

Victorian Model of Care for Osteoarthritis of the Hip and Knee

**VICTORIAN MUSCULOSKELETAL
CLINICAL LEADERSHIP GROUP**

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Executive Summary

Background to the Model of Care

Osteoarthritis (OA) places a major burden on Victorians who live with the condition and their communities. Often health services for people who live with OA are not consistently aligned to their needs or with best evidence for effective care. As a strategy to address the burden of disease of OA in Victoria and optimally align health services to consumers' needs and evidence, the Department of Health and Human Services commissioned the development of a Model of Care (MoC). A MoC is an evidence- and consultation-informed framework that describes what and how health services and other resources should be delivered locally to people who live with specific health conditions.

The MoC was informed by an External Expert Advisory Committee and aligns with MoCs in other Australian jurisdictions, Victorian health policy, and current care standards and guidelines for OA care. The MoC focuses on diagnosed hip and knee OA only, and considers the continuum from diagnosed early OA management to advanced OA management, which for some people may include surgery. The MoC does not consider prevention of OA or OA at sites other than the hip and knee.

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). It is recommended that the MoC be considered along with emerging state and federal health policies, funding agreements and service contracts.

Diagnosis and assessment

OA can be diagnosed clinically by a qualified health professional without the need for imaging. In particular, magnetic resonance imaging (MRI) is not required unless a specific differential diagnosis is needed for an atypical presentation. Assessment in people with OA should be holistic, considering social factors and social supports; beliefs, concerns and knowledge about pain and OA; the occupational impact of OA; mood; sleep; pain features; attitudes to exercise; and comorbidities. The MoC recommends specific patient-reported and physical assessments be undertaken in people with hip or knee OA.

Components of care

All people with hip or knee OA should be provided with appropriate non-pharmacological and non-surgical care. This includes education about pain, their condition and effective strategies for self-care; support for physical activity and exercise; weight loss (where indicated); and strategies for effective management of persistent pain that are underpinned by a contemporary understanding of pain science. Pharmacological care is an important adjunct for some people with OA and may include simple analgesics, non-steroidal anti-inflammatory agents, intra-articular agents, and for a minority, a short-term trial of opioids with a discontinuation plan in place. It is imperative that pharmacological therapy is integrated with non-pharmacological management options to ensure that pain and function are addressed holistically, based on contemporary pain science. For a sub-group of people with advanced disease, total joint replacement (TJR) may be indicated. Importantly, TJR surgery should be reserved for people who have exhausted all other non-surgical care options and where there is good probability

of successful surgical and patient satisfaction outcomes. Health services should endeavour to provide surgery, to those who need it, within a time frame consistent with current Victorian policy on urgency categorisation, informed by clinical assessment, pain and disability. That is, patients classified as Category 1 receive surgery within 30 days, Category 2 within 90 days and Category 3 within 365 days. For most patients who are appropriately selected for TJR surgery, a Category 2 classification would be expected. Patients who have been assessed and deemed to not require TJR surgery should not be placed on a surgical waitlist. 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 could be adapted to Victoria.

Inappropriate care

Arthroscopic debridement and/or lavage for knee OA are not recommended as a primary treatment.

Delivery of care

The MoC supports access to effective OA care through:

- community health education
- delivery of accurate pain and OA care information in multiple formats and culturally-sensitive modes
- promoting availability of local services to support effective self-care.

Innovative models of service delivery are necessary to more effectively meet consumers' needs, ensure evidence-based care is delivered more systematically, and to ensure health services meet the projected increase service requirements in coming decades. Such models should include:

- Funding mechanisms that support components of care for OA that are known to be effective and move towards supporting care packages, rather than care episodes.
- Improved access to allied health providers and strategies that support effective self-care (e.g. exercise facilities).
- Models that support effective use of the workforce through widespread implementation of advanced practice roles for allied health and nursing staff.
- Building workforce capacity in best-practice OA and pain care, particularly among primary care providers, through a range of flexible professional development options.
- Supporting care delivery in local settings, rather than tertiary hospital settings. This might include establishment of community-based musculoskeletal clinical centres for people with advanced OA or complex presentations; establishment of community-based, multidisciplinary OA programs; and multidisciplinary outreach services for rural areas.
- Establishment of systems to manage and triage orthopaedic surgery referrals to public hospitals to facilitate provision of surgery, to those who need it, within a time frame consistent with current Victorian policy.

Information and communication technologies (ICT) are also an important enabler to delivery of care. ICT strategies that could be supported, implemented and disseminated at scale to improve access to effective OA care include:

- Telehealth/telecare services to improve access to specialist and allied health clinics in public and private settings.
- Web platforms that provide accurate, contemporary information to support effective care and education for consumers and clinicians.

Implementation of the Model of Care

Improving the delivery of care for OA in Victoria by actualising the MoC is the responsibility of the whole health sector, with consumers, clinicians, peak bodies and service providers, as well as the system managers, being major actors in achieving positive change.

Suggested system level approaches to improve care delivery and strategies to achieve such improvements, are presented across four key domains, and outlined in Section 2; Table 2.

1. Building people's capacity to more effectively participate in care
2. Models of Health Service Delivery
3. Information and communication technologies
4. Health policy and planning.

Importantly, while these suggestions are targeted at the whole health sector, clinicians and peak bodies are well placed to champion improvements and drive best practice. It is urged that partners from across the sector support the dissemination and implementation of this MoC across Victoria.

Priority areas for action have been identified to inform future planning, and include a number of focused initiatives under each of the following categories:

1. Information delivery
2. Service delivery for OA care
3. Funding models
4. Workforce capacity building in OA care
5. Information and communication technologies
6. Health policy and governance
7. Research and evaluation.

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Table of Acronyms

ACR	American College of Rheumatology
AOANJRR	Australian Orthopaedic Association National Joint Replacement Registry
AP	Antero-posterior
ASA	Arthroplasty Society of Australia
BMI	Body mass index
CAM	Complementary and Alternative Medicine
COAMI	Chronic Osteoarthritis Management Initiative of the United States Bone and Joint Initiative
CPAC	Clinical Priority Assessment Criteria
EULAR	European League Against Rheumatism
EQ-5D	European Quality of Life (EuroQuolTM) Questionnaire (5 dimensions)
HOOS	Hip Injury and Osteoarthritis Outcome Score
ICHOM	International Consortium for Health Outcomes Measurement
ICT	Information and communication technology
KOOS	Knee Injury and Osteoarthritis Outcome Score
MAPT	Multi-attribute Arthritis Prioritisation Tool
MRI	Magnetic Resonance Imaging
MOC	Model of Care
NHMRC	National Health and Medical Research Council, Australia
OA	Osteoarthritis
OACCP	Osteoarthritis Chronic Care Program Model of Care, New South Wales
OAHKs	Osteoarthritis Hip and Knee Service, Victoria
OARSI	Osteoarthritis Research Society International
SF-12	12-item Short Form Quality of Life Survey
TJR	Total joint replacement

Part 1: Context

What is a Model of Care?

A 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 conditions¹. 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 would optimally be delivered, such that the right care is delivered at the right time, by the right team, in the right place with the right resources¹⁻³.

A MoC is not an operational plan or a clinical guideline; rather, a MoC is a comprehensive system-level pathway.

The aim of the Victorian OA MoC is to provide a system-level, best-practice management framework for hip and knee OA that is informed and supported by the health sector. The focus of this MoC is diagnosed hip and/or knee OA with service delivery spanning early to advanced stage of the condition, once diagnosed. While the burden of OA in other body sites (e.g. shoulder, hand and spine) is recognised, hip and knee OA are the greatest contributors to the burden of disease of OA at a population level.

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 diseases⁴. About one half of Australians live with a chronic disease, while one in five Australians live with multiple chronic health conditions⁵. 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 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^{1,6-8}.

Urgent action is required to modify risk factors for chronic diseases and optimise management for people who have established diseases⁴, particularly musculoskeletal conditions. Action is required at multiple levels – from the health systems and policy level to the individual’s lifestyle choices⁹. Musculoskeletal

conditions, including OA, have a profound effect on the Australian economy. For example, in 2012 the national cost of back pain, osteoporosis, OA and rheumatoid arthritis was conservatively estimated at \$55.1 billion with projections indicative that costs will continue to rise¹⁰. 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 2015¹¹. 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 2015¹¹[§].

Current data suggest the lifetime risk of symptomatic OA of the knee in adults from age 25 years is 13.8%, based on the 2007-08 National United States (US) Health Survey¹², with the risk in some population groups for knee and hip OA being as high as 45% and 25% respectively^{13,14}. Victorian data for 2008 suggest that the lifetime risk of total knee joint replacement was 11.9% for females and 10.4% for males¹⁵, and for total hip joint replacement were 10.0% and 9.9%, respectively¹⁶; both demonstrating an upward trajectory. By 2030, an estimated 645,898 Victorians will live with OA, representing a 42% increase since 2015¹⁷. 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 Wales¹⁷. 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)^{18,19}. Importantly, the prevalence of OA in Australia appears to be associated with socioeconomic status. Individuals in a lower socioeconomic band are more likely to report OA^{20,21}, independent of age and female sex²², and more likely to utilise total knee joint replacement²³, and to some extent total hip joint replacement²⁴. Optimising service delivery and access to care across socioeconomic and geographic groups is therefore important.

Purpose of the Model of Care

The purpose of this MoC is to describe **what care and how care should be organised and delivered** to provide optimal management to Victorians who have been diagnosed with hip or knee OA. While the burden of OA in other areas, particularly spine, hands and feet are recognised, this MoC focuses on hip and knee OA only due to the high prevalence of OA at these joints and costs associated with care delivery for hip and knee OA²⁵. 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 increase 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](#) and the [National Safety and Quality Health Service Standards \(second edition\)](#).

We now know that OA is partly preventable, it is not an inevitable part of ageing, and we know what works to effectively manage OA and improve a person's quality of life. Despite this knowledge, effective care and accurate information are not consistently provided to consumers. This MoC 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*.

[§] expressed in 2015 Australian dollars

[†] direct healthcare costs comprise hospital expenses, out of hospital medical expenses, and costs of pharmaceuticals.

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). It is recognised that care delivery for OA differs between private and public health systems in Victoria. For example, a greater proportion of total joint replacements are performed in the private system. A key objective of the MoC is to articulate what is appropriate and inappropriate care for OA in Victoria, irrespective of the health system providing the care and irrespective of socioeconomic status and geography.

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 support improved 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 and that early, appropriate management is important for physical and psychological health.
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. It recognises that a range of medical and non-medical providers deliver care for people with OA. The MoC does not aim to identify specific disciplines for care delivery; rather, to outline *what* care should be provided and *how*.
5. The MoC aligns with best practice evidence and current Australian and international care standards for OA.
6. Taking action to implement the MoC requires a partnership approach across the health, education and social care sectors.

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 policies and strategies)
- [National Strategic Framework for Chronic Conditions](#)²⁶
- Models of Care for OA in other states^{27,28}
- [Australian Commission on Safety and Quality in Health Care Osteoarthritis of the Knee Clinical Standard](#)^{29†}
- [National Safety and Quality Health Service Standards](#)³⁰
- [National Time to Move: Osteoarthritis Strategy](#)³¹
- Existing Standards of Care for management of OA^{32,33}

[†] The Australian Orthopaedic Association has declined to endorse the current ACSQHC *Osteoarthritis of the Knee Clinical Standard* as Quality Statements 1 & 2 do not support the use of x-rays as a diagnostic tool

- International Consortium for Health Outcomes Measurement (ICHOM) standard set for hip and knee osteoarthritis³⁴
- Clinical Framework for Delivery of Health Services (Transport Accident Commission and WorkSafe Victoria)³⁵
- Royal Australian College of Physicians Australasian Consensus Statement on the Health Benefits of Work³⁶
- Australian National Pain Strategy³⁷.

Developing the Model of Care

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. The development process was informed by an internationally-adopted best-practice framework^{2,3} with oversight from a governance sub-committee of the Victorian Musculoskeletal Clinical Leadership Group.

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 Health 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 OA healthcare landscape in Victoria.

The initial consultation provided a framework for the MoC, which was iteratively developed by the project leads and an External Expert Advisory Committee from April to October 2016.

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 Victorian health services 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 Victoria³⁸.
- A recent systematic scoping review by Wluka et al³⁹ 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 MoC using an online survey platform. Organisational-level feedback was further facilitated through the External Expert Advisory Committee and the Victorian Musculoskeletal Clinical Leadership Group. A revised version of the MoC was circulated to all organisations that provided feedback in the broad consultation phase in December 2016 to February 2017. At this time, organisations were invited to publicly support the MoC through co-badging with organisational logos.

Subsequent to this final broad consultation, the Musculoskeletal Clinical Leadership Group ratified the final draft of the MoC.

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 OA have recently been published by the European Musculoskeletal Conditions Surveillance and Information Network (eumusc.net)⁴⁰. The European Standards align with Australian Standards developed in 2010³² and recent draft Clinical Care Standards developed by the Australian Commission on Safety and Quality in Health Care for knee OA²⁹. 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.

Resource 1 contains a lay version of these Standards to assist consumers in managing their OA care.

Structure of the Model of Care

The Victorian Model of Care for Osteoarthritis of the Hip and Knee 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, often there is overlap between them and individuals may not necessarily progress from one stage to the next. The MoC assumes a diagnosis of OA has been made.

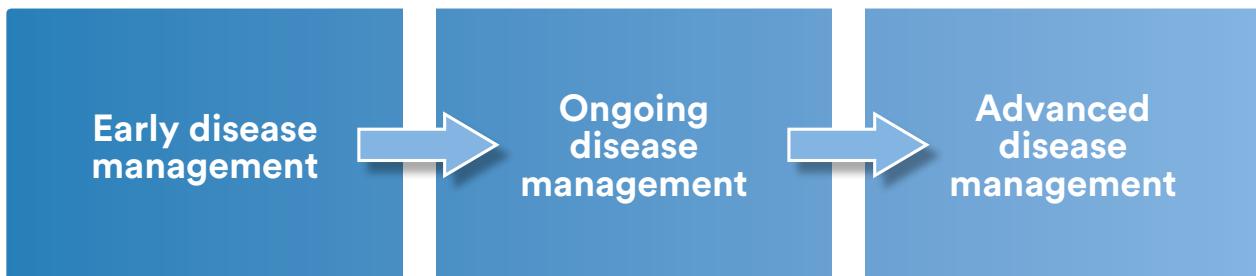


Figure 1 Continuum of care for OA addressed in this MoC

While primary prevention of OA is recognised as critically important for individuals' health and population wellbeing, it is not comprehensively addressed in the MoC. [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 work, 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^{41,42}.

The MoC is structured as:

- 1. What care should be provided**
- 2. How optimal care could be delivered**
- 3. A consumer pathway for OA care.**

Supporting resources are contained at the end of this document.

What care for osteoarthritis should be delivered in Victoria

Approach to care delivery for osteoarthritis

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 of 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 Juhl⁴³. Importantly, core non-pharmacological and non-surgical components of care should be made available to consumers across the clinical spectrum of OA. Involving a patient's family/partner in the management planning is important.

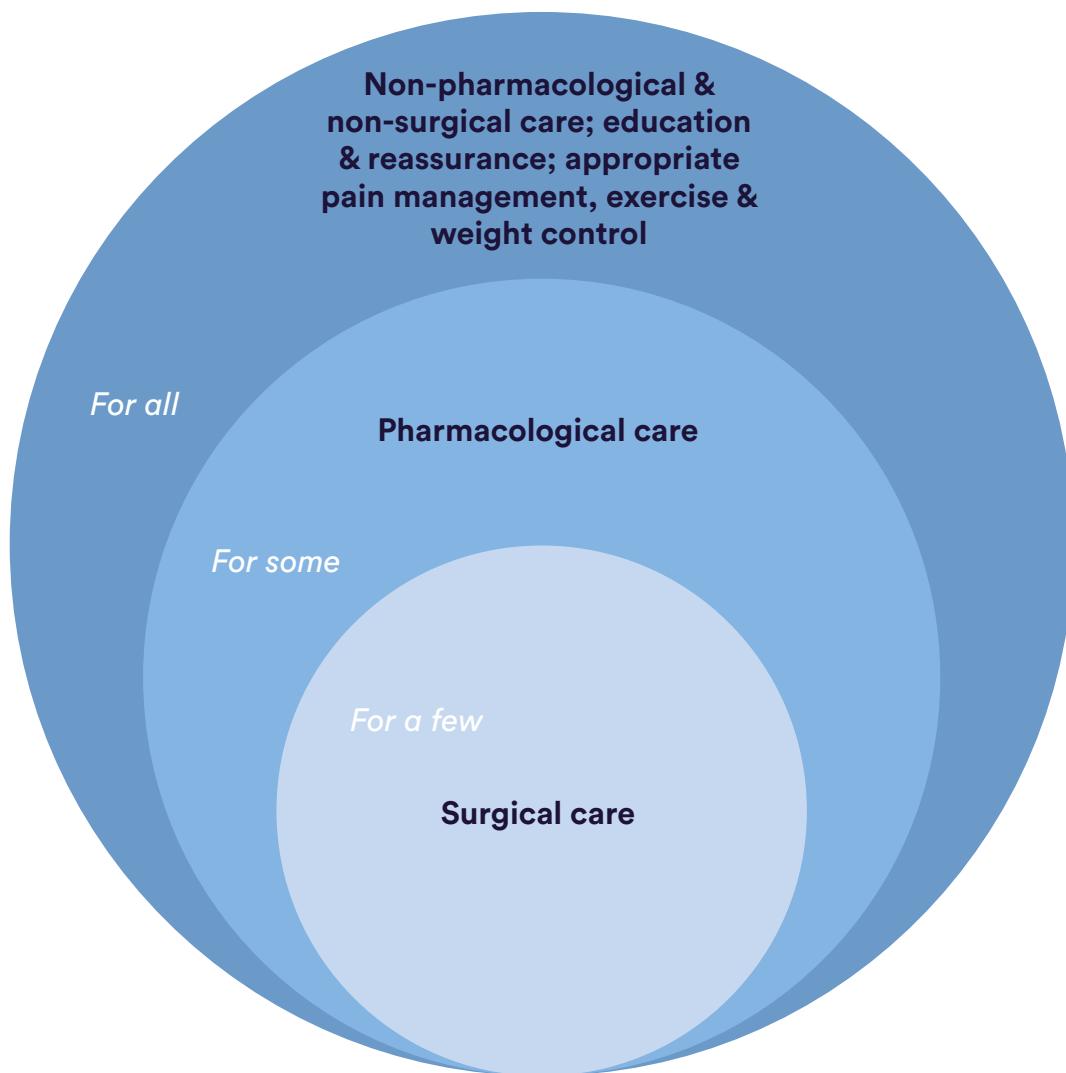


Figure 2 Components of osteoarthritis care

For consumers, the most important issues in OA are pain and loss of function³⁹. 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 Model⁴⁴. The National Institute for Health and Care Excellence (NICE) recommends a holistic management framework for people with OA, (Figure 3)⁴⁵, recognising that pain and function outcomes may be improved when a holistic approach to management is adopted.

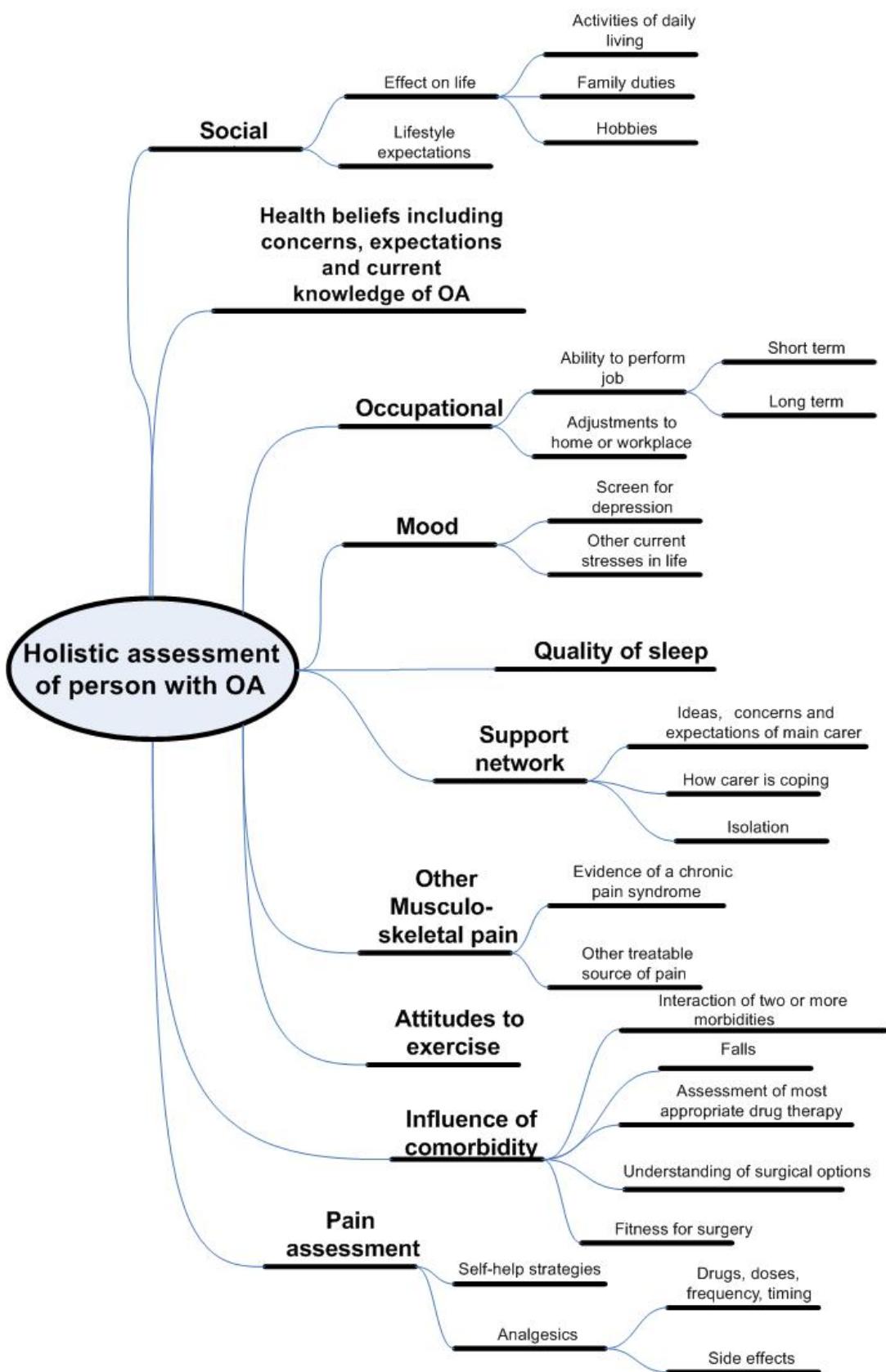


Figure 3 Person-centred components of care that should be considered for assessment and management in adults with osteoarthritis. National Institute for Health and Care Excellence (2014) CG177 *Osteoarthritis: care and management*. Manchester: NICE. Available from www.nice.org.uk/CG177. Reproduced with 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 withdrawn⁴⁵. 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 osteoarthritis

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 and their family/partner 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 co-ordinator.
- OA is most effectively managed by a core set of treatments, including exercise, weight loss, education to support effective self-care, and pain management⁴⁶. A stepped approach is used to deliver other treatments outside the ‘core set’⁴⁵.
- 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, socio-psycho-biomedical[†] 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 conditions and other co-morbidities⁴⁷.

Approaching pain in osteoarthritis

Persistent pain is the single most important symptom experienced by people with OA. In the last 20 years, our understanding of the biology of persistent pain has increased substantially. In particular, an understanding that neural signals from body structures (i.e. nociception) are neither sufficient nor necessary for the brain to produce the sensation of pain. While nociception is often associated with pain, the experience is modulated by a milieu of other contextual factors unique to the individual – cognitive, social, environmental and neurobiological⁴⁸. In order to effectively address the experience of pain in people with OA, factors other than nociception must be considered. In particular, consideration of a person’s unique context is critical – for example, their beliefs about pain and fear avoidance, expectations of management, psychological health and social circumstances. Here, the education, reassurance and support for adopting a healthy lifestyle and strategies to function with pain, such as psychological-based therapies, informed by contemporary pain science, are critical⁴⁹⁻⁵¹.

Pathways of care for osteoarthritis management

For most people with hip or knee OA, non-surgical care is appropriately delivered in community-based settings, with care co-ordinated between primary care providers. Systematising pathways of care for people with OA, for example through *HealthPathways* or *Map of Medicine*, would improve the consistency of appropriate management. Leadership from Primary Health Networks in this area will be increasingly important, particularly in rural settings where access to appropriate care can be limited. The MoC supports care delivery from a range of providers, according to the needs of the patient.

Diagnosis of hip/knee osteoarthritis

- 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)^{45,52}.

[†] previously referred to as the biopsychosocial model

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 requested²⁷:

- 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 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 necrosis⁵³.

Assessment in hip/knee osteoarthritis

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 care⁵⁴. 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 osteoarthritis³⁴ and the Chronic Osteoarthritis Management Initiative (COAMI)⁵⁴ recommend a core set of domains be assessed in people with hip or knee OA and these are summarised in Table 1. While these outcome measures are recommended for use in Victoria, these recommendations do not preclude the use of other tools, such as the commonly used *Western Ontario and McMaster Universities Osteoarthritis Index* (WOMAC) or the *Brief Pain Inventory* (BPI). The Osteoarthritis Research Society International (OARSI) has also proposed a range of tools to measure pain associated with OA (<https://www.oarsi.org/research/outcome-measures>). It is recommended that assessments be conducted annually from baseline and repeated 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 professionals⁵⁴. In a busy general practice or orthopaedic outpatient 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 to enable collection of outcome measures.

Given the high prevalence of co-morbid health conditions in people with OA, assessment should include prevalent 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, especially surgery. In the context of complex co-morbidities, inflammatory arthropathy, large joint effusions, or other red flag conditions, specialist medical assessment may be indicated; e.g. rheumatology, rehabilitation medicine, sport and exercise medicine. Psychological therapies may be indicated in patients presenting with psychological impairments such as distress, anxiety, depression or other mood disorders.

Physical performance measures and patient reported outcomes

OARSI recommends that physical performance measures be measured in conjunction with patient reported outcomes (Table 1 and Resource 2)⁵⁵. 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 MoC for OA recommends the **30-second chair test as a primary outcome, with other measures to be taken as clinically feasible/appropriate.**
- The Victorian MoC for OA 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.

Assessment domains	Minimum assessment tools	Assessment tools for more detailed measurement	Access
Hip/knee joint function	Are you limited in any of your usual activities because of joint symptoms: yes/no ^c OR To what extent are you limited in any of your usual activities because of 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/ 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} Hip injury and Osteoarthritis Outcome Score – Pain subscale (short form) – HOOS-PainS ^{a,b}	http://www.koos.nu/ 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 of 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/

Assessment domains	Minimum assessment tools	Assessment tools for more detailed measurement	Access
Work status	<p>Select one nominal response option:^a</p> <ul style="list-style-type: none"> ● 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 (and type of work) ● Seeking employment (I consider myself able to work but cannot find a job) ● Working part-time (and type of work) ● Working full-time (and type of work) 		
Sleep	To what extent is your sleep affected by your OA? (11-point NRS) ^d	Patient Reported Outcomes Measurement System (PROMIS) – Sleep Disturbance Short Form ^b	http://www.nihpromis.org/Measures/domainframe/work1.aspx#sd
Fatigue	Stanford Numeric Rating Scale Fatigue ^b	Patient Reported Outcomes Measurement System (PROMIS) – Fatigue Short Form ^d	http://patienteducation.stanford.edu/research/vnsfatigue.pdf https://www.assessmentcenter.net/PromisForms.aspx
Mental health	Kessler-10 (K-10) Anxiety and Depression Checklist ^d	Depression, Anxiety and Stress Scale – 21 item (DASS-21) ^d	https://www.beyondblue.org.au/the-facts/anxiety-and-depression-checklist-k10 http://www2.psy.unsw.edu.au/dass/
Anthropometrics	Body weight (kg) and body mass index (kg/m ²)		

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-PHARMACOLOGICAL AND NON-SURGICAL CARE

- Non-pharmacological and non-surgical care for OA 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 effective⁵⁶ and recommended as 'core' components of care for knee OA. Non-pharmacological and non-surgical care strategies have been shown to be cost effective and if appropriately implemented could save the Australian health system a sizable volume of funds and improve labour force participation^{11,17}. For example, the potential cost savings from avoiding or delaying knee replacements through delivery of appropriate non-surgical care options would be over \$170 million in 2015, increasing to over \$233 million in 2030¹⁷. Effective components of care include:

1. Education, reassurance and support to optimise people's capacity to actively engage in care

All people should have access to information about OA and pain care 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 strategies⁵⁷, which is likely to be influenced by unhelpful beliefs⁵⁸. Further, a recent systematic review identified a higher volume of literature reporting dissatisfaction from consumers about OA care information they had received, relative to satisfaction³⁹. Information about OA and pain care should primarily be delivered by health professionals and supplemented by information from other sources³⁹. Broadly, consumers should be educated and reassured about their OA. In particular:

- that healthy lifestyles are fundamental in management; e.g. obesity and overweight management
- that pain and reduced function associated with OA can be effectively managed
- that OA has a fluctuating course and that symptoms may not necessarily progress
- that OA is not an inevitable consequence of ageing
- that results of imaging do not always correspond to symptoms and function.

Information for consumers should specifically include^{29,39,59}:

- Healthy lifestyle choices and habits
- Information about the drivers of persistent pain, in particular the role of psychological and social factors
- Disease-related information:
 - 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.

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 symptoms⁶⁰. The effectiveness of peer-led self-management programs for OA remains uncertain, although some benefits may be derived in the short term⁶¹. Consumers also identify barriers in accessing such programs^{39,62}, 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^{39,63-65}. For people living in rural and remote areas, access to web-based information that is hosted by appropriate, credible organisations is particularly important^{64,65}. The language used to communicate information to consumers should be non-technical³⁹.

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 some people with OA⁶⁶. Nonetheless, 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^{67,68} and improve quality of life⁶⁹. To facilitate increasing or maintaining physical activity, people with OA should be provided with a physical activity plan, developed through shared decision-making and behaviour change support with their healthcare provider. Referral to an exercise physiologist, physiotherapist or online tools such as [MyJointPain](#) or [painHEALTH](#) may be appropriate.

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 land⁷⁰⁻⁷² or water-based⁷³, 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 availability⁷⁴. Co-morbid health conditions are generally not a barrier to participating in exercise. For example, a recent trial established the feasibility and effectiveness of tailored exercise for people with knee OA who had at least one other chronic health condition⁷⁵. 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 OA⁷⁶ 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 adherence⁷⁷. Optimal outcomes have been reported for exercise undertaken three times per week⁷⁸. Integration of pain coping skills with exercise may enhance outcomes for some patients. Pain coping skills can be delivered by clinicians (e.g. psychologists or other appropriately trained professionals)⁷⁹ or through online platforms such as [painHEALTH](#)⁸⁰. 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 (referred to as ‘pre-habilitation’) to improve pre-operative function as a known predictor of post-operative outcomes⁸¹, clinically-important post-operative improvements have not been shown⁸².

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 Australia⁸³. Increasing body mass index (BMI) is directly related to the risk of developing knee and hip OA^{84,85} and a high BMI is associated with progression of knee OA⁸⁶. Obesity can result in structural damage to joint tissue through an increase in mechanical load and changes to metabolic pathways associated with adipose tissue⁸⁷.

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 adults⁸⁸. Specifically, active management, such as referral to a dietitian for dietary management and support is indicated for most adults where $BMI > 27 \text{ kg/m}^2$. 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 co-morbidities and the relative distributions of lean mass and fat mass. In hospital settings it is recognised that access to dietitians may be limited, so referral to community-based dietitians or leveraging technologies such as telehealth may be appropriate.

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 management⁸⁸. 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 (e.g. at least 5% of body weight), at all stages of OA⁸⁹ are likely to improve symptom features of knee OA⁹⁰. Moderate clinical effects on self-reported disability may be expected with weight loss of at least 7.5% body weight at a rate of 0.6% per week⁹⁰. Australian data identify a dose-response relationship between weight loss and knee symptoms among a representative community-based study of Australians with knee OA. The data confirm weight loss as a feasible and therapeutic intervention in a community setting in Australia⁹¹. Both OARSI and the Royal Australian College of General Practitioners (RACGP) recommend a 5% weight reduction within 20 weeks or a rate of 0.25% per week for treatment to be efficacious^{46,90,92}. Importantly, the combination diet-induced weight loss and exercise has a greater positive effect on pain and function than either intervention in isolation^{93,94}.

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 appropriate⁹⁵.

5. Persistent pain management

Management of persistent pain in OA is recognised as one of the single most important factors for people with OA³⁹. Effective pain management requires that management strategies address the likely multiple contributors to the pain experience: psychological, physical and social. In terms of non-pharmacological and non-surgical care this may include psychological therapies (e.g. cognitive behavioural strategies), mind-body therapies and graded exposure to physical activity^{50,96}. 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 complex co-morbid conditions, may require referral to specialist pain management clinicians (e.g. medical clinicians with expertise in pain management, such as pain medicine specialists, sport and exercise medicine physicians, rheumatologists, rehabilitation medicine physicians), allied health providers with requisite skills and knowledge in pain management (e.g. psychologists, physiotherapists, occupational therapists, exercise physiologists) or interdisciplinary pain management programs, particularly those associated with formal multidisciplinary pain management services. Importantly, psychological therapies, physical therapies and pharmacological 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. Coordination of care and consistency in messaging about persistent pain, based on a contemporary understanding of pain biology, is critical, in particular for those people with compensable injuries⁵¹. In Victoria, the Transport Accident Commission and WorkSafe Victoria have designated certain providers to be Network Pain Management Program providers, to help injured Victorians manage their musculoskeletal injuries and persistent pain, and increase their independence at home, work, and in the community.

6. Other non-pharmacological and non-surgical therapies

A range of other therapies is commonly accessed by consumers, such as manual therapies, bracing, orthoses and walking aids. The evidence base underpinning these therapies varies. For further guidance, refer to clinical practice guidelines and current Therapeutic Guidelines⁹⁷.

COMPONENT 2: PHARMACOLOGICAL CARE

Pharmacological management is an important component of OA care for some people with OA. Currently, there are no disease-modifying therapies available for OA. Therefore, pharmacological 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-pharmacological management options. The approach to pharmacological therapy must recognise that:

- Pain, particularly persistent pain, occurs due to multiple and complex factors – biological, psychological and social – and that the choice of pharmacological agent may only address one component of the pain experience. It is imperative, therefore, that pharmacological management be integrated with other non-pharmacological therapies to ensure pain is addressed holistically.
- Pain associated with OA often fluctuates due to a combination of biological, psychological and social factors and therefore can reflect multiple mechanisms. Therefore, pharmacological 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 pharmacological 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 pharmacological therapies should be explored and education about the role of pharmacological agents provided by the prescriber or pharmacist.

The choice of pharmacological therapy balances the effectiveness of pain and inflammation control with risk profiles of the agent(s) selected. A range of topical, oral and injectable agents is used in clinical practice to manage OA, with evidence for the effectiveness of different agents continuing to change and emerge. Reference to contemporary clinical guidelines, such as the Rheumatology 3 Therapeutic Guidelines⁹⁷, and emerging systematic reviews are recommended to guide therapeutic decisions for prescription medicines and complementary medicines. Broadly, three pharmacological categories for management of OA symptoms are recommended, including:

1. Non-steroidal anti-inflammatory agents (topical and oral)
2. Simple analgesics
3. Intra-articular agents

Currently, there remains inconsistency in the evidence of effectiveness and safety of newer therapies such as stem cell and platelet rich plasma preparations. Other medications may be indicated to manage specific pain presentations and psychological co-morbidities. Opioids have a very limited role in the management of OA. 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 bowel dysfunction, hormonal suppression, sleep disordered breathing, tolerance formation and increased pain sensitisation outcomes⁹⁸⁻¹⁰⁴. 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. The [National Prescribing Service](#) and [NSW Pain Management Network](#) also provide clinical advice in this context.

It is appropriate that all health professionals involved in a person’s care are aware of the pharmacological therapies that are currently prescribed.

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.

- Patients who have been referred for surgical assessment and are deemed not suitable candidates for surgery should be referred for appropriate non-surgical therapeutic options (Components 1 and 2).
- Patients who are deemed appropriate for surgery should have co-morbid health conditions optimally managed prior to surgery.

Total joint replacement

Total joint replacement (TJR) is the cornerstone of surgical management of advanced OA of the hip and knee joint, demonstrated to be beneficial and cost-effective for improving pain and function^{105,106}. TJR surgery represents major orthopaedic surgery and 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

Studies show that a small proportion of patients (higher rates reported for knee replacement compared to hip replacement) report dissatisfaction with surgery^{107, 108-110}. Meeting pre-operative expectations and achieving satisfactory pain relief appear to be the most important factors in predicting success of TJR^{109,110}. 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 that correlates with symptoms.
3. Objective measures of pain and function that indicate significant impact.
4. The patient is willing to consider major orthopaedic surgery and undergo an extensive period of rehabilitation.

In addition to these guiding criteria, it is recommended that, where possible, other major physical and psychological co-morbid conditions be addressed prior to surgery, including poorly managed pain.

There have been tools developed in Victoria such as the Multi-attribute Arthritis Prioritisation Tool (MAPT)¹¹¹ 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)¹¹². These are largely algorithms based on clinical presentation or symptoms and have little evidence as a predictor of surgical outcome^{113,114}. 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^{115,116}, BMI¹¹⁷, response to conservative care, and psychological co-morbidity¹¹⁸. 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^{34,119}.

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 infections¹²⁰. 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 $\geq 45\text{kg}/\text{m}^2$. 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^{121,122}. However, there is a lack of evidence for short or long term benefits of joint arthroplasty procedures following bariatric surgery¹²⁰. In addition, bariatric surgery is recommended to patients less than 65 years of age¹²³ 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 Australia¹²⁴. It is recommended that patients who do undergo bariatric surgery be referred to a dietitian as part of their management.

Psychological co-morbidities

Depression, anxiety and catastrophising has been shown to be associated with poor outcomes following joint replacement^{120,125,126}. 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. Rather, these patients should be referred to services where appropriate non-surgical care options are delivered.

- All health services should endeavour to provide surgery, to those who need it, within the timeframe consistent with current Victorian policy on urgency categorisation, informed by clinical assessment, pain and disability. For most patients who are appropriately selected for TJR surgery, a Category 2 classification would be expected.

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 Victoria¹²⁷.

Key points from the 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, based on contemporary guidelines.
- 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 pre-admission assessment to identify possible surgical risk factors and inform discharge planning.
- Implementation of a consistent, state-wide post-operative pathway of care, with an emphasis on discharge to the home environment where access to appropriate post-operative care services, such as allied health care, is available.

- 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:
- Adoption of an orthogeriatric MoC, e.g. the [NSW Orthogeriatric Model of Care](#), for elderly patients to ensure integration of care between physicians and surgeons.
- 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 tool into the surgical care pathway pre-operatively.
- Ensure all patients who require surgery who are waitlisted and appropriate, can receive surgery 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, where appropriate. Pre-operatively, patients should be assessed for rehabilitation and post-discharge support. In those identified pre-operatively to require support, early post-operative assessment should be undertaken, e.g. by a rehabilitation physician.

Surgical facilities

To provide the highest standards of TJR surgery care, teaching and research, centres could 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^{27,128-132}. 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 need to ensure their quality and safety measurements of those patients are adequate. A possible approach is that regional and smaller healthcare networks in Victoria develop 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 care

The implementation of Accelerated Rehabilitation After Surgery (ARAS) pathways varies across the sector, particularly between public and private settings. Standardisation of a post-operative care pathway in Victoria would ensure consistency of care across the sector.

Post-operative assessment should include a clinician review as well as patient-reported outcome measures. 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 reviews¹³³. 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 questioned¹³⁴. 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 reviews¹³⁵. Other innovative models such as remote review and virtual clinics are established or being trialled across several healthcare centres in Victoria¹³⁶.

- **It is important that patients who present with symptoms have prompt access to clinical care and diagnostic services.**

Post-arthroplasty reviews should also include health behaviour change coaching to support people to adopt healthy lifestyles, increase physical activity and (where indicated) lose weight. Allied health providers such as exercise physiologists, physiotherapists and dietitians, usually provide these services. Medical specialists such as rehabilitation medicine and sport and exercise medicine physicians may also contribute to care for patients with complex co-morbid conditions.

Care for osteoarthritis that should **not** be delivered in Victoria

Magnetic resonance imaging (MRI)

- The use of MRI in the diagnosis and clinical management of knee OA, including surgery, is not endorsed within any current guideline⁵⁶.

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 radiographs¹³⁷. MRI has been recommended for use within clinical OA trials¹³⁸ and to screen for atypical conditions such as avascular necrosis. There is a high insidious prevalence of asymptomatic meniscal morphology in the knee in the general population with increasing age¹³⁹ and it has been proposed that over imaging with MRI may result in unnecessary arthroscopies and be a barrier to active management of knee pain¹⁴⁰.

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 age¹⁴¹.

Arthroscopic debridement for osteoarthritis

Arthroscopic surgery has been shown to be no more effective than sham surgery¹⁴² or physical therapy¹⁴³ for the management of patients with symptomatic OA and is not recommended¹⁴⁴⁻¹⁴⁶. 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 referral¹⁴⁷⁻¹⁵⁰.

The position statement of the Australian Knee Society on behalf of the Australian Orthopaedic Association (October 2016) 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. Partial medial meniscectomy is not indicated as an initial treatment for atraumatic tears of degenerative menisci, excluding bucket handle tears and surgeon assessed locked or locking knees.*”¹⁵¹

How care for osteoarthritis may be best delivered in Victoria

Improving the delivery of care for OA in Victoria by incorporating the components of care outlined earlier in this document is the responsibility of the whole health sector, with consumers, clinicians, peak bodies and service providers as well as the system managers, being major actors in achieving positive change. Based on this principle, Table 2 outlines suggested approaches to improve care delivery and suggested strategies to achieve such improvements. Importantly, while these suggestions are targeted at the whole health sector, clinicians and peak bodies are well placed to champion improvements and drive best practice.

The suggestions are considered across four key domains:

1. Building people's capacity to more effectively participate in care
2. Models of Health Service Delivery
3. Information and communication technologies
4. Health policy and planning.

Improvements to care delivery for Victorians living with OA require active participation and leadership from across the health sector.

Table 2 Summary of enablers and suggested implementation strategies

Domain	Enablers to improve OA care delivery	Suggested implementation strategies
Building peoples' capacity to more effectively participate in care	<p>Community health education</p> <p>This may include:</p> <ul style="list-style-type: none"> • Community health campaigns targeted towards the general community about the impact of musculoskeletal health conditions, particularly OA. • Key messages would include: <ul style="list-style-type: none"> — obesity as a risk factor for OA — OA is not just a disease of ageing and the impact of OA on younger people is significant — persistent musculoskeletal pain can be effectively managed — effective and ineffective management options. 	<p>This may include:</p> <ul style="list-style-type: none"> • Community education about OA and core management principles that are evidence-based. • Promotion of community services that provide OA management information.
	<p>Delivery of accurate information to people in multiple formats and in culturally-sensitive modes</p> <p>This may include:</p> <ul style="list-style-type: none"> • Resources in different languages, formats and in culturally-sensitive modes. The essential components of education are summarised in the education component of the MoC (Component 1). • Access to contemporary information in multiple formats (hard copy, digital, different languages) by multidisciplinary primary care providers, in order to provide education about OA disease, effective and ineffective management options, particularly management strategies for persistent pain. • Comprehensive OA education provided to consumers by allied health practitioners and primary health care nurses to complement GP-delivered care and education. • Education to form part of all episodes and packages of care. • Peer-support programs, either online or face-to-face. • Support or resources for consumers to actively engage in shared-decision making during consultations. <p>Availability of local services to support effective self-management</p> <p>This may include:</p> <ul style="list-style-type: none"> • Access to community-based facilities to undertake exercise with consideration to subsidies for transport and access to facilities. 	<p>This may include:</p> <ul style="list-style-type: none"> • A central repository of contemporary, evidence-based and consumer-focused OA resources, including a service directory of local resources that is promoted to clinicians and consumers.

Domain	Enablers to improve OA care delivery	Suggested implementation strategies
Models of Health Service Delivery	<p>Funding models</p> <p>This may include:</p> <ul style="list-style-type: none"> • Funding models (public and private) 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 with a minimal administrative burden. For example, increasing access to the Medicare Team Care Arrangement scheme. • Supporting people to access effective self-management strategies (e.g. land exercise, water exercise, development of pain coping skills, weight loss services) within funding models. Importantly, flexibility in funding models and service delivery models is needed to align to diversity in peoples' needs, preferences and places of residence. 	<p>This may include:</p> <ul style="list-style-type: none"> • Reforms to the Medicare Chronic Disease Management and Team Care Arrangement schemes to focus on outcomes rather than episodes of care. • Monitoring the outcomes of the proposed Healthier Medicare package through implementation of Health Care Homes, as it relates to OA care outcomes. • Expanding funding for telehealth services and training to include allied health providers in public and private settings. In particular, revision of Medicare item numbers for allied health services to accommodate telehealth consultations. • More than five allied health consultations per annum under the Medicare Team Care Arrangement scheme being made available, inclusive of a higher funding amount for initial/extended consultations. A cap of 5 consultations per annum across all allied health providers is inadequate for quality management of OA.
	<p>Maximising workforce resources and efficiencies</p> <p>This may include:</p> <ul style="list-style-type: none"> • Advanced practice roles for OA care for allied health and nursing staff in community-based settings in the public and private systems. These roles should include assessment, triage and coordination of care for people with OA. • Expanding advanced scope roles/musculoskeletal care coordinator roles for allied health staff in tertiary hospitals as part of Osteoarthritis Hip and Knee Service (OAHKS) clinics for assessment, triage and coordination of care for people with OA. • Early OA care provided in partnership between GPs, nurse educators and allied health providers to ensure appropriate early intervention is initiated. • Investment in telehealth infrastructure and training as a priority, for all health practitioners. 	<p>This may include:</p> <ul style="list-style-type: none"> • Developing 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 example¹⁵². • Development and implementation of a telehealth training program for clinicians.

Domain	Enablers to improve OA care delivery	Suggested implementation strategies
	<p><i>Building workforce capacity in OA care</i></p> <p>This may include:</p> <ul style="list-style-type: none"> Ensuring trainee clinicians are appropriately skilled in best-practice, person-centred chronic disease management and behaviour change support, inclusive of shared 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. Ensuring regular professional development for primary care providers around best-practice management of OA with a focus on contemporary pain biology, pain management/coping strategies and behaviour change/health coaching. A workforce culture shift in OA management, where more emphasis is placed on effective non-pharmacological and non-surgical management within a socio-psychobiomedical MoC that supports behaviour change, an understanding of contemporary pain biology and interprofessional care. Upskilling 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-pharmacological and non-surgical care options. 	<p>This may include:</p> <ul style="list-style-type: none"> Incentivise participation by trainee and practicing primary care clinicians in accredited and flexible education about optimal OA care, particularly as it relates to arthroscopy and imaging for knee OA and core components of care that emphasise non-pharmacological and non-surgical OA care. Upskilling the workforce in presenting unbiased and accurate information to facilitate informed decision-making by patients, including benefits and harms of diagnostic and therapeutic options. Specifically, development of decision aids/frameworks for arthroscopy and imaging for clinicians and consumers. Upskilling all primary care providers (especially primary health care nurses and GPs), trainee specialists and Independent Medical Examiners in effective non-pharmacological and non-surgical care options for OA, including the role of allied health. Flexible delivery of education is important, using strategies like e-learning resources and training opportunities within the public health system. Upskilling the workforce in relation to psychological screening and effective pain management options.

Domain	Enablers to improve OA care delivery	Suggested implementation strategies
	<p>Deliver care locally</p> <p>This may include:</p> <ul style="list-style-type: none"> • Providing OA care locally in community-based settings by multidisciplinary providers, led by a GP or allied health provider with early OA care focused on evidence-based, core treatments. Development and implementation of OA programs, akin to the NSW Osteoarthritis Chronic Care Program (OACCP)²⁸ or the Victorian Osteoarthritis Hip and Knee Service (OAHKS), could be undertaken in community-based facilities in Victoria. • Tertiary hospital-based care only to be delivered when clinically indicated or when adequate primary care services are not accessible. • Routine TJR provided to patients in hospitals close to their home, where appropriate, within timeframes consistent with current Victorian policy on urgency categorisation. For most patients who are appropriately selected for TJR surgery, a Category 2 classification would be expected. • Development of a state-wide post-operative care pathway for routine TJR for Victoria to ensure adequate access to rehabilitation services, particularly for patients who are discharged home. • <i>HealthPathways, Map of Medicine</i> and other electronic care and referral pathways for OA to promote local, interprofessional care that is coordinated by the GP. • Providing community-based programs for OA education and peer support. • Ensuring availability of multidisciplinary-led, group-based education programs that focus on exercise, weight loss, mental health and pain coping skills. In particular, these should be made available during business and after hours to cater for people with OA in the workforce. • Establishing community-based centres of excellence for musculoskeletal health 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 would 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. • Multidisciplinary outreach services to rural areas, inclusive of physicians (e.g. rheumatology, sport and exercise medicine physicians), orthopaedic surgeons and allied health professionals as a minimum core team 	<p>This may include:</p> <ul style="list-style-type: none"> • Expanding OAHKS services to community-based settings with appropriate operational modifications to suit the local context. Any expansion of the OAHKS model into community settings should be coupled with local stakeholder consultation to ensure the model of service delivery meets the local operational requirements. In this context, an expansion or transition strategy would be important develop. • Consulting with, and supporting, Primary Health Care Networks to develop strategies and pathways for community-based service delivery for people with OA. Identifying appropriate patient flow in rural settings as a priority. • Establishing 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 persistent pain. These facilities would provide upskilling opportunities for general practitioners. Where feasible, these centres would link with subacute care funding initiatives. • Ensuring personnel in appointed facility or area-wide musculoskeletal clinical coordination roles (e.g. through OAHKS sites, community musculoskeletal centres) have the opportunity to meet biannually for peer support and service standardisation. • Establishing public and private advanced practice physiotherapy roles in community centres, initially for surgical triage and post-arthroplasty review. • Subsidising patient transport to facilitate access to community-based conservative management services (e.g. exercise facilities including gyms and hydrotherapy centres). • Developing and maintaining a database of public and private facilities for pain management in Victoria, and link with Network Pain Management Providers enrolled with WorkSafe Victoria and providers listed with the Australian Pain Society. • Developing and implementing <i>HealthPathways</i> or <i>Map of Medicine</i> (or similar) for OA care in primary care settings as a state-wide initiative. • Reviewing post-operative care pathways and strategies used across private and public hospitals in Victoria, including Accelerated Rehabilitation After Surgery (ARAS) pathways, in order to develop recommendations around appropriate care pathways and bundles of care required for patients undergoing TJR surgery.

Domain	Enablers to improve OA care delivery	Suggested implementation strategies
	<p>Surgical referrals management in public hospitals</p> <p>This may include:</p> <ul style="list-style-type: none"> Establishing a process of triaging referrals in a timely manner in order to streamline the patient flow and access into specialist clinics. Ensuring that people on the surgical waitlist have access to OA education and non-surgical care options, as well as information about the surgical procedure and post-operative expectations and rehabilitation. Ensuring that the clinical status of people on the surgical waitlist is monitored and that rapid access to surgery can be provided when needed. Ensuring that TJR surgery is provided, to those who need it, within timeframes consistent with current Victorian policy on urgency categorisation. For most patients who are appropriately selected for TJR surgery, a Category 2 classification would be expected. 	<p>This may include:</p> <ul style="list-style-type: none"> Incorporating the WA Elective Joint Replacement Surgery Model of Care pathway (referral processing) into the Victorian Healthcare system and incorporate a pathway to link with existing and planned OAHKS services in Victoria.
Information and communication technologies	<p>Capacity to monitor OA outcomes</p> <p>This may include:</p> <ul style="list-style-type: none"> Supporting innovative, ICT-enabled strategies to make assessment and data collection in Victoria simple for clinicians. 	<p>This may include:</p> <ul style="list-style-type: none"> Developing a Victoria-wide app that can be used to measure key health outcomes relevant to OA (Table 1)

Domain	Enablers to improve OA care delivery	Suggested implementation strategies
	<p><i>Innovation in service delivery models</i></p> <p>This may include:</p> <ul style="list-style-type: none"> • Expanding telehealth services 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^{153,154}. • Promoting web-based and smartphone app tools that deliver accurate health information about OA and support behaviour change to consumers and care providers¹⁵⁵. • Care delivery, particularly in primary care, to be supported with telephone support (medical, nursing, allied health and peer) and access to web-based consultation tools (e.g. telehealth facilities, Skype). • Supporting development and dissemination of Australian internet-supported or phone-supported care delivery platforms (e.g. painHEALTH; MyJointPain; Healthy Weight for Life; NSW Pain Management Network Resources). <p>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.</p>	<p>This may include:</p> <ul style="list-style-type: none"> • Deploying 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 Service¹⁵⁶. • Providing clinician training in use of telehealth and internet-supported service delivery models. • Developing 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 • Establishing a Victorian musculoskeletal or OA online hub that acts as a central repository of existing information and tools for clinicians and consumers, integrating existing resources and supported with peer stories to engage consumers and support behaviour change. Importantly, the hub should not duplicate existing, high-quality resources that already exist, but rather act as a clearing house or portal to direct users to effective resources such as MyJointPain, painHEALTH and others.
	<p><i>ICT to support shared-care</i></p> <p>This may include:</p> <ul style="list-style-type: none"> • Establishing shared e-health records that enable shared-care between providers and across public and private systems should be prioritised. 	<p>This may include:</p> <ul style="list-style-type: none"> • Developing 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).

Domain	Enablers to improve OA care delivery	Suggested implementation strategies
Health policy and planning	<p><i>Integration of the MoC with State health policies and funding agreements</i></p> <p>This may include:</p> <ul style="list-style-type: none"> • Considering the MoC during development of new health policies and funding agreements with health services and other providers. In particular, alignment with policies and priorities for health of Victorians in rural and remote sectors is important. • Communicating the burden of disease of OA widely through integration with other chronic health condition policies and strategies relevant to Victoria, and nationally. 	<p>This may include:</p> <ul style="list-style-type: none"> • Establishing and supporting an implementation steering group for the MoC. • Sharing and promoting the MoC across Australian jurisdictions. • Promoting the MoC in Victorian health services and policy units across the Department of Health and Human Services.

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 health, social care and education sectors, should support the dissemination and implementation of this MoC across Victoria.

Priority areas for action

The following implementation and evaluation priorities and strategies have been identified by the Victorian Musculoskeletal Clinical 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, peak bodies 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; PainAustralia; 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 osteoarthritis care

- 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 coordinator 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 timeframes consistent with current Victorian policy on urgency categorisation. For most patients who are appropriately selected for TJR surgery, a Category 2 classification would be expected.

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, which may include home-based therapy.
- Advocate for OA care to be funded appropriately through current funding reforms and reviews being undertaken by the Commonwealth Government, such as the development of a National Arthritis Action Plan.

Workforce capacity building in osteoarthritis care

- Support OA-focused 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 pharmacological 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 based on expansion of the existing advanced scope musculoskeletal physiotherapy framework¹⁵².

Information and communication technologies

- Provide telehealth and tele-rehabilitation education to clinicians of all disciplines in private and public sectors, consistent with the policies of the Department of Health and Human Service and other suitable implementation frameworks^{157,158}.
- Support implementation of Healthdirect telehealth systems across Victorian healthcare setting and ensure OA services are included within scope.

Health policy and governance

- Task the Musculoskeletal Clinical Leadership Group and support other advisory groups to advocate that all new Government policies relating to health service delivery explicitly consider OA care and implementation opportunities of this MoC.

Evaluation priorities

Research and evaluation

- Support financially and in-kind research projects that seek to evaluate implementation of components of the MoC; e.g. NHMRC Partnership Projects and Better Care Victoria strategic projects.
- Monitor and report on the rollout and evaluation of the Healthier Medicare initiative.
- Align research priorities with the Commonwealth Government's [Medical Research Future Fund](#).
- 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.
- Determine an appropriate model of service delivery for shoulder OA given the rapidly increasing rate of joint replacement surgery being performed at the shoulder.
- Appropriate outcome measures for evaluation initiatives include:
 - Outcomes related to TJR surgery, particularly patient satisfaction outcomes
 - 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 Care². The implementation plan should be reported on and reviewed annually. Importantly, an implementation plan will need continued consultation with local health services particularly around resourcing capabilities.

Part 4: Background

What is osteoarthritis?

OA 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 OA is a non-inflammatory condition and highlights the important role of inflammatory processes⁸⁷. OA is now considered a complex condition that is influenced by an interaction between genetic, biomechanical, metabolic and biochemical responses. The risk factors for OA include age, obesity, joint injury and some occupational factors (e.g. bending and squatting)^{41,159}.

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

Burden of disease

While OA is less commonly associated with mortality compared to other chronic conditions like cancer, diabetes, heart disease and lung disease; the impact of OA on physical and mental wellbeing, quality of life and economic prosperity of the individual and society are enormous^{21,25,160}. 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 over¹⁷. The prevalence of OA is relatively higher in Indigenous populations and in people living in regional areas²¹. 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)^{10,17}, resulting in early retirement from the workforce and reduced accumulated wealth¹⁶¹ and an increased risk of falling into poverty¹⁶². The impact of OA on the productivity of the Australian workforce is also profound, and second to back problems, exceeding all other chronic health conditions¹⁶³. 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^{164,165}. For these reasons, OA 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 globally²⁵.

Current projections suggest that the prevalence of OA 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 population¹⁷. Importantly, the downstream economic, productivity, health service and population wellbeing consequences of a surge in OA prevalence of this magnitude will be immense¹¹. For example, OA is among the most commonly managed conditions in general practice¹⁶⁶ while data from the 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 2013–14¹⁶⁷. Between 1994–95 and 2013–14 Victoria had a 175% increase in primary total hip replacements and 285% increase in primary total knee joint replacements¹⁶⁷. In 2014 988,667 primary and revision hip and knee replacements were reported to the registry reflecting an increase of 97,460 procedures from 2013¹⁶⁸. 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 expenditure¹⁶⁹.

One of the most significant issues associated with effective management of OA is co-morbidity. Data suggest that three out of four Australians with arthritis also have another co-morbid condition, most often cardiovascular disease, back problems and mental health conditions⁴⁷. Obesity in people with OA is also more prevalent than those without OA⁴⁷, including obesity prevalence after total joint replacement^{117,170}. Co-morbid musculoskeletal pain is also common in people with knee OA¹⁷¹.

Evidence-practice gaps in osteoarthritis management

Despite consistent evidence for ‘what works’ to manage hip and knee OA, including Australian guidelines⁹², there remains inconsistency in the approach to care that includes pharmacological management, non-pharmacological management, and surgical/interventional management^{25,29-34}. A notable contemporary example is knee arthroscopy¹⁷², 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 OA¹⁷³. 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 benefit¹⁴⁵.

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 OA⁵⁷. 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 care⁶². Enablers to accessing care included having private health insurance, proximity to hospitals, and care coordination by health professionals⁶².

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 jurisdiction¹⁷⁴.

How should osteoarthritis 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^{46,56,175}. Components of care include non-pharmacological and non-surgical care, pharmacological 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^{175,176}, consistent with Wagner’s Chronic Care Model¹⁷⁷ and NICE guidelines for the management of OA in adults⁴⁵ (Figure 3).

A recent publication summarises the current international Models of Care for OA⁵⁰.

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 MoC 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 socioeconomic 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 several relevant health topic hubs, including "Bones, muscles and joints" and "Pain".
- [Community Health Integrated Program \(CHIP\) 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 to 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 Program Guidelines](#): The Health Independence Program (HIP) guidelines reflect the vision of HIP, which is to improve and maintain a person's optimal independence within the community. These guidelines outline the minimum requirements for Victorian health services in developing a person-centred service model that promotes efficiency and effectiveness across the continuum of care for people with chronic and complex care needs.
- [Specialist Clinics in Victorian Public Hospitals](#): *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 OA care is implicit in these initiatives, there is currently no system-wide policy or strategic framework for the management of OA. In view of the well-established burden of disease associated with OA²⁵, 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 MoC for Osteoarthritis through the Victorian Musculoskeletal Clinical Leadership Group. Western Australia and New South Wales have developed MoC's for OA as platforms to improve organisation and delivery of OA care to consumers in those states^{27,28}, with formative evaluation data pointing to improved system efficiencies and care for consumers with OA^{178,179}. The scope and intent of the present Victorian MoC 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. The *National Strategic Framework for Chronic Conditions* supersedes the National Chronic Disease Strategy (2005) and provides a national approach to guide planning, design and delivery of policies, strategies, actions and services to reduce the impact of chronic conditions in Australia.
- A 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.

Resource 1

Standards of Care for osteoarthritis: consumer-version

A consumer-version of the eumusc.net Standards of Care for OA⁴⁰ 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 a dietitian, exercise physiologist, general practitioner, nurse, occupational therapist, physiotherapist, psychologist, rheumatologist or 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?

Resource 2

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.

Assessment domains	Minimum assessment tools	Assessment tools for more detailed measurement	Access
Hip/knee joint function	Are you limited in any of your usual activities because of joint symptoms: yes/no ^c OR To what extent are you limited in any of your usual activities because of 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/ 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} Hip injury and Osteoarthritis Outcome Score – Pain subscale (short form) – HOOS-PainS ^{a,b}	http://www.koos.nu/ 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 of 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/

Assessment domains	Minimum assessment tools	Assessment tools for more detailed measurement	Access
Work status	<p>Select one nominal response option:^a</p> <ul style="list-style-type: none"> ● 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 (and type of work) ● Seeking employment (I consider myself able to work but cannot find a job) ● Working part-time (and type of work) ● Working full-time (and type of work) 		
Sleep	To what extent is your sleep affected by your OA? (11-point NRS) ^d	Patient Reported Outcomes Measurement System (PROMIS) – Sleep Disturbance Short Form ^b	http://www.nihpromis.org/Measures/domainframe/work1.aspx#sd
Fatigue	Stanford Numeric Rating Scale Fatigue ^b	Patient Reported Outcomes Measurement System (PROMIS) – Fatigue Short Form ^d	http://patienteducation.stanford.edu/research/vnsfatigue.pdf https://www.assessmentcenter.net/PromisForms.aspx
Mental health	Kessler-10 (K-10) Anxiety and Depression Checklist ^d	Depression, Anxiety and Stress Scale – 21 item (DASS-21) ^d	https://www.beyondblue.org.au/the-facts/anxiety-and-depression-checklist-k10 http://www2.psy.unsw.edu.au/dass/
Anthropometrics	Body weight (kg) and body mass index (kg/m ²)		

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

Resource 3

National web-based services available to support osteoarthritis care

Resource	Program components	Audience	Contact/access
Arthritis Australia 	<p>Printed education material on specific types of arthritis and their management including complementary treatments. Materials are available in multiple languages</p> <p>Information on current clinic trials in OA</p>	<p>Health professionals Person with OA</p>	<p>http://www.arthritisaustralia.com.au/</p> <p>Information sheets in different languages</p>
Better Health Channel: Department of Health and Human services (Victoria) 	Consumer-focused information about healthy living and specific conditions, including OA	Person with OA	https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/osteoarthritis
MOVE muscle, bone & joint health (formerly known as Arthritis & Osteoporosis Victoria) 	<p>MOVE is a national consumer organisation supporting people with musculoskeletal conditions such as OA. MOVE provides:</p> <p>Webinars for consumers and health professionals</p> <p>Printed and web-based information on OA</p> <p>Telephone Help Line for consumers and health professionals</p>	<p>Health professionals Person with OA</p>	<p>https://www.move.org.au/ Help Line on 1800 263 265 or email helpline@move.org.au</p>

Resource	Program components	Audience	Contact/access
My Joint Pain  MyJointPain .org.au	Online self-management support program for people with OA. Includes: <ul style="list-style-type: none">• Personalised action plan• Continued monitoring and lifestyle improvement plan• Short education videos on OA by multidiscipline professionals	Person with OA Health professionals	https://www.myjointpain.org.au/
National Prescribing Service  NPS MEDICINEWISE	NPS MedicineWise is an independent, not-for-profit and evidence-based organisation that works to improve the way health technologies, medicines and medical tests are prescribed and used. For OA care, it describes best practice medicine use.	Health professionals Person with OA	www.nps.org.au
painHEALTH painHEALTH	painHEALTH helps consumers with musculoskeletal pain access reliable, evidence-based information and tips to assist in the co-management of musculoskeletal pain. It contains specific information about OA care and practical strategies to manage pain associated with OA. painHEALTH is a Government of Western Australia, Department of Health initiative.	Health professionals Person with OA	http://painhealth.csse.uwa.edu.au/
Therapeutic Guidelines: Rheumatology 	eTG complete is recognised as a leading source of accurate, independent and practical treatment advice for a wide range of clinical conditions. It includes explicit instructions for therapy, assisting practitioners in making decisions to ensure their patients receive optimum treatment. Available in textbook, electronic or smart phone app	Health professionals	https://www.tg.org.au/

Resource 4

Practical summary for clinicians

The key principles of osteoarthritis management

Shared decision-making and communication between healthcare providers and patients and their family/partner 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 if appropriate, education to support effective self-care, and pain management. A stepped approach should be used to deliver other treatments outside this ‘core set’ (Figure 1).

A multidisciplinary team of skilled health professionals should deliver care for people with OA (when required), where treatment plans are shared and coordinated between providers.

Care should be provided within a whole-person, socio-psycho-biomedical 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 conditions and other co-morbidities.

Diagnosis recommendations

OA can be diagnosed clinically by a qualified health professional without the need for imaging. Plain X-rays are only indicated if differential diagnosis is required or in the planning of interventions such as surgery.

- ***Magnetic resonance imaging (MRI) is not necessary for diagnosing OA. MRI should only be considered where a differential diagnosis is required for atypical pathologies.***

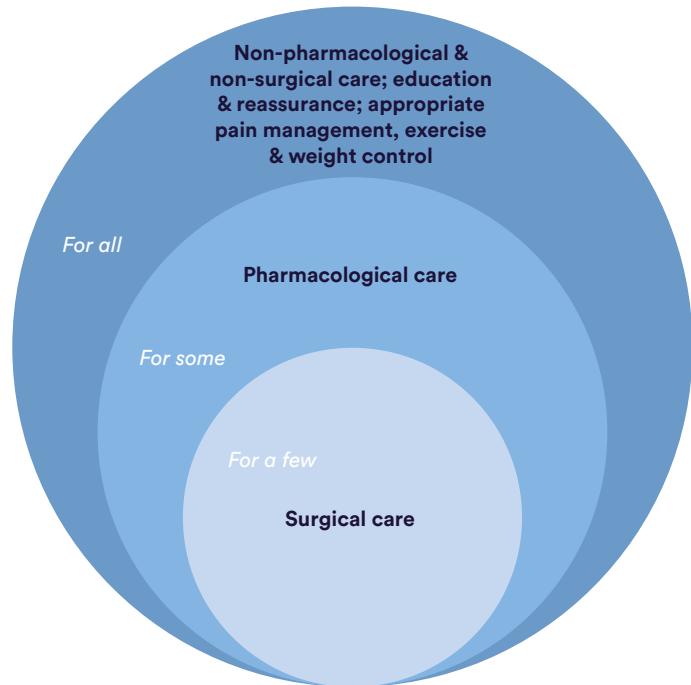
Assessment recommendations

- Should be holistic, considering social factors and social supports, beliefs, concerns and knowledge about pain and OA. Assessment should be undertaken at least annually.
- Co-morbidities such as hypertension, obesity, depression, cardiovascular disease, renal disease, and gastrointestinal disease should be assessed to identify any relevant contraindications or precautions to treatments.
- A functional outcome measure such as the 30-second chair test should be included
- Body mass index (BMI) should be measured.
- Refer to Resource 2 in the MoC for appropriate patient-reported outcome measures

Components of care

Clinical guidelines support a stepped approach to care, where core interventions should be offered to everyone, irrespective of the stage of the disease (Figure).

- All people should have access to information about OA, pain management and effective management strategies.
- Using a behaviour change coaching approach, people should be encouraged to adopt a healthy lifestyle (physical activity, smoking cessation, alcohol restriction, good nutrition, sleep hygiene).
- All people with OA should be encouraged to increase or at least maintain general physical activity levels and reduce sedentary activity time.
- People who are overweight or obese should be strongly encouraged and supported to lose weight. Referral to a dietitian for dietary management and support is indicated for most adults where $BMI > 27 \text{ kg/m}^2$.
- Exercise is indicated at all stages of OA and started as early as possible. It must be matched to the preferences of the individual and consider their functional impairments and goals. 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.
- Management of persistent pain in OA requires strategies that address the likely multiple contributors to the pain experience. This may include psychological therapies, physical therapies and pharmacological therapies delivered in a coordinated manner.
- Pharmacological management must be integrated with other non-pharmacological therapies. The choice of pharmacological therapy should balance the effectiveness of pain and inflammation control with risk profiles of the agent(s) selected. A range of agents is recommended for OA care, including: non-steroidal anti-inflammatory agents, simple analgesics, and intra-articular agents. Opiate medications are generally not indicated.
- Total joint replacement surgery should only be undertaken when all other appropriate non-operative management strategies have been tried for an adequate period of time and there is a good probability of both surgical success and an improvement in pain and function.



The following criteria are recommended for orthopaedic surgical referral:

1. A poor response to an adequate period of appropriate non-surgical therapy.
 2. Radiographic evidence of advanced disease that correlates to symptoms.
 3. Objective measures of pain and function that indicate significant impact to the person.
 4. The patient is willing to consider major surgery and undergo extensive period of rehabilitation.
- ***Arthroscopic surgery is not effective for the management of patients with symptomatic OA and is not recommended.***
- In the context of complex co-morbidities, inflammatory arthropathy, large joint effusions, or other red flag conditions, specialist medical assessment is recommended.

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