OA receiving non-steroidal anti-inflammatory medications or aspirin therapy should be assessed for gastrointestinal bleeding risk, cardiovascular disease risk and renal risks.
8. People with OA should receive information tailored to their needs within 3 months of diagnosis by health professionals.
9. People with OA should receive information about weight reduction (if necessary).
10. People with OA failing to respond to appropriate pharmacological and non-pharmacological therapy should be considered for surgical intervention. If referred they should be seen by an orthopaedic surgeon within a reasonable time.

Appendix 2 contains a lay version of these Standards to assist consumers in managing their OA care.
Structure of the Model of Care

The Victorian Osteoarthritis Model of Care is framed around a continuum of care from early disease management (after diagnosis) to advanced disease management in adults, inclusive of total joint replacement (TJR) surgery (Figure 1). It is recognised that these stages on the continuum are not discrete and often there is overlap between them. The MoC assumes a diagnosis of OA has been made.

![Diagram of Continuum of Care](image)

**Figure 1**  Continuum of care for OA addressed in this Model of Care

While primary prevention of osteoarthritis is recognised as critically important for individuals’ health and population wellbeing, it is not comprehensively addressed in the Model of Care. *The Victorian Public Health and Wellbeing Plan 2015–2019* articulates principles and strategic directions for supporting population health and wellbeing and preventing chronic disease and the principles covered in the Plan are equally applicable to the prevention of OA. In addition to these generic prevention strategies, prevention of joint trauma from sporting and other injuries (e.g. motor vehicle accidents, workplace injuries), maintaining and/or improving muscle strength through physical activity and preventing overweight and obesity are recognised as important modifiable risk factors for hip and knee OA, with the most important risk factor for OA being excess body weight\(^{28,29}\).

The MoC is structured as:

1. **What care should be provided**
2. **How the care should be delivered, inclusive of implementation enablers**
3. **A consumer pathway for OA care.**
What care for OA should be delivered in Victoria

Approach to care delivery for OA

Unlike other chronic health conditions, OA cannot be meaningfully classified into early, middle and advanced stages. Rather, OA is considered a spectrum condition that may fluctuate over time and is characterised by symptoms of pain, mobility impairment, function/participation impairment and reduced quality life. Management is directed towards these domains and principally consists of three streams of care, which may span the continuum of the condition. These are illustrated in Figure 2, adapted from Roos and Juhl. Importantly, core non-pharmacological and non-surgical components of care should be made available to consumers across the clinical spectrum of OA.

Figure 2 Components of OA Care

For consumers, the most important issues in OA are pain and loss of function. Management strategies targeted to address these issues should be prioritised. Delivery of care should be undertaken within a co-ordinated chronic disease management model, consistent with the philosophies of the Wagner Chronic Care model and Primary Care Medical Home Model. The National Institute for Health and Care Excellence (NICE) recommends an holistic management framework for people with OA, (Figure 3), recognising that pain and function outcomes may be improved when a holistic approach to management is adopted. Appendix 1 contains a summary of current clinical practice guidelines for OA care.
Holistic assessment of person with OA

Social
- Activities of daily living
  - Effect on life
  - Family duties
  - Hobbies
- Lifestyle expectations

Health beliefs including concerns, expectations and current knowledge of OA
- Ability to perform job
  - Short term
  - Long term
- Adjustments to home or workplace
- Screen for depression
- Other current stresses in life

Occupational

Mood
- Other treatable source of pain
- Evidence of a chronic pain syndrome

Quality of sleep
- Ideas, concerns and expectations of main carer
- How carer is coping
- Isolation

Support network

Other Musculo-skeletal pain
- Interaction of two or more morbidities
- Falls
- Assessment of most appropriate drug therapy
- Understanding of surgical options
- Fitness for surgery

Attitudes to exercise

Influence of comorbidity
- Drugs, doses, frequency, timing
- Analgesics
- Side effects

Pain assessment
Figure 3  Person-centred components of care that should be considered for assessment and management in adults with OA. National Institute for Health and Care Excellence (2014) CG177 Osteoarthritis: care and management. Manchester: NICE. Available from www.nice.org.uk.CG177. Reproduced with permission. NICE guidance is prepared for the National Health Service in England and Wales and does not apply to Australia. All NICE guidance is subject to regular review and may be updated or withdrawn32. The licence to reproduce this Figure does not confer approval or endorsement from NICE for the Victorian osteoarthritis Model of Care

Principles of care delivery for OA

The following principles underpin each of the components of OA care outlined in Figure 2 and the approach to components of care outlined in Figure 3.

- Shared decision-making and communication between healthcare providers and patients should underpin delivery of OA management strategies across the OA care journey.
- Wherever possible and appropriate, care should be delivered locally. In most cases, it is appropriate for care to be delivered by primary care providers, with the general practitioner as a central care coordinator.
- OA is most effectively managed by a core set of treatments, including exercise, weight loss, education to support effective self-care, and pain management33. A stepped approach is used to deliver other treatments outside the "core set"32.
- Care for OA should be delivered by a multidisciplinary team of health professionals (when required), where treatment plans are shared and coordinated between providers.
- Care should be provided within a whole-person, biopsychosocial model that includes co-morbidity management. Attention to co-morbidity management is particularly important in people with OA due to the high prevalence of co-morbid mental health and other co-morbidities34.

Diagnosis of OA

- OA can be diagnosed clinically by a qualified health professional without the need for imaging.

For example, EULAR and NICE clinical guidelines recommend diagnosis of knee OA based on clinical signs and symptoms only (aged 45 years and over, activity-related pain, no morning stiffness or stiffness of less than 30min)32,35.

Plain X-rays are not normally required as part of the diagnostic pathway. Where a differential diagnosis is required, or to plan a specific management approach such as surgery, plain film X-rays may be indicated. In these contexts, specific views should be requested16:

- Knee: AP weight bearing; lying lateral, and skyline at 30 degrees flexion
- Hip: AP pelvis centred on the public symphysis and lateral image of affected side.

Magnetic resonance imaging (MRI) is usually not necessary for diagnosing OA. MRI should only be considered where a differential diagnosis is required and can be effectively deduced from this specific mode of imaging; e.g. avascular necrosis36.
Assessment in OA

Unlike other chronic conditions, such as diabetes, routine monitoring of signs and symptoms is not commonplace for OA, but is critical for delivering appropriate person-centred care. Assessment of a person with OA should consider the domains outlined in Figure 3. Measurement of standardised domains may not be the responsibility of one practitioner, such as the General Practitioner.

Both the International Consortium for Health Outcomes Measurement (ICHOM) for hip and knee osteoarthritis and the Chronic Osteoarthritis Management Initiative (COAMI) recommend a core set of domains be assessed in people with hip or knee OA and these are summarised in Table 1. It is recommended that assessments are conducted annually from baseline or when a significant change in treatment occurs, such as the decision to undertake surgery, or when there is a significant change in symptoms or function. COAMI recommends a tiered approach to measurement, where Tier 1 tools are brief patient-reported outcomes that can be used in primary care as screening tools, while later tiers increase in depth and complexity of assessment. A tiered approach provides flexibility in measurement to meet different assessment requirements for different care settings and the scope of practice of different health professionals. In a general practice setting, it is recognised that measuring all recommended physical performance and patient-reported outcome measures may not be feasible in a standard consultation. In some circumstances, an interprofessional approach to assessment may be more appropriate.

Given the high prevalence of co-morbid health conditions in people with OA, assessment should include prevalence of co-morbidities (e.g. hypertension, obesity, depression, cardiovascular disease, renal disease, and gastrointestinal disease). Co-morbidities should be assessed to identify any relevant contraindications or precautions to treatments. In the context of complex comorbidities, inflammatory arthropathy, large joint effusions, or other red flag conditions, rheumatology assessment may be indicated.

Physical performance measures and patient reported outcomes

The Osteoarthritis Research Society International (OARSI) recommends that physical performance measures be measured in conjunction with patient reported outcomes (Table 1 and Appendix 3). OARSI recommends the following performance measures (https://www.oarsi.org/research/physical-performance-measures) for OA assessment:

- 30 second chair test
- 40 meter fast paced walk test
- Stair climb test
- Timed up and go test
- 6 minute walk test.

- For practical reasons, the Victorian Model of Care recommends the 30-second chair test as a primary outcome, with other measures to be taken as clinically feasible.

- The Victorian Model of Care for osteoarthritis also recommends measurement of body weight using absolute weight and Body Mass Index (BMI).
Table 1  Recommended assessment tools for hip and knee OA. A tiered approach is recommended for assessment, where minimum and more advanced assessment tools are described. A minimum assessment tool for each domain should be used at least annually or when a significant change in management occurs.

<table>
<thead>
<tr>
<th>Assessment domains</th>
<th>Minimum assessment tools</th>
<th>Assessment tools for more advanced measurement</th>
<th>Access</th>
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| Hip / knee joint function           | Are you limited in any of your usual activities because of arthritis or joint symptoms: yes/no\(^c\)  
OR                                                                                                   | Knee injury and Osteoarthritis Outcome Score – Physical Function Subscale (short form) – KOOS-PS\(^a,b\)                                                           | http://www.koos.nu/                                                   |
|                                     | To what extent are you limited in any of your usual activities because of arthritis or joint symptoms? (11 point NRS)\(^a\)                                                                                             | Hip injury and Osteoarthritis Outcome Score – Physical Function subscale (short form) – HOOS-PS\(^a,b\)         | http://www.koos.nu/                                                   |
| Hip / knee / lower back pain severity| 11 point NRS (0-10) relevant to pain severity in the last week\(^a,b\)  
(individual ratings for each site, as applicable)                                                                                     | Knee injury and Osteoarthritis Outcome Score – Pain subscale (short form) – KOOS-PainS\(^a,b\)                  | http://www.koos.nu/                                                   |
|                                     |                                                                                                                                                                                                                           | Hip injury and Osteoarthritis Outcome Score – Pain subscale (short form) – HOOS-PainS\(^a,b\)                  | http://www.koos.nu/                                                   |
| Health-related quality of life       |                                                                                                                                                                                                                           | Veterans Short Form 12 measure (VR-12), which is equivalent to the Short Form 12 (SF-12®) Health Survey and an algorithm is available to transform SF-12® responses to a European Quality if Life Questionnaire (EQ-5D) index score\(^a\) | http://www.bu.edu/sph/research/research-landing-page/vr-36-vr-12-and-vr-6d/about-the-vr-36-vr-12-and-vr-6d/ |
| Work status                         | Select one nominal response option:\(^a\)  
• Unable to work due to a condition other than OA  
• Not working by choice (e.g. student, retired)                                                                                                       |                                                                                                                                                          |                                                                       |
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Assessment Tool</th>
<th>Source</th>
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<tr>
<td>Sleep</td>
<td>To what extent is your sleep affected by your OA? (11-point NRS)(^a)</td>
<td>Patient Reported Outcomes Measurement System (PROMIS) – Sleep Disturbance Short Form (PROMIS-SD)(^b)</td>
<td><a href="http://www.nihpromis.org/Measures/domainframework1.aspx#sd">http://www.nihpromis.org/Measures/domainframework1.aspx#sd</a></td>
</tr>
<tr>
<td>Fatigue</td>
<td>Stanford Numeric Rating Scale Fatigue(^b)</td>
<td></td>
<td><a href="http://patienteducation.stanford.edu/research/vnsfatigue.pdf">http://patienteducation.stanford.edu/research/vnsfatigue.pdf</a></td>
</tr>
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</table>

\(^{a}\) ICHOM recommendation;  
\(^{b}\) COAMI Tier 1 recommendation;  
\(^{c}\) COAMI Tier 2 recommendation;  
\(^{d}\) recommended by the MoC External Expert Advisory Group  
NRS: numeric rating scale
Components of care

Component 1: Non-pharmacologic and non-surgical care

- Non-pharmacologic and non-surgical care for osteoarthritis is considered the cornerstone of effective management at all stages of a person’s OA condition.

These treatments are consistently highlighted in clinical practice guidelines as effective and recommended as ‘core’ components of care for knee OA. Effective components of care include:

1. **Education and support to optimise people’s capacity to actively engage in care**

   All people should have access to information about OA to support informed and shared decision-making and active participation in their care. This is particularly important as many people do not participate in effective OA management strategies and a recent systematic review identified a higher volume of literature reporting dissatisfaction from consumers about OA care information they had received, relative to satisfaction. Information about OA care should primarily be delivered by health professionals and supplemented by information from other sources. Broadly, consumers should be educated about the fluctuating nature of OA that effective management strategies are available, and that OA is not an inevitable consequence of ageing.

   Information for consumers should specifically include:

   - The disease of OA: what it is, how it’s managed, and the role of the patient in participating in care
   - Appropriate diagnostics
   - Principles of management and, specifically, management options that are known to be effective, ineffective and where the evidence is unclear
   - The role of complementary and alternative medicines (CAM)
   - Any side effects related to therapeutic options for OA
   - Where to access disease information and peer support (e.g. through MOVE: muscle, bone and joint health or Arthritis Australia).

   Using a behaviour change coaching approach, people should be encouraged to adopt a healthy lifestyle including engaging in physical activity, smoking cessation, alcohol restriction, good nutrition, appropriate sleep and appropriate footwear. Evidence from research trials suggests the benefits from self-management education programs people with OA are small and short term in the areas of self-management skills, pain, function and symptoms. The effectiveness of peer-led self-management programs for OA remains uncertain, although some benefits may be derived in the short term. Consumers also identify barriers in accessing such programs, suggesting that alternative modes of delivery may be required.

   Dissemination of information for people with OA should be made available in different modes, including paper-based and digital-based, and delivered via a range of options such as mailed information, telephone support, web-based and social media-based. For people living in rural and remote areas, access to web-based information that is hosted by appropriate, credible organisations is particularly important. The language used to communicate information to consumers should be non-technical.

2. **Physical activity**

   The World Health Organisation defines physical activity as “as any bodily movement produced by skeletal muscles that requires energy expenditure”. Physical activity is essential
for human health, having positive effects on almost all body systems. In the context of OA, physical activity is important for maintaining joint mobility, muscle strength, co-ordination and balance, and control of body weight. While Australian physical activity guidelines for adults (18-64 years) and older adults (65+ years) have been developed, these may not be achievable for people with OA. All people with OA should be encouraged to increase or at least maintain general physical activity levels and reduce sedentary activity time in order to optimise function and improve quality of life.

3. Exercise

Exercise is defined as a physical activity that is planned, structured, and repetitive for the purpose of conditioning any part of the body. Exercise is indicated at all stages of OA and ideally should be initiated as early as possible in OA care. Exercise must be matched to the preferences of the individual and consider their functional impairments and goals. Exercise should be prescribed by a professional who is appropriately qualified in musculoskeletal and pain care and who can support behaviour change. Evidence suggests that no one specific exercise approach is superior to another. Therefore, appropriate exercise for OA may involve a combination of lower limb strength training and aerobic, neuromuscular and range of motion exercises. Exercise can be land or water-based, performed in the community, or be home-based. As outcomes have shown to be comparable the choice of environment for exercise will depend on patients' preferences, level of disability, symptoms associated with weight bearing, cost and availability. Recent Canadian data highlight that a majority of consumers would be willing to attend community-based centres or gyms for exercise management of hip or knee OA and these data are likely to be transferable to Australia.

Regular review and progression of exercise by an appropriately trained professional is important. All exercise programs should be accompanied by patient education to support positive health behaviour change in order to address common barriers to exercise adherence. Optimal outcomes have been reported for exercise undertaken three times per week. Integration of pain coping skills with exercise may enhance outcomes for some patients. Pain coping skills can be delivered by clinicians (e.g. clinical psychologists or other appropriately trained professionals) or through online platforms such as painCOACH and painHEALTH. Online resources for other possible psychological barriers to active participation in exercise are also available, such as https://thiswayup.org.au/.

Although exercise is indicated pre-operatively to improve pre-operative function as a known predictor of post-operative outcomes, clinically-important post-operative improvements have not been shown.

4. Obesity and overweight management

Obesity is one of the most important modifiable risk factors for OA. It has been estimated that obesity causes a quarter of OA in Australia. Increasing body mass index (BMI) is directly related to the risk of developing knee and hip OA and a high BMI is associated with progression of knee OA. Obesity can result in structural damage to joint tissue through an increase in mechanical load and changes to metabolic pathways associated with adipose tissue.

People who are overweight or obese should be strongly encouraged and supported to lose weight. The NHMRC provides a clinical framework for overweight and obesity management in adults. Specifically, active management, such as referral to a dietician for dietary management and support is indicated for most adults where BMI > 30 kg/m². In older adults, BMI thresholds for overweight and obesity and management are less clear. In this context,
weight loss should be considered on a case-by-case basis that considers existing
comorbidities and the relative distributions of lean mass and fat mass.

Generally, a more intensive period of weight management support and monitoring is required
through the first three months of a weight reduction program. Long term monitoring and
support are essential to sustain weight management. On-referral to other allied health
professionals to support weight loss and address psychological barriers to weight control may
be indicated.

Even small amounts of weight loss, at all stages of OA are likely to improve symptom
features of knee OA and slow disease progression. Both OARSI and the RACGP
recommend a 5% weight reduction within 20 weeks or a rate of 0.25% per week for treatment
to be efficacious.

While weight loss for obesity and overweight is the ultimate aim, a subgroup of people may
not achieve this in a sustainable manner. In this context, supporting people to avoid further
weight gain is appropriate.

5. Persistent pain management

Management of persistent pain in OA is recognised as one of the single most important
factors for people with OA. Effective pain management requires that management
strategies address the likely multiple contributors to the pain experience: psychological,
physical and social. In terms of non-pharmacologic and non-surgical care this may include
psychological therapies (e.g. cognitive behavioural strategies), mind-body therapies and
graded exposure to physical activity. Thorough assessment of the nature and impact of
pain is important to inform the appropriate components of care and their sequencing for an
individual. While most therapies can be feasibly delivered in primary care settings, some
patients, particularly those with more advanced OA and/or complex co-morbid conditions,
may require referral to specialist pain management clinicians (e.g. pain medicine specialists,
rheumatologists) allied health providers (e.g. clinical psychologists, physiotherapists,
occupational therapists) or interdisciplinary pain management programs, particularly in
situations where central nervous system changes occur with persistent pain. Importantly,
psychological therapies, physical therapies and pharmacologic therapies (where indicated)
should be delivered in a co-ordinated and integrated manner. Engagement of the general
practitioner as the co-ordinator of care for persistent pain management is important. For
people with compensable injury claims, coordination of care and consistency in messaging
about persistent pain, based on a contemporary understanding of pain biology, is critical.

Component 2: Pharmacologic care

Pharmacologic management is an important component of OA care for some people with
OA. Currently, there are no disease-modifying therapies available for OA. Therefore,
pharmacologic therapies are aimed at addressing symptoms associated with OA, in particular
pain, to enable improved function and participation and provide a ‘therapeutic window’ for
people to engage in effective non-pharmacologic management options. The approach to
pharmacologic therapy must recognise that:

• Pain, particularly persistent pain, occurs due to multiple and complex factors – biological,
  psychological and social – and that the choice of pharmacologic agent may only address
  one component of the pain experience. It is imperative; therefore, that pharmacological
  management be integrated with other non-pharmacologic therapies to ensure pain is
  addressed holistically.

• Pain associated with OA often fluctuates due to a combination of biological, psychological
  and social factors. Therefore, pharmacologic requirements will also change. For example,
pharmacological agents are often most effective when targeted to address short-term fluctuations (increases) in symptoms. While escalation in pharmacologic therapies may be indicated (e.g. in patients with advanced OA waiting joint replacement surgery), de-escalation is also important as symptoms fluctuate or improve.

- Patient expectations about pharmacologic therapies should be explored and education about the role of pharmacologic agents provided by the prescriber or pharmacist.

The choice of pharmacologic therapy balances the effectiveness of pain and inflammation control with risk profiles of the agent(s) selected. A range of agents are recommended for OA care, including:

1. Simple analgesics (e.g. paracetamol)
2. Non-steroidal anti-inflammatory agents
3. Intra-articular agents (e.g. steroids)
4. Short term trial of opioids with a discontinuation plan in place.

The Rheumatology 3 Australian Therapeutic Guidelines (in press) provides further detail about the indications for different agents and their risk profiles and stepped approaches to prescribing. Other medications may be indicated to manage specific pain presentations and psychological co-morbidities.

While a recent systematic review points to the long-term inefficacy of paracetamol in managing OA, its safety profile warrants use as first line therapy (Rheum 3 guidelines in press). The use of opioids, including their combination with other adjunct therapies, should be undertaken judiciously given the multiple and significant adverse events associated with prolonged use of these agents, including addiction and increased pain sensitisation outcomes. In this context, the Victorian Government has provided a resource hub for health professionals and consumers to promote the safer use of opioid medicines. Similarly, the Faculty of Pain Medicine of the Australian College of Anaesthetists, has recently developed a clinical App to assist doctors with opioid dosing, and help patients better understand the safe use of opioids and the National Prescribing Service also provides clinical advice in this context.

Component 3: Surgical care

A range of surgical interventions may be indicated for management of hip and knee OA. Total joint replacement (TJR) represents the largest proportion of surgical interventions and therefore the MoC focuses on these alone. For some patients, TJR may not be appropriate (e.g. patients younger than 50 years) and in these situations other joint preserving surgeries may be indicated, such as high tibial osteotomy.

**Total Joint Replacement (TJR)**

TJR is the cornerstone of surgical management of advanced OA of the hip and knee joint. It is one of the most beneficial and cost-effective interventions for improving pain and function in advanced OA. TJR surgery should only be undertaken when all other non-operative management strategies have been tried and there is a good probability of surgical success.

The Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR) was established in 1999 and provides a large volume of information about the survival rates of joint replacements and should be referred to when making decisions about type of replacement, the method of fixation and the type of bearing surfaces used. Several combinations have been identified as giving excellent long-term results with few revisions needed, particularly in the elderly.
**Surgical selection**

Although joint replacements have shown to be effective in reducing pain and improving function in people with advanced osteoarthritis, studies show that a small proportion of patients (higher rates reported for knee replacement compared to hip replacement) report dissatisfaction with surgery. Meeting preoperative expectations and achieving satisfactory pain relief appear to be the most important factors in predicting success of TJR. Identification of those patients who respond well to surgery (‘responders’) may assist in delivering the most cost effective and clinically effective management. However, there are very few formal predictive tools available to aid clinicians to determine those who are likely to be good or poor responders.

The following broad criteria are recommended for orthopaedic surgical referral in Victoria:

1. A poor response to an adequate period of appropriate non-surgical therapy
2. Radiographic evidence of advanced disease
3. Objective measures of pain and function that indicate significant impact
4. The patient is willing to consider major orthopaedic surgery

In addition to these guiding criteria, it is recommended that, where possible, other major co-morbid conditions are addressed prior to surgery.

There have been tools developed in Victoria such as the Multi-attribute Arthritis Prioritisation Tool (MAPT) that focus on prioritising patients with hip or knee OA waiting for surgery and a similar one in New Zealand called the Clinical Priority Assessment Criteria (CPAC). These are largely algorithms based on clinical presentation or symptoms and have little evidence as a predictor of surgical outcome. The role of these tools can be valuable to identify patients in need of care but not specific enough to conclude that surgical intervention would be worthwhile.

In order to predict good responders to surgical intervention, assessment should include measures of pain severity, functional disability, radiographic changes, BMI, response to conservative care, and psychological co-morbidity. It is also recommended that multiple assessments over several time points with the same healthcare provider may provide a clearer understanding of patient’s needs and expectations prior to surgical referral.

**Obesity**

Although the impact of morbid obesity on outcomes following joint replacement remains unclear, there is strong evidence to indicate there is an increased risk of medical complications, especially infections. Other complications such as acute kidney injury, myocardial infarction, dislocations and early rates of revision may also be important to consider, especially for people with a BMI of ≥45kg/m². There is some argument for introducing bariatric surgery as preoperative management for this population as studies have shown quicker and greater weight loss with bariatric surgery than conservative care. However, there is a lack of evidence for short or long term benefits of joint arthroplasty procedures following bariatric surgery. In addition, bariatric surgery is recommended to patients less than 65 years of age and excludes some co-morbidities such as schizophrenia, which overall reduces the number of patients to whom this may apply. The establishment of the Bariatric Surgery Registry in 2014 may provide further guidance on this issue as data are prospectively collected from all bariatric procedures performed in Australia.
Psychological co-morbidities
Depression, anxiety and catastrophizing has been shown to be associated with poor outcomes following joint replacement.\textsuperscript{101,106,107} There is emerging evidence and interest around pre-operative mind-body therapies for improving post-operative outcomes.

Patients who have been assessed and deemed to not require TJR at the time of assessment should not be placed on a surgical waitlist. This practice will improve timely access to TJR for those patients who require surgery within 180 days.

➢ All health services should endeavour to provide surgery, to those who need it, within 180 days.

Peri-operative care processes for total joint replacement surgery in Victoria
The Western Australian Model of Care for Elective Joint Replacement Surgery provides a comprehensive framework concerning peri-operative care, peri-operative processes of care and post-operative care that can be adapted to Victoria.\textsuperscript{108}

Key points from WA Model of Care that should be considered in Victoria include:

• Establishment of referral pathways to standardise and improve patient flow through the healthcare system. They should aim to ensure the right person is seeing the right healthcare professional at the right time. This also involves the appropriate tests and procedures being conducted at the right time to ensure efficiency in this system. Pathways should also outline appropriate referrals (e.g. standard outcome measures and imaging to include), criteria around fitness for surgery and processes to manage inappropriate referrals. Electronic referrals should be established.

• Triage of referrals in hospital using standard protocols
• Orthopaedic clinic assessment using standard protocols
• Monitoring of patients’ status while on a surgical wait list using an appropriate, simple tool so that patients who are deteriorating rapidly can be fast-tracked for surgery. Patients who have been placed on the waitlist should concurrently receive non-surgical therapies
• Multidisciplinary preadmission assessment to identify possible surgical risk factors and inform discharge planning
• Implementation of a post-operative pathway of care, with an emphasis on discharge to the home environment
• Establishment of a state-wide database for collection of patient outcomes data.

Aspects of the WA Model of Care that could be changed or expanded include:

• Recommendation on what tools or outcome measures general practitioners should use and how scores should be interpreted for triage processes.
• Integration of a discharge predictor into the surgical care pathway.
• Ensure all patients who require surgery and are fit for it, can be performed within 180 days.
• Public and private healthcare providers should prioritise discharge from acute hospital facilities to home and community outpatient-based care, rather than inpatient rehabilitation facilities.

Surgical facilities
To provide the highest standards of TJR surgery care, teaching and research, centres should be identified that have the necessary multidisciplinary skill mix and expertise of staff, equipment and infrastructure. The relationship between post-operative complications rates and length of stay with both the hospital surgical and surgeon procedure volumes across a
range of surgical areas is variable\textsuperscript{16,109-113}. The AOANJRR has not established a clear association between poor outcomes and low volume surgeons or units. The exact surgeon and unit volumes to maintain competence and quality is unclear but surgeons and centres performing low volumes of cases per year should ensure their quality and safety measurements of those patients are adequate. It is recommended that regional and smaller healthcare networks in Victoria have a tiering structure with guidelines for multidisciplinary staffing and complexity of patients and the ability to refer onto more specialised centres if required.

**Post-operative assessment**

Post-operative assessment should include a clinician review as well as patient-reported outcome measures (e.g. refer to Table 1). Standardisation of outcome measures across Victorian healthcare facilities would enable better health surveillance and larger-scale research initiatives.

The current position statement of the Arthroplasty Society of Australia (ASA) states that all patients following joint replacement surgery have regular and standard reviews\textsuperscript{114}. This process is very resource intensive, reduces surgeons’ ability to see new and complicated cases and the overall success of identifying complications through long term regular reviews is being questioned\textsuperscript{115}. Advanced scope physiotherapy-led clinics are effective, cost-effective and improve quality of care and should be adopted by health services as usual practice for triage and standard reviews. Other innovative models such as remote review and virtual clinics are established or being trialled across several healthcare centres in Victoria\textsuperscript{116}.

- It is important that patients who present with symptoms have prompt access to clinical care and diagnostic services.
Care for OA that should not be delivered in Victoria

Magnetic Resonance Imaging (MRI)

- The use of MRI in the diagnosis and clinical management of knee osteoarthritis, including surgery, is not endorsed within any current guideline\(^\text{39}\).

MRI has been demonstrated to be important in the understanding of the natural history of OA. Pathological joint changes can be detected much earlier with MRI than radiographs\(^\text{117}\). MRI has been recommended for use within clinical OA trials\(^\text{118}\) and to screen for unusual conditions such as avascular necrosis. There is a high insidious prevalence of asymptomatic meniscal morphology in the knee in the general population with increasing age\(^\text{119}\) and it has been proposed that over imaging with MRI may result in unnecessary arthroscopies and be a barrier to active management of knee pain\(^\text{120}\).

MRI is also unhelpful in deciding on the appropriateness of a total hip joint replacement, as there is a high incidence of asymptomatic chondral and labral pathology with advancing age\(^\text{121}\).

Arthroscopic debridement for osteoarthritis

Arthroscopic surgery has shown to be no more effective than sham surgery\(^\text{122}\) or physical therapy\(^\text{123}\) for the management of patients with symptomatic OA and is not recommended. The role of arthroscopic procedures in patients with OA with mechanical symptoms such as locking is less clear but there is good evidence to suggest that all patients should have a trial of non-operative management prior to surgical referral\(^\text{124-127}\).

The 2016 position statement of the Australian Knee Society on behalf of the Australian Orthopaedic Association states: “Arthroscopic debridement and/or lavage, has been shown to have no beneficial effect on the natural history of osteoarthritis, nor is it indicated as a primary treatment in the management of osteoarthritis. However, this does not preclude the judicious use of arthroscopic surgery, when indicated, to manage symptomatic coexisting pathology, in the presence of osteoarthritis or degeneration.”\(^\text{128}\)
How care for OA should be delivered in Victoria

Table 2 summaries how care should be provided to Victorians with hip or knee OA. Specifically, system-level enablers to OA care delivery and relevant implementation strategies are considered across four key domains:

1. Building peoples’ capacity to more effectively participate in care
2. Models of Health Service Delivery
3. Information and communication technologies
4. Health policy and planning
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<th>Domain</th>
<th>Enablers to OA care</th>
<th>Implementation strategies</th>
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| Building peoples’ capacity to more effectively participate in care   | **Community health education**  
- Community health campaigns targeted towards the general community about the impact of musculoskeletal health conditions, particularly OA should be undertaken. Key messages should include:  
  o obesity as a risk factor for OA  
  o OA is not just a disease of aging and the impact of OA on younger people is significant  
  o effective and ineffective management options  | - Deliver community education about OA and core management principles that are evidence-based  
- Promote community services that provide OA management information, such as [MOVE: muscle, bone & joint health](https://www.move.org.au), [Arthritis Australia](https://www.arthritis.org.au), and the [Better Health Channel](https://www.betterhealth.com.au).                                                                                                                                                                                                 |                                                                                                                                                                                                                                                     |
| **Delivery of accurate information to people in multiple formats and in culturally-sensitive modes**                                     | - Resources should be available in different languages, formats and in culturally-sensitive modes  
- Multidisciplinary primary care providers need access to contemporary information in multiple formats (hard copy, digital, different languages) in order to provide education about OA disease, effective and ineffective management options, particularly management strategies for persistent pain  
- Comprehensive OA education should be provided to consumers by allied health providers to complement GP-delivered care and education. Education should form part of all episodes and packages of care  
- Peer-support programs should be supported, either online or face-to-face  
- Support or resources for consumers to actively engage in shared-decision making during consultations should be developed  | - A central repository of contemporary, evidence-based and consumer-focused OA resources, including a service directory of local resources, should be promoted to clinicians and consumers; e.g. through the [MOVE: muscle, bone & joint health](https://www.move.org.au), [Arthritis Australia](https://www.arthritis.org.au), and the [Better Health Channel](https://www.betterhealth.com.au). |                                                                                                                                                                                                                                                     |
<p>| Availability of local services to support effective self-management    | - Access to community-based facilities to undertake exercise should be supported with consideration to subsidies for transport and access to facilities  | - Partnerships with local government and community facilities should be explored and innovative programs supported to facilitate access to exercise centres (e.g. transports, dedicated exercise times/supports)  |                                                                                                                                                                                                                                                     |</p>
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| **Funding models**             | - Funding models (public and private) are required to support packages of care inclusive of exercise, weight loss, pain management and psychological health interventions  
  - Increased funding to enable access to allied health providers is required with a minimal administrative burden. For example, increasing access to the Medicare Team Care Arrangement scheme.  
  - Support for people to access effective self-management strategies (e.g. land exercise, water exercise, development of pain coping skills, weight loss services) is required within funding models. Importantly, flexibility in funding models and service delivery models is required to align to diversity in peoples' needs, preferences and places of residence. | - Reform the Medicare Chronic Disease Management and Team Care Arrangement schemes to focus on outcomes rather than episodes of care  
  - Monitor the outcomes of the proposed Healthier Medicare package through implementation of Health Care Homes, as it relates to OA care outcomes  
  - Expand funding for telehealth services and training to include allied health providers in public and private settings  
  - More than 5 allied health consultations per annum under the Medicare Team Care Arrangement scheme should be made available, inclusive of a higher funding amount for initial/extended consultations |
| **Maximising workforce resources and efficiencies** | - Advanced practice roles for OA care for allied health and nursing staff should be created and implemented in community-based settings in the public and private systems. These roles should include assessment, triage and co-ordination of care for people with OA.  
  - Advanced scope roles / musculoskeletal care coordinator roles for allied health staff should be expanded in tertiary hospitals as part of OAHKS clinics for assessment, triage and co-ordination of care for people with OA.  
  - Early OA care should be provided in partnership between GPs and allied health providers to ensure appropriate early intervention is initiated  
  - Investment in telehealth infrastructure and training should be prioritised for all health practitioners | - Develop a workforce capacity building framework for musculoskeletal care coordinators in community settings, inclusive of training, credentialing and infrastructure requirements. The Advanced Musculoskeletal Physiotherapy Operational Framework provides an example  
  - Development and implementation of a telehealth training program for clinicians. |
<p>| <strong>Building workforce capacity in OA care</strong> | - Trainee clinicians should be appropriately skilled in best-practice, person-centred chronic disease management and behaviour change support, inclusive of shared | - Incentivise participation by trainee and practicing primary care clinicians in accredited and flexible education about optimal OA care, particularly as |</p>
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<td>decision making. This may require realignment of current curricula or integration of new curricula to ensure the emerging workforce has the appropriate skills and knowledge to deliver the right care and work interprofessionally.</td>
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<td>- Primary care providers should receive regular professional development around best-practice management of OA with a focus on contemporary pain biology, pain management/cop ing strategies and behaviour change/health coaching.</td>
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<td>- A workforce culture shift in OA management is required, where more emphasis is placed on effective non-pharmacologic and non-surgical management within a biopsychosocial model of care that supports behaviour change, an understanding of contemporary pain biology and interprofessional care.</td>
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<td>- Upskill clinicians in educating patients about appropriate and inappropriate diagnostic and therapeutic strategies using shared decision-making. In the context of OA this refers particularly to discussing the role of imaging and arthroscopic surgery and the effectiveness of non-pharmacologic and non-surgical care options.</td>
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<td>Deliver care locally</td>
<td>- OA care should be provided locally in community-based settings by multidisciplinary providers, led by a GP or allied health provider. Early OA care should focus on evidence-based, core treatments. Development and implementation of OA programs, akin to the NSW Osteoarthritis Chronic Care Program (OACCP) 17 or the Victorian Osteoarthritis Hip and Knee Service (OAHKS), could be undertaken in community-based facilities in Victoria.</td>
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<td>- Tertiary hospital-based care should only be delivered when clinically indicated or when adequate primary care services are not accessible.</td>
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<td>- Expand OAHKS services to community-based settings</td>
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<td>- Establish private and public musculoskeletal health centres, incorporating allied health, medical and orthopaedic surgery practitioners, to provide services for people with advanced OA or complex presentations, particularly for complex situations</td>
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<td>Routine TJR should be provided to patients in hospitals close to their home, where appropriate, within 180 days</td>
<td>provide upskilling opportunities for general practitioners. Where feasible, these centres should link with Sub Acute Care funding initiatives.</td>
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<td><em>HealthPathways, Map of Medicine</em> and other electronic care and referral pathways for OA should promote local, interprofessional care that is co-ordinated by the GP</td>
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<td>Community-based programs for OA education and peer support should be provided.</td>
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<td>Multidisciplinary-led, group-based education programs that focus on exercise, weight loss, mental health and pain coping skills should be made available. In particular, these should be made available during business and after hours to cater for people with OA in the workforce.</td>
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<td>Community-based centres of excellence for musculoskeletal health should be established in Victoria to enable co-location of a skilled multidisciplinary clinical workforce (surgical, medical specialists, allied health) to provide services for people with advanced OA or complex presentations, particularly for complex persistent pain. These services should be made available after hours (e.g. by engaging the private sector) and have referral criteria and appropriate triage systems established to ensure appropriate inclusion criteria are met.</td>
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<td></td>
<td>Multidisciplinary outreach services to rural areas should be provided, inclusive of rheumatology, orthopaedic surgery and physiotherapy as a minimum core team.</td>
<td></td>
</tr>
<tr>
<td>Surgical referrals management in public hospitals</td>
<td>Establish a process of triaging referrals in a timely manner in order to streamline the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incorporate the <em>WA Elective Joint Replacement Surgery Model of Care</em> pathway (referral processing) into the</td>
<td></td>
</tr>
<tr>
<td>Domain</td>
<td>Enablers to OA care</td>
<td>Implementation strategies</td>
</tr>
<tr>
<td>--------</td>
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<td>---------------------------</td>
</tr>
<tr>
<td></td>
<td>patient flow and access into specialist clinics</td>
<td>Victorian Healthcare system and incorporate a pathway to link with existing and planned OAHKS services in Victoria.</td>
</tr>
<tr>
<td></td>
<td>- Ensure that people on the surgical waitlist have access to OA education and non-surgical care options</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Ensure that the clinical status of people on the surgical waitlist is monitored and that rapid access to surgery can be provided when needed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Ensure that TJR surgery is provided, to those who need it, within 180 days</td>
<td></td>
</tr>
</tbody>
</table>

**Capacity to monitor OA outcomes**

- Support innovative, ICT-enabled strategies to make assessment and data collection about OA in Victoria simple for clinicians

<table>
<thead>
<tr>
<th>Innovation in service delivery models</th>
<th>Deployment of telehealth services and Internet-supported services in the public and private sectors either as stand-alone or combined in hybrid models of service delivery such as the St Vincent’s Post Arthroplasty Review Service.</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Telehealth services should be expanded to improve consumers’ access to specialist clinics and other health services, including allied health services, for the purposes of clinical assessment, management planning and treatment. ¹³⁰,¹³¹</td>
<td>- Provide clinician training in use of telehealth and Internet-supported service delivery models</td>
</tr>
<tr>
<td>- Web-based tools that deliver accurate health information about OA and support behaviour change should be promoted to consumers and care providers</td>
<td>- Develop Apps that allow regular self-monitoring of symptoms, adherence to self-management, monitoring weight loss or exercise participation with simple graphical displays back to consumers to show individual progress over time. These could be promoted through the Victorian Better Health Channel</td>
</tr>
<tr>
<td>- Care delivery, particularly in primary care, should be supported with telephone support (medical, allied health and peer) and access to web-based consultation tools (e.g. telehealth facilities, Skype)</td>
<td>- Establish a Victorian musculoskeletal or OA online hub that acts a central repository of information and tools for clinicians and consumers, integrating existing resources and supported with</td>
</tr>
<tr>
<td>- Support development and dissemination of Australian Internet-supported or phone-supported care delivery platforms (e.g. Pain Coach [<a href="https://paincoach.chaicore.com">https://paincoach.chaicore.com</a>]; painHEALTH [<a href="http://painhealth.csse.uwa.edu.au/">http://painhealth.csse.uwa.edu.au/</a>]; MyJointPain [<a href="https://www.myjointpain.org.au/">https://www.myjointpain.org.au/</a>])</td>
<td></td>
</tr>
</tbody>
</table>

It is recognised that while ICT-enabled service delivery models will improve access for many, it may also inadvertently compromise access for others (e.g. those without Internet access or those with low computer literacy skills). ICT-enabled services, therefore, should not replace face-to-face consultations for those who require this mode of service. For the population with OA, introduction of ICT-enabled service delivery strategies are likely to require a phased introduction.
<table>
<thead>
<tr>
<th>Domain</th>
<th>Enablers to OA care</th>
<th>Implementation strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICT to support shared-care</td>
<td>peer stories to engage consumers and support behaviour change.</td>
</tr>
<tr>
<td></td>
<td>- Establishment of shared e-health records that enable shared-care between providers and across public and private systems should be prioritized</td>
<td>- Develop a communication strategy to target clinicians, peak bodies and consumers across the health sector to educate and promote the benefits of My Health Record and information about its roll-out especially for people managing or living with chronic disease(s).</td>
</tr>
<tr>
<td>Health policy and planning</td>
<td>Integration of the Model of Care with State health policies and funding agreements</td>
<td>- Establish and support an implementation steering group for the Model of Care</td>
</tr>
<tr>
<td></td>
<td>- The Model of Care should be aligned with new health policies and funding agreements with health services and other providers</td>
<td>- Share and promote the Model of Care across Australian jurisdictions</td>
</tr>
<tr>
<td></td>
<td>- The burden of disease of osteoarthritis should be communicated widely through integration with other chronic health condition policies and strategies relevant to Victoria, and nationally</td>
<td>- Promote the Model of Care in all Victorian health services and policy units across the Department of Health and Human Services</td>
</tr>
</tbody>
</table>
A consumer pathway for OA in Victoria

Info graphic here
Part 3: Implementation and evaluation priorities

Dissemination and implementation of the Model of Care

The Victorian Musculoskeletal Leadership Group, in partnership with Government and other partners across the sector, should support the dissemination and implementation of this Model of Care across Victoria.

Priority areas for action

The following implementation and evaluation priorities and strategies have been identified by the Victorian Musculoskeletal Leadership Group and the External Expert Advisory Group for undertaking by the sector, in partnership with Government and other organisations.

Information delivery

- Deliver public health messages about the impact, cost, prevention and effective management options of OA. Messages should be disseminated through non-government organisations such as MOVE muscle, bone & joint health; all new government policy; private health insurers; Primary Health Networks; public health campaigns; clinical organisations and community pharmacies. Partnership models (e.g. multi-agency involvement) in co-design and co-delivery of information messages are recommended.
- Support development, updating and dissemination of detailed and evidence-based OA management information for consumers through a variety of modes and channels; e.g. via the Better Health Channel; MOVE muscle, bone & joint health; Arthritis Australia; community pharmacies and private health insurance companies.
- Establish and maintain an electronic musculoskeletal resources hub for clinicians and consumers where OA resources are integrated in a central repository. For consumers, resources should be available in multiple languages and focus on evidence-based management options. For clinicians, a directory of OA-relevant community services and clinical practice tools and resources should be established and maintained. The Better Health Channel may be an appropriate repository for Victoria.

Service delivery for OA

- Establish community-based public and private musculoskeletal clinical service centres in metropolitan and regional areas to provide services for people with complex musculoskeletal health presentations and persistent pain. The public centres may operate in a similar manner to the successful OAHKS clinics already established throughout Victorian health services or the NSW OACCP model. Centres need to have appropriate referral and triage criteria established, be accessible after hours, and have formal linkages with tertiary centres. For any service it is important that personnel in co-ordinator roles have the opportunity to meet biannually to ensure a standardised approach to care, particularly communication strategies with general practitioners.
- Establish key performance indicators for all health service networks within their Statement of Priorities, to ensure patients with OA of the hip or knee have access to joint replacement surgery, when required, within 180 days at a facility close to home.

Funding models

- Advocate for expansion of the Medicare Chronic Disease Management initiative and broader implementation of the Healthier Medicare trial to include musculoskeletal health conditions.
• Advocate for private health insurance companies to support outcomes-based OA care, such as packages of care, rather than episodes of care.

Workforce capacity building in OA care

• Support OA-focussed professional development opportunities for clinicians working in primary care and surgeons, delivered by their own professional bodies, with a focus on early and effective conservative management; appropriate imaging; appropriate pharmacologic care and appropriate surgical selection.
• Establish a framework for supporting the implementation of advanced practice roles in musculoskeletal and pain care for non-medical health professionals (e.g. physiotherapists, nurses), based on expansion of the existing advanced scope physiotherapy framework129.

Information and communication technologies

• Provide telehealth and tele-rehabilitation education to clinicians of all disciplines in private and public sectors, consistent with an implementation framework developed by the Department of Health and Human Services and other implementation frameworks132,133.
• Support implementation of Health Direct telehealth systems across Victorian healthcare setting and ensure OA services are included within scope.

Health policy and governance

• Task the Musculoskeletal Clinical Leadership Group with ensuring that all new Government policies relating to health service delivery explicitly consider OA care and implementation opportunities of this Model of Care.

Evaluation priorities

Research and evaluation

• Support financially and in kind research projects that seek to evaluate implementation of components of the Model of Care; e.g. NHMRC Partnership Projects and Better Care Victoria strategic projects
• Monitor and report on the rollout and evaluation of the Healthier Medicare initiative
• Evaluate the system, consumer and cost efficiency outcomes of implementing community-based musculoskeletal health services centres in public and private settings that utilise an interprofessional workforce
• Evaluate the outcomes associated with establishment of advanced practice roles in OA and musculoskeletal health care in primary care settings for nursing and allied health professionals
• Evaluate the effectiveness of implementing ICT-enabled models of service delivery for OA care
• Develop and evaluate a holistic tool to improve the selection/identification of patients who are likely to respond to total joint replacement.
• Appropriate outcome measures for evaluation initiatives include:
  – Outcomes related to TJR surgery
  – Appropriate use of imaging
  – Consumer pathways consistent with the recommendations in the MoC.
Approach to implementation

It is recommended that an implementation plan be developed around the priorities outlined above, with oversight from a cross-sector, multidisciplinary implementation steering group, linked with the Victorian Musculoskeletal Clinical Leadership Group. The Plan should outline phases for implementation and key performance indicators, aligned with the Victorian Innovation and Reform Impact Assessment Framework and best practice approaches to implementation of Models of Care\textsuperscript{134}. The implementation plan should be reported on and reviewed annually.
Part 4: Background

What is osteoarthritis?

Osteoarthritis is a painful condition that affects the joints of the body and structures such as subchondral bone, ligaments and muscles. It is characterised pathologically by damage to the structures, such as localised loss of cartilage, and clinically by pain and mobility impairment, reduced quality of life and mental wellbeing. Notably, there is high variability in clinical presentations and an inconsistent relationship between the degree of pathology and clinical presentation, particularly structural changes on imaging. Recent evidence refutes the historical perception that osteoarthritis is a non-inflammatory condition and highlights the important role of inflammatory processes\(^6\). OA is now considered a complex condition that is influenced by an interaction between genetic, biomechanical, metabolic and biochemical responses. The risk factors for osteoarthritis include age, obesity, joint injury and some occupational factors (e.g. bending and squatting)\(^{28,135}\).

Why is a Model of Care for osteoarthritis needed in Victoria?

Burden of disease

While osteoarthritis (OA) is less commonly associated with mortality compared to other chronic conditions like cancer, diabetes, heart disease and lung disease; the impact of osteoarthritis on physical and mental wellbeing, quality of life and economic prosperity of the individual and society are enormous\(^{136-138}\). Approximately 2.2 million Australians had OA in 2015, with the prevalence increasing with age, e.g. up to 32.3% in Australians aged 75 years and over\(^15\). The prevalence of OA is relatively higher in Indigenous populations and in people living in regional areas\(^{137}\). Importantly, OA is not just a disease of older age. The majority of people living with OA remain in their prime income-earning years (25-64 years)\(^9,15\), resulting in early retirement from the workforce and reduced accumulated wealth\(^{139}\) and an increased risk of falling into poverty\(^{140}\). The impact of OA on the productivity of the Australian workforce is also profound, and second to back problems, exceeding all other chronic health conditions\(^{141}\). The impact of OA on younger people is also significant. Recent data highlight the enormous quality of life impact, psychological distress and work disability experienced by Victorians aged 20-55 years with hip or knee OA\(^{142}\). For these reasons, osteoarthritis has been a National Health Priority Area condition in Australia since 2002 and identified in the top 20 conditions imposing the largest burden of disease in Australia and globally\(^{138}\).

Current projections suggest that the prevalence of osteoarthritis in Australia will soar by 41% in coming decades due to population ageing and expansion and an increasing prevalence of chronic diseases and their risk factors among the population\(^{15}\). Importantly, the downstream economic, productivity, health service and population wellbeing consequences of a surge in OA prevalence of this magnitude will be immense\(^10\). For example, osteoarthritis is among the most commonly managed conditions in general practice\(^{143}\) while data from the Australian National Joint Replacement Registry highlight an annual increase in hip and knee joint replacement of approximately 3-13%, with Victoria having the second highest volume of procedures after New South Wales and the largest increase in volume of procedures between 2012–13 and 2013–14\(^{144}\). Between 1994–95 and 2013–14 Victoria had a 175% increase in primary total hip replacements and 285% increase in primary total knee joint replacements\(^{144}\). In 2014 988,667 primary and revision hip and knee replacements were reported to the registry reflecting an increase of 97,460 procedures from 2013\(^{145}\). Hospital utilisation statistics 2014–15 compiled recently by the Australian Institute of Health and Welfare highlight that musculoskeletal conditions are the diagnostic category responsible for the greatest public hospital expenditure\(^{146}\).

One of the most significant issues associated with effective management of OA is co-morbidity. Data suggest that 3 out of 4 Australians with arthritis also have another co-morbid condition, most often
cardiovascular disease, back problems and mental health conditions\textsuperscript{34}. Obesity in people with OA is also more prevalent than those without OA\textsuperscript{34}, including obesity prevalence after total joint replacement\textsuperscript{26,147}. Co-morbid musculoskeletal pain is also common in people with knee OA\textsuperscript{148}.

**Evidence-practices gaps in OA management**

Despite consistent evidence for ‘what works’ to manage hip and knee osteoarthritis, including Australian guidelines\textsuperscript{71}, there remains inconsistency in the approach to care that includes pharmacologic management, non-pharmacologic management, and surgical/interventional management\textsuperscript{25,29-34}. A notable contemporary example is knee arthroscopy\textsuperscript{149}, where Victorian data between 1 July 2000 to 30 June 2009 demonstrate a decline in the total volume of procedures, but not for people with knee OA\textsuperscript{150}. In fact, the data point to a significant increase in arthroscopies for middle-aged patients with knee OA, despite Cochrane systematic-review level evidence that the procedure offered no benefit\textsuperscript{151}.

Active participation by consumers in care for their OA is an essential component of effective management. Data demonstrate that Victorian consumers do not consistently adopt effective non-surgical and non-pharmacological interventions like exercise to manage their knee or hip OA\textsuperscript{40}. Several challenges have also been reported regarding accessing care for hip or knee OA, including: health-professional related factors, health-system factors such as waitlists, financial factors relating to taking time off work and paying for care, and personal beliefs about effective OA care\textsuperscript{44}. Enablers to accessing care included having private health insurance, proximity to hospitals, and care coordination by health professionals\textsuperscript{44}.

Passive dissemination of clinical guidelines has historically been ineffective to achieve system-wide and cross-sector changes in healthcare delivery practices and consumers’ participation in care. Models of Care serve as one strategy to bridge the gap between evidence (i.e. what care) and how to implement it in a jurisdiction\textsuperscript{152}.

**How should OA be managed?**

Contemporary clinical guidelines for the management of OA support the concept of a stepped approach to care, where core interventions should be provided to everyone and other components of care included in a care package, as clinically indicated\textsuperscript{33,39,153}. Components of care include non-pharmacologic and non-surgical care, pharmacologic care, and surgical care (Figure 2). Ideally, health services should be provided by an integrated multidisciplinary team, coordinated at the primary care level and adopt a whole person approach to care with a particular focus on pain management and restoring function, quality of life and mental and physical wellbeing\textsuperscript{153,154}, consistent with Wagner’s Chronic Care Model\textsuperscript{155} and NICE guidelines for the management of OA in adults\textsuperscript{32} (Figure 3).

Appendix 1 contains a summary of clinical practice guidelines for OA care. A recent publication also summarises the current international Models of Care for OA\textsuperscript{75}.

**Articulation with policy**

**State Policy**

Victoria has policies and strategies to support an integrated approach to chronic disease prevention and management. These recognise the growing burden of chronic disease in Victoria and acknowledge the need to adapt and innovate to meet this challenge. Key resources are listed below for the continuum from population health and prevention through to specialist clinics in public hospitals.

- **Victorian public health and wellbeing plan 2015–2019**: The plan articulates principles and strategic directions for supporting population health and wellbeing, and preventing chronic disease. It sets out a life-course approach, recognising that improvements to health can be realised at every stage of life.
The plan also describes an active living approach, which encourages increased physical activity and social engagement at all stages of life.

- **Koolin Balit**: Koolin Balit outlines the Victorian Government’s strategic directions for Aboriginal health to 2022. It sets out what the Department of Health and Human Services together with Aboriginal communities, other parts of government and service providers will do to achieve the government’s commitment to improve Aboriginal health. Priorities of Koolin Balit that are of particular relevance to the Model of Care are: caring for older people; addressing risk factors; and managing illness better with effective health services. Koolin Balit acknowledges that a system in which all service providers deliver high-quality and culturally responsive health services for all Aboriginal people in Victoria is critical to achieving these priorities.

- **Victorian Active Ageing Partnership**: The purpose of the Victorian Active Ageing Partnership is to increase opportunities for participation in physical activity for older Victorians, especially in areas of socio-economic disadvantage and among isolated, lonely older people not currently involved in physical activity. The Victorian Active Ageing Partnership started in October 2015 and will run for three years. The project is being led by MOVE muscle, bone & joint health, in collaboration with Fitness Australia and Monash University.

- **The Better Health Channel**: The Better Health Channel is the Department of Health and Human Services’ consumer-facing web resource. It provides health and medical information for the purpose of helping people understand and manage their health and medical conditions, but is not intended as a substitute for care. The Better Health Channel includes a several relevant health topic hubs, including “Bones, muscles and joints” and “Pain”.

- **Community Health Integrated Program guidelines**: These guidelines provide an overarching framework for the Community Health Program, delivered both through Community Health Services and through a range of other service providers. They provide specific guidance on meeting the needs of people with chronic disease.

- **The Victorian Service Coordination Practice Manual**: The manual is designed to support managers and service providers involved in the implementation of service coordination. It is a service coordination framework applicable to a range of sectors and services, and includes resources support its implementation. The manual highlights the importance of service coordination to the care of people with chronic conditions, and sets out:
  - An agreed minimum standard across Victoria for how organisations work together to improve services to consumers
  - Common concepts and language to ensure improved service coordination across sectors
  - An approach that enables organisations to adopt the service coordination principles.

- **Health independence programs guidelines**: These guidelines provide health and community services with direction for more closely aligning health independence programs that have target populations who live with chronic and complex conditions. The guidelines cover Post-Acute Care services, Sub-acute Ambulatory Care Services, and Hospital Admission Risk Program services.

- **Specialist clinics in Victorian public hospital: Access policy**: Specialist clinics provide planned, non-admitted services for people who need the focus of an acute setting to ensure the best outcomes. Specialist clinics provide an interface between primary care services and acute inpatient services. The Access policy outlines expectations about service delivery, including indicative timeframes for the completion of key processes relating to specialist clinics. The policy also includes non-mandatory implementation guidelines.

- **While osteoarthritis care is implicit in these initiatives, there is currently no system-wide policy or strategic framework for the management of osteoarthritis. In view of the well-established burden of disease associated with OA**, its particular characteristics, and the impacts these have on the recipients and deliverers of care, the Department of Health and Human Services commissioned the development of this Model of Care for Osteoarthritis through the Victorian Musculoskeletal Clinical
Leadership Group. Western Australia and New South Wales have developed Models of Care for osteoarthritis as platforms to improve organisation and delivery of OA care to consumers in those states\textsuperscript{16,17}, with formative evaluation data pointing to improved system efficiencies and care for consumers with OA\textsuperscript{156,157}. The scope and intent of the present Victorian Model of Care aligns with these key resources and with current government directions.

**National Policy**

- The first **National Chronic Disease Strategy** was developed in 2005 to provide an overarching framework for national direction, which was aimed at improving chronic disease management. Five major conditions, of which OA was one, were identified and specific service improvement frameworks were established, including a **framework for musculoskeletal conditions** and improved access to services through subsidies to allied health.

- A recent national report from the **Primary Health Care Advisory Group**, released 4 April 2016, includes recommendations to change the way health care for chronic and complex health conditions are managed and funded. The main concepts include continuity of care, flexible modes of delivery of health care and data to drive continuous quality improvement.
Appendix 1

Summary of current clinical guidelines for the management of osteoarthritis

Recent clinical guidelines have broad agreement and recommend a combined non-pharmacologic and pharmacologic approach to the management of hip and knee OA\textsuperscript{33,158-161} with timely access to surgery, when appropriate. While most of the evidence is derived from knee OA studies, many experts agree that recommendations can be reasonably extrapolated to hip OA. Guidelines include a focus on integrating therapeutic options within a Chronic Care Model\textsuperscript{162} in which other factors, including a whole-person, biopsychosocial approach and support for behaviour change are implicit. The following Table provides an overview of recent clinical guidelines.

## NON-PHARMACOLOGICAL INTERVENTIONS

### Treatment

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acupuncture</td>
<td>?</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td></td>
<td>unclear/controversial</td>
</tr>
<tr>
<td>Balneo therapy/spa</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td></td>
<td></td>
<td>not reviewed in most guidelines</td>
</tr>
<tr>
<td>Biomechanical interventions: shoes</td>
<td>✓ knee</td>
<td>✓ if biomechanical joint pain or instability</td>
<td>X against lateral wedge</td>
<td>✓ for medial but no recommendation for lateral wedges</td>
<td></td>
<td>unclear/controversial</td>
</tr>
<tr>
<td>Biomechanical interventions: insoles</td>
<td>✓ knee</td>
<td>✓ if biomechanical joint pain or instability</td>
<td>?</td>
<td>? no recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Care package rather than single treatments: based on the main recommendations</td>
<td>✓ offer advice on all core treatments</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>mod support for multimodal treatment</td>
<td></td>
</tr>
<tr>
<td>home/car modifications</td>
<td>✓ Adjunct</td>
<td>✓</td>
<td></td>
<td></td>
<td>mod support for multimodal treatment</td>
<td></td>
</tr>
<tr>
<td>Electrotherapy/neuromuscular electronic stimulation</td>
<td>X</td>
<td>?</td>
<td></td>
<td></td>
<td>no support</td>
<td></td>
</tr>
<tr>
<td>Exercise general</td>
<td>3 core therapies including exercise, weight management and self management/education</td>
<td>mode of delivery based on location and pt choice, including strength, aerobic,</td>
<td>mode of delivery based on location and pt choice, including strength, aerobic, ROM</td>
<td></td>
<td>mod support for multimodal treatment</td>
<td></td>
</tr>
<tr>
<td>Exercise (land-based)</td>
<td>✓ included a combination of strength, ROM, aerobic</td>
<td>✓ group, 1:1 Home program</td>
<td>✓</td>
<td>✓</td>
<td>Strong Support for exercise</td>
<td></td>
</tr>
<tr>
<td>Exercise (water-based)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>mod support for water based exercise</td>
</tr>
<tr>
<td>Pacing of exercise</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Strength training</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>strong support</td>
</tr>
<tr>
<td>Stretching</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>neuromuscular education</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulating/manual therapy</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td>✓</td>
<td></td>
<td>mild-mod support</td>
</tr>
<tr>
<td>Self-management and education</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>strong support</td>
</tr>
<tr>
<td>Taping (medial patella)</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>not reviewed in most guidelines</td>
</tr>
<tr>
<td>Tai chi</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TENS</td>
<td>? Knee OA only, X multi joint OA</td>
<td>✓</td>
<td>?</td>
<td>✓</td>
<td>unclear/controversial</td>
<td></td>
</tr>
<tr>
<td>walking Aids</td>
<td>? Knee OA only, X multi joint OA</td>
<td>✓</td>
<td>?</td>
<td>✓</td>
<td>good support if indicated and as a adjunct to other interventions</td>
<td></td>
</tr>
<tr>
<td>Weight management</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>strong support</td>
</tr>
<tr>
<td>Vocational Training</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>some support</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>? Knee OA only, X multi joint OA</td>
<td>✓</td>
<td>?</td>
<td>✓</td>
<td>Lacking support</td>
<td></td>
</tr>
</tbody>
</table>

**Recommendation key**

- ✓ = appropriate
- ? = Uncertain
- ✓ = not appropriate

**Assessment**

| radiology                                   | no investigations if >45, has activity related joint pain and no morning stiffness >30mins | |
| Arthroscopic                                 | X | X | no support |
|------------------------------------------------|---------------|-------------|-------------|------------|------------------------------|
| Acetaminophen (paracetamol)                   | ✓ without other co-morbidities, ✓ with relevant co-morbidities | ✓ | ? | ✓ | moderate support |
| Avocado soybean unsaponifiables (ASU)         | ? | | | | no support |
| Capsaicin                                     | ✓ knee-only OA without relevant co-morbidities, ✓ multi-joint OA and relevant morbidities | ✓ | | X | controversal |
| Corticosteroids (intra-articular injection)   | ✓ | ✓ | ? | ✓ | moderate support |
| Chondroitin (for symptom relief)              | ? | | X | X | no support |
| Chondroitin (for disease modification)        | X | X | X | X | no support |
| Dicerein                                       | ? | | ? | | no support |
| Duloxetine                                    | ✓ without co-morbidities, ✓ multi-joint OA and relevant co-morbidities, ? knee-only OA with relevant co-morbidities | ✓ | ? | | min support |
| Glucosamine (for symptom relief)              | ? | X | X | X | no support |
| Glucosamine (for disease modification)        | X | X | X | X | no support |
| growth factor                                 | X | | | | no support |
| Hyaluronic acid (intra-articular injection)   | ? Knee-only OA, X multi-joint OA | X | X | ? | no support |
| NSAIDs (oral non-selective NSAIDs)            | ✓ without other co-morbidities, ✓ multi-joint OA with moderate co-morbidity risk, ? Knee OA only with moderate co-morbidity risk, X with high co-morbidity risk | ✓ careful consideration on comorbidities, monitoring. Ot on aspirin | ✓ | ✓ | moderate support |
| NSAIDs (oral COX-2 inhibitors)                | ✓ without other co-morbidities, ✓ multi-joint OA with moderate co-morbidity risk, ? Knee OA only with moderate co-morbidity risk, X with high co-morbidity risk | ✓ careful consideration on comorbidities, monitoring. Ot on aspirin | ✓ | ✓ | moderate support |
| NSAIDs (topical)                              | ✓ knee-only OA, ? multi-joint OA | ✓ knee | ✓ | ✓ | strong support |
| Opioids (transdermal)                         | ? | | ? | | no support |
| Opioids (oral)                                 | ? | ✓ tramadol | ✓ Tramadol | | Support for tramadol but not strong narcotics |
| platelet rich plasma                          | X | | | | no support |
| Risedronate                                    | X | | | | no support |
| rubefacients                                   | X | | | | no support |
| Rosehip                                       | ? | | | | no support |

**Recommendation key**

- ✓ appropriate
- ? uncertain
- X not appropriate
- blank = not discussed
Appendix 2

Standards of Care for OA: consumer-version

A consumer-version of the eumusc.net Standards of Care for OA management are summarised below. Consumers are encouraged to self-reflect on the following components of OA care.

1. Was my OA diagnosed by a health professional?
2. Do I have regular assessment concerning my symptoms and functioning in daily life?
3. Do I have a treatment target and a corresponding treatment plan?
4. Do I have the opportunity to receive support if needed from health professionals such as rheumatologist, dietician, general practitioner, nurse, occupational therapist, physiotherapist, psychologist and social worker?
5. Do I know how to control pain associated with OA?
6. Do I know how to maximise my physical function despite having OA?
7. Have I been assessed for any risks associated with my treatment?
8. Do I understand my disease and my role in its management? Specifically:
   - Have I been offered information in different formats and/or education about my disease?
   - Have I been informed about living with and managing my OA?
   - Have I been informed about a healthy lifestyle?
   - Have I been informed about exercises specific for me?
   - Have I been informed about pain relieving medication—the benefits and potential risks?
9. Do I know what benefit I can have from my exercise program?
10. Have I been informed and did I receive advice and training on aids, devices and ergonomic principles to enhance function in daily life and participation in social roles?
11. If my body mass index is >27kg/m², have I been informed about weight reduction?
12. Have I been informed about when surgery should be considered, what it involves, its benefits and risks?
Appendix 3

Assessment tools for hip and knee osteoarthritis

Recommended assessment tools for hip and knee OA. A tiered approach is recommended for assessment, where minimum and more advanced assessment tools are described. A minimum assessment tool for each domain should be used at least annually or when a significant change in management occurs.

<table>
<thead>
<tr>
<th>Assessment domains</th>
<th>Minimum assessment tools</th>
<th>Assessment tools for more advanced measurement</th>
<th>Access</th>
</tr>
</thead>
</table>
| Hip / knee joint function| Are you limited in any of your usual activities because of arthritis or joint symptoms: yes/no\(^c\)  
**OR**  
To what extent are you limited in any of your usual activities because of arthritis or joint symptoms? (11 point NRS)\(^d\)                                                                                                                                                                                                                                                                                                                                 | Knee injury and Osteoarthritis Outcome Score – Physical Function Subscale (short form) – KOOS-PS\(^{a,b}\)  
Hip injury and Osteoarthritis Outcome Score – Physical Function subscale (short form) – HOOS-PS\(^{a,b}\)                                                                                                                                                                                                                                                                                                                                 | http://www.koos.nu/                                                                                                                                                                                                                                                                                                                                                                              |        |
| Hip / knee / lower back pain severity | 11 point NRS (0-10) relevant to pain severity in the last week\(^{a,b}\) (individual ratings for each site, as applicable)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Knee injury and Osteoarthritis Outcome Score – Pain subscale (short form) – KOOS-Pain\(^{a,b}\)  
Hip injury and Osteoarthritis Outcome Score – Pain subscale (short form) – HOOS-Pain\(^{a,b}\)                                                                                                                                                                                                                                                                                                                                 | http://www.koos.nu/                                                                                                                                                                                                                                                                                                                                                                              |        |
| Health-related quality of life |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Veterans Short Form 12 measure (VR-12), which is equivalent to the Short Form 12 (SF-12\(®\)) Health Survey and an algorithm is available to transform SF-12\(®\) responses to a European Quality if Life Questionnaire (EQ-5D) index score\(^a\)                                                                                                                                                                                                 | http://www.bu.edu/sph/research/research-landing-page/vr-36-vr-12-and-vr-6d/about-the-vr-36-vr-12-and-vr-6d/ |        |
### Work status

Select one nominal response option:

- Unable to work due to a condition other than OA
- Not working by choice (e.g. student, retired, homemaker)
- Unable to work due to OA
- Working less hours than preferred due to OA
- Seeking employment (I consider myself able to work but cannot find a job)
- Working part-time
- Working full-time

### Sleep

To what extent is your sleep affected by your OA? (11-point NRS)<sup>a</sup>

Patient Reported Outcomes Measurement System (PROMIS) – Sleep Disturbance Short Form (PROMIS-SD)<sup>b</sup>

http://www.nihpromis.org/Measures/domainframework1.aspx#sd

### Fatigue

Stanford Numeric Rating Scale Fatigue<sup>b</sup>

http://patienteducation.stanford.edu/research/vnsfatigue.pdf

### Mental health

Kessler-10 (K-10) Anxiety and Depression Checklist<sup>c</sup>

Depression, Anxiety and Stress Scale – 21 item (DASS-21)<sup>d</sup>


http://www2.psy.unsw.edu.au/dass/

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a: ICHOM recommendation; b: COAMI Tier 1 recommendation; c: COAMI Tier 2 recommendation; d: recommended by the MoC External Expert Advisory Group

NRS: numeric rating scale
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